23-24
RESEARCH REPORT

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INTRODUCTION

Beirut Arab University has consistently demonstrated its commitment to research excellence, positioning itself as a leading institution in Lebanon and the region. In the academic year 2023-2024, BAU made significant strides in enhancing its research capabilities and fostering innovation across various disciplines. This year, we have introduced new subthemes within our established research framework, reflecting our responsiveness to emerging trends and advancements in technology. Notably, the integration of artificial intelligence across different research areas has played a crucial role in driving innovative solutions and methodologies, ensuring that BAU remains at the forefront of academic research.

BAU's research achievements during this period are underscored by our Faculty's impressive output, with more than 55% of research papers appearing in highly indexed journals. These contributions have not only elevated BAU's academic profile but also attracted international funding bodies that recognize the quality and impact of our research initiatives. Our collaborations with various funding organizations have facilitated groundbreaking projects that address pressing societal challenges and promote knowledge transfer.

Furthermore, BAU has actively integrated the United Nations Sustainable Development Goals (SDGs) into its research themes and subthemes. This commitment reflects our understanding of the critical role research plays in addressing global challenges and promoting sustainable development. By aligning our research agenda with the SDGs, we aim to contribute to a more just, equitable, and sustainable future for all. To further emphasize this commitment, the corresponding SDG icons are incorporated throughout this research report, visually connecting our research endeavors with the specific global goals they support.

The introduction of new subthemes has allowed for greater exploration of interdisciplinary approaches, particularly in fields influenced by artificial intelligence. This strategic expansion reflects our commitment to staying current with global research trends and enhancing our contributions to fundamental knowledge. By fostering an environment that encourages creativity and collaboration among Faculty members, BAU continues to support innovative ideas that align with our mission to serve the community effectively.

As we document the outcomes of our faculty's research efforts in this annual report for the academic year 2023-2024, we celebrate their dedication and exceptional contributions to advancing knowledge across diverse fields. The achievements highlighted herein not only reflect the depth of expertise within our institution but also reinforce BAU's role as a repository for knowledge, technology, and expertise in Lebanon and beyond.

Prof. Hania Nakkash
Dean of Graduate Studies and Research

BAU RESEARCH THEMES

At Beirut Arab University, we have assigned four thematic research areas that serve as the foundation for our scholarly pursuits, enabling us to address critical questions in the fields of science, technology, engineering, and human and social sciences.

THEME 1: HEALTH AND WELLBEING

THEME 2: SCIENCE AND TECHNOLOGY

THEME 3: SOCIETY, CULTURE AND HUMAN BEHAVIOR

THEME 4: CREATIVE SUSTAINABLE DEVELOPMENT

In selecting these research themes, we conducted a thorough examination of both national and international research strategies, utilized advanced bibliometric tools, and aligned what we can offer with the needs of our community and our passion for innovation.

These four research themes inspire our researchers to explore innovative ideas, challenge prevailing perspectives, engage in inquiry, and generate new knowledge that benefits Lebanon and the global community. Each Faculty at BAU has also identified specific subthemes that reflect unique research directions and interests, as detailed in the tables below. We place significant emphasis on providing our students with ample opportunities to collaborate with our researchers, fostering their development as emerging scholars and guiding them in conducting community-based research.

BAU FACULTY SUBTHEMES

FACULTY	HEALTH AND WELLBEING
Faculty of Human Sciences	- Quality of Life and Lifestyle - Psychopathology and Mental Health - Emotion Regulation and Mental Health
Faculty of Law and Political Science	
Faculty of Business Administration	- Environmental Business and Economics - Sustainable Healthcare & Development - Enhancing Efficiency in the Healthcare Industry
Faculty of Architecture-Design & Built Environment	Quality of Life in the Built Environment
Faculty of Engineering	
Faculty of Science	- Industrial and Medical Microbiology - Human Diseases at the Molecular Level - Toxicology - Bioactivities of Plant Extracts and Phytotherapy
Faculty of Pharmacy	- Drug Discovery - Clinical Pharmacy and Practice - Therapies' Development - Pharmacology - Pharmacovigilance and Drug Safety - Traditional Medicine - Pharmaceutical Education and Training
Faculty of Medicine	- Epidemiology of Communicable and Non-communicable Diseases - Molecular Biology and Therapeutics of Diseases - Women and Health - Medical Education - Preventive Medicine and Health Promotion - Mental Health and Wellbeing - Occupational Health and Wellbeing
Faculty of Dentistry	- Oral Health Related Quality of Life - Esthetics and Oral Rehabilitation - Management of Musculoskeletal Disorders
Faculty of Health Sciences	- Illness and Therapy - Medical Education - Prevention and Health Promotion in Health Sciences - Nursing Education - Psychology in Health Sciences - Cardiology and Cardiac Patients - Health Informatics

FACULTY	SCIENCE AND TECHNOLOGY
Faculty of Human Sciences	Impact of Communication Technology on Social Relationships
Faculty of Law and Political Science	- Digital Currency - E-Procedures - Artificial Intelligence (from a Legal Standpoint) - Technology and Public International Law/ and International Relations/ and a State - Legal Transformation in Light of Global Developments: Digital Forensics - Digital Transformation and Contemporary Criminal Policy
Faculty of Business Administration	Information and Communication Technology in Business
Faculty of Architecture-Design & Built Environment	Digital Technology in Architecture and Design
Faculty of Engineering	-Sustainability in Engineering -Environmental Issues -Green and Bio-Materials -Advanced Technologies and Innovation -Lean Management
Faculty of Science	- Advanced Materials - Mathematical and Computational Science - Nuclear and Radiation Physics - Software and Computing - Environmental Studies - Green Science - Corrosion Control - Cryptography and Blockchain - Network Optimization
Faculty of Pharmacy	- Pharmaceutical Nanotechnology and Drug Delivery Systems - Pharmaceutical Analytical Chemistry - Pharmacogenomics and Personalized Medicine
Faculty of Medicine	- Digital Technology in Healthcare - Artificial Intelligence in Medicine
Faculty of Dentistry	- Laser Application in Dentistry - Towards Digital Dentistry - Regenerative Endodontics - In Vivo Tissue Regeneration
Faculty of Health Sciences	Food Technology & Processing

FACULTY	SOCIETY, CULTURE AND HUMAN BEHAVIOR
Faculty of Human Sciences	- Social Psychology and Interpersonal Processes - History and Heritage - Language and Literature - Information Literacy - Media - Societal Change
Faculty of Law and Political Science	- Contemporary Developments of Public International Law (in Human Rights, Humanitarian, Criminal, Economics, and Monetary) - Contemporary International and National Developments, Crises and Conflicts - Contractual, Non-contractual Relationships and Trans-border Transactions - Dispute Resolution: Judiciary and Alternatives - The Impact of Homosexuality on Society - Sexual Transformation and its Impact on Personal Status - Personal Freedom between Release, Restriction and Public Order - Contemporary Developments in Criminal Law in Light of National and International Developments - Crises and Financial and Economic Problems from a Criminal Standpoint
Faculty of Business Administration	Human Behavior in Organizations
Faculty of Architecture-Design & Built Environment	Theories, History, & Humanities in Architecture
Faculty of Engineering	
Faculty of Science	
Faculty of Pharmacy	
Faculty of Medicine	- Traditional and Alternative Medicine - Health Communication and Health Literacy - Ethical Considerations in Medicine
Faculty of Dentistry	- Preventive and Community Dentistry - Child Management
Faculty of Health Sciences	

FACULTY	CREATIVE SUSTAINABLE DEVELOPMENT
Faculty of Human Sciences	
Faculty of Law and Political Science	
Faculty of Business Administration	Sustainability in Business
Faculty of Architecture-Design & Built Environment	Environmental Studies & Sustainability in Architecture
Faculty of Engineering	
Faculty of Science	
Faculty of Pharmacy	
Faculty of Medicine	Sustainable Medical Technologies
Faculty of Dentistry	- Sustainable Development in Dentistry - Environmental Sustainability
Faculty of Health Sciences	

PUBLICATION STATISTICS

Table 1: Research Output for the Academic Year 2023-2024 Classified According to Type of Publication

FACULTY	Academic Journal Articles	Conference Proceedings	Books/Book Chapters	Total
Human Sciences	2		1	**3**
Law and Political Science	5		1	**6**
Business Administration	25	3	3	**31**
Architecture Design & Built Environment	7	1	1	**9**
Engineering	62	24	5	**91**
Science	106	11	1	**118**
Pharmacy	21			**21**
Medicine	20			**20**
Dentistry	16			**16**
Health Sciences	50			**50**

Table 2: Publications for the Academic Year 2023-2024 Classified According to Journal Ranking and Indexing

FACULTY	Q1	Q2	Q3	Q4	Books/Book Chapters	APJ*/BAU Journal**	Conference Proceedings	Not Indexed	Total
Human Sciences					1			2	**3**
Law and Political Science					1	1	1	3	**6**
Business Administration	2	6	4	3	3	5	3	5	**31**
Architecture Design & Built Environment			1	1	1	3	1	2	**9**
Engineering	21	24	6	1	5	6	24	4	**91**
Science	37	52	6	1	1	4	11	6	**118**
Pharmacy	9	4	3	1		2		2	**21**
Medicine	4	4	10	1		1			**20**
Dentistry		1						15	**16**
Health Sciences	28	10	5			2		5	**50**

The total number of publications is 355, with 10 joint publications among BAU Faculties.

*APJ Architecture & Planning Journal
**BAU Journal-Journal of Legal Studies
BAU Journal-Health & Wellbeing
BAU Journal-Society Culture, & Human Behavior
BAU Journal-Creative Sustainable Development
BAU Journal-Science & Technology

FACULTY INCENTIVES

At Beirut Arab University, we take immense pride in recognizing and rewarding the outstanding contributions of our researchers. To foster academic excellence, we provide incentives to researchers from each Faculty, based on highly indexed publications and specific criteria reflecting the quality and impact of their work.
BAU's commitment to offering these incentives underscores our dedication to promoting a culture of innovation and scholarly achievement. By acknowledging the hard work and dedication of our researchers, we celebrate their successes and inspire the entire academic community to reach for excellence.
Below is a demonstration of the incentives provided to our Faculty members during the academic year 2023-2024.

Incentive Awards' Statistics per Faculty:

Faculty of Engineering

Count of Incentives Awarded for Publications **23**

Incentives Amount **9,800$**

Percentage from Total Incentives Awarded **30%**

- Abdul Rahman El Falou
- Abdallah Ghali
- Ali Haidar
- Amira Zavlaa
- Amr Ibrahim
- Hassan Assoum
- Hassan Ghanem
- Hiba Bazzi
- Imane Haidar
- Jamal Khatib
- Lina Jaber
- Mohamad Dandachy
- Mohamad El Gohary
- Mohammad Dandachy
- Mohammad Noureddine Ali
- Mohammad Tarnini
- Rami Harkous

Faculty of Science

Count of Incentives Awarded for Publications **30**

Incentives Amount **13,800$**

Percentage from Total Incentives Awarded **43%**

- Ghada Khawaja
- Jamila Borjac
- Maher Ineid
- Mahmoud El Korek
- Mahmoud Khalil
- May Itani
- Mohammad Dakdouki
- Safaa Baydoun
- Soha Rawas
- Toufic El Arwadi

Faculty of Pharmacy

Count of Incentives Awarded for Publications **2**

Incentives Amount **800$**

Percentage from Total Incentives Awarded **2%**

- Deema Rahme

Faculty of Medicine

Count of Incentives Awarded for Publications **2**

Incentives Amount **800$**

Percentage from Total Incentives Awarded **2%**

- Amal Naous
- Bilal Azakir

Faculty of Health Sciences

Count of Incentives Awarded for Publications **15**

Incentives Amount **7,100$**

Percentage from Total Incentives Awarded **22%**

- Ahmad El Tassi
- Ahmed El Melhat
- Elie Sokhn
- Fatima Saleh
- Hiba Deek
- Mirna Fawaz
- Nada El Darra
- Rami Abbas
- Sara Khalife
- Sara Mina

Total

Count of Incentives Awarded for Publications

72

Incentives Total

32,300$

RECOGNITION OF ACTIVE RESEARCHERS - FACULTY MORAL INCENTIVES

Moral incentives are awarded to the top researchers from each Faculty based on a well-structured set of criteria. These criteria emphasize the publication of numerous articles in highly indexed journals and the faculty's status in scientific boards, memberships and grants awarded, reflecting the researchers' significant achievements and contributions to their fields. This approach not only recognizes outstanding research but also aligns with BAU's commitment to fostering Sustainable Development Goals (SDGs). By doing so, BAU ensures that the best works are acknowledged and celebrated, promoting a culture of excellence and innovation.
Herein, our Faculty members who were selected to receive moral incentives and the distinction of being the most active researchers in their respective Faculties for the academic year 2023-2024.

Faculty of Human Sciences


Dr. Samir Itani


Dr. Helga Alaaeddine

Faculty of Business Administration


Prof. Hani Chaarani


Dr. Ali Abou Ali

Faculty of Architecture - Design & Built Environment


Dr. Mary Felix


Dr. Khaled El-Daghar

Faculty of Engineering


Prof. Adel El Kordi


Prof. Jamal Khatib


Dr. Hassan Ghanem

Faculty of Science


Prof. Mahmoud Khalil


Dr. Soha Rawas


Dr. Mohamad Dakdouki

Faculty of Pharmacy


Dr. Deema Rahma


Dr. Rania Itani

Faculty of Medicine

Dr. Bilal Azakir

Dr. Amal Naous

Faculty of Dentistry

Prof. Nayer Aboelsaad

Dr. Ahmad Tarabaih

Faculty of Health Sciences

Dr. Elie Sokhn

Prof. Nada El Darra

AWARDS AND MEMBERSHIPS

Faculty members across all Faculties are distinguished by their exceptional achievements and prestigious memberships. Their awards and affiliations underscore the University's commitment to excellence and innovation, aligning with the Sustainable Development Goals (SDGs) and enhancing our global ranking.
The recognition of our faculty through various awards and memberships in esteemed scientific and professional committees highlights BAU's commitment to fostering a thriving research environment. This success is further evidenced by the University's strategic partnerships through Memoranda of Understanding (MOUs) with leading institutions and its strong relationships with national and international funding bodies. These collaborations provide our faculty with invaluable resources and opportunities, enabling them to conduct cutting-edge research, achieve pioneering discoveries, and elevate BAU's international standing.

Name	Short Description
Faculty of Human Sciences	
Prof. Nermin Awny Mohammed	Professor Nermin Awny Mohammed, Head of the Psychology Department at the Faculty of Human Sciences, won first place in the Hamdan-ALECSO award for distinguished educational research in its twenty-sixth session (2023) for her submitted research entitled «The Impact of a Program Based on Principles of Education for Sustainability on Developing Awareness of Climate Change and Values of Environmental Citizenship Among Middle School Students in Informal Settlements.» It is noteworthy that the competition involved seventeen Arab countries and resulted in three winning research papers out of 146 submitted across the Arab world.
Faculty of Law and Political Science	
Dr. Sara Zein	Dr. Sara Zein from the Faculty of Law and Political Science has been selected for membership in the scientific committee of the conference expected to be held in April of next year, entitled «Developing Legal Education in Law Schools at Palestinian Universities: The Legal Clinic as a Model.»
Faculty of Architecture - Design & Built Environment	
Dr. Fatima Belok	Dr. Fatima Belok, Assistant professor at the Faculty of Architecture- Design & Built Environment in Tripoli branch, won the second place in the «International Competition Design of Innovative Furniture03- for Neglected Communities (2023)" that was organized and funded by "Ketham's Atelier Architects" and "Thinking Hand" NGO. Dr.Belok was the only winner from the Arab world to make it to the top 3 ranks.
Prof. Hassan Abdel Salam and Dr.Hiba Mohsen	The Faculty of Architecture - Design & Built Environment at Beirut Arab University has been collaborating since the academic year 2024-2023 with Kassel University in Germany, Alexandria University in Egypt, and Babylon University in Iraq on a three-year project funded by the German Academic Exchange Service (DAAD) program, with a budget of 374,000 Euros. The project, entitled «Urban Acupuncture: A Strategy of Catalytic Interventions,» will be conducted from 2023 to 2025 as part of the DAAD - Ta'ziz Science Cooperations. This project is part of BAU Urban Lab›s initiatives, with Faculty Dean Prof. Hassan Abdel Salam as the project›s Principal Investigator and Dr. Hiba Mohsen as the main coordinator.

Dr. Samer El Sayary	Dr. Samer El Sayary from the Faculty of Architecture- Design & Built Environment was awarded the Grand Prize of the 1st STELSI International Metaverse Architecture Competition. The international design competition organized by STELSI Metaverse Competition to design a metaverse architecture. The competition challenged designers to create 3D models focusing on typologies such as smart buildings, social connectivity, cultural integration, and digital art spaces. Dr. Samer El Sayary from the Faculty of Architecture- Design & Built Environment also received an honorable mention in Non-A international competition for the design of AI museum-Culture Competition Series for the project CLOUDS. This competition invited architects, designers, and dreamers to imagine the future of art as influenced and created by artificial intelligence. Dr. El Sayary also received received an honorable mention in Non-A «Villa on the Moon 2050» competition which challenged architects and designers to envision a residential villa on the moon in 2050.
Dr. Mona Abdelkader Salem	Dr. Mona Abdelkader Salem from the Faculty of Architecture- Design & Built Environment received the "Outstanding Reviewer Award" from a pool of more than 30,000 reviewers who have submitted reports to journals published by IOP. This award acknowledges the high quality, quantity, and timeliness of Dr. Salem's reviews for their Q1 journals. Dr. Salem is also the recipient of the "Trusted Reviewer Award". This prestigious award was in recognition of an exceptionally high level of peer review competency to IOP Publishing journals and the contribution to ensure quality and trust in peer review and critique scientific literature to an excellent standard.

Faculty of Engineering

Dr. Alaa Daher	Dr. Alaa Daher, Assistant Professor in the Department of Electrical and Computer Engineering at the Faculty of Engineering, Beirut Arab University, was appointed at the IEEE EMBS, Worldwide Chapter Development Committee within the Electrical and Electronics Engineers assembly. It is worth mentioning that the committee comprises five people worldwide, including Dr. Alaa Daher who is representing the Arab world and the Middle East.
Dr. Amira Zaylaa	Dr. Amira Zaylaa Assistant Professor in the Biomedical Engineering Program was awarded the «Women Researcher Award» in recognition of her groundbreaking contributions to Scopus-certified research in the field of artificial intelligence and optical medical imaging for the detection of diabetic retinopathy. This distinction was accompanied by a Certificate of Excellence in June and an Award Memento in December 2023, at the 4th International Research Award on Sensing Technology.

Faculty of Science

Dr. Mohammad H. El-Dakdouki	Dr. Mohammad H. El-Dakdouki, Head of the Chemistry Department at the Faculty of Science completed the prestigious Fulbright Visiting Scholar program sponsored by the US Department of State. Dr. El-Dakdouki visited Prof. Xuefei Huang's research group at Michigan State University, USA. Dr. El-Dakdouki's research activities focused on the development novel targeted magnetic nanoparticles as contrast agents for the medical Imaging modality called Magnetic Particle Imaging (MPI) which is currently undergoing extensive preclinical assessment and evaluation worldwide.
Dr. Nawal El Hakawati	Dr. El Hakawati from the Faculty of Scinece was awarded a one-year Visiting Researcher Fellow (Fully Funded) from the Thermochemistry Laboratory at the University of Surrey in England. Dr. El Hakawati is working on electrically gated transistors for metal detections with Dr. Maxim Shkunov from the ATI centre (Electronic Engineering) and Professor Angela F Danil de Namor from the School of Chemistry and Chemical Engineering.

Faculty of Pharmacy

Dr. Rania Itani	Dr. Rania Itani, Clinical Assistant Professor at the Faculty of Pharmacy was appointed as an Editorial Board Member in BMC Health Services Research. This esteemed peer-reviewed open-access journal, known for its excellence, covers a broad range of health services research topics, with a focus on digital health, governance, policy, quality, accessibility, financing, and workforce issues.
Dr. Marwa Al Jamal	Dr. Marwa Al Jamal, Associate Professor at the Faculty of Pharmacy was awarded the Fulbright Scholar Award for University professors for the 2025-2024 academic year. This honor allows her to conduct advanced research in collaboration with the UCSD-Skaggs School of Pharmacy, one of the leading pharmacy schools in the United States. Dr. Al Jamal was selected from a pool of 40 applicants.
Dr. Soumaya Hijazi	Dr. Soumaya Hijazi, Assistant Professor of Microbiology at the Faculty of Pharmacy, and her student's team were awarded second place winner at the WHO EMRO AMR competition organized by the World Health Organization for the first time. Health care students and professionals from different universities among the 22 countries of the Eastern Mediterranean regions have participated to develop short videos and campaigns about appropriate prescribing and dispensing of antibiotics through innovative and creative ways to reduce Antimicrobial Resistance (AMR). The team's campaign was announced and showcased on all WHO EMRO's social media channels and highlighted at the regional press briefing on the occasion of World AMR Awareness Week (WAAW) in November 2024.

Faculty of Dentistry

Dr. Aly Essam Osman	Dr. Aly Osman from the Faculty of Dentistry was awarded international membership in the AAO is a way to help this community grow. In the 2005 Survey of International Member Needs & Satisfaction. Reasons included a desire to actively promote the profession, receive professional support, receive the associated orthodontic publications, and participate in continuing education. The AAO continuing education program also promotes joint meetings with other specialties and sponsors video downloads as well as Internet-based programs for all members. One of the most-appreciated benefits of AAO international membership is the AJO-DO. A full subscription is included in the membership fee, and that includes access to all articles online—now available back to 1923.
Prof. Nadia El Harouni	Prof. Nadia El Harouni from the Faculty of Dentistry was awarded Fellowship of the Pierre Fauchard Academy in January 2024 which is an International Honor Dental Organization with over 6000 professionals from around the world. Selection to fellowship is a tribute to past accomplishments and encouragement to future productivity. The honor of fellowship is conferred on those dentists who have demonstrated that they have 'served' and/or have great potential for service and leadership. Fellowship is extended to fewer than %1 internationally.
Prof. Nayer Abo El Saad	Prof. Nayer Abo El Saad from the Faculty of Dentistry is a member of the Lebanese Society of Periodontology. Prof. Abo El Saad supervised two student groups who were award winners in conferences: a. Hiba Abdelkarim Al Rifai won 1st place in Case Report Poster presentation in the 10th Lebanese International Dental Congress LIDC 2024. b. Dania Radwan El Rostom won 3rd place in case report Poster presentation in the 10th Lebanese International Dental Congress LIDC 2024. c. Dania Radwan El Rostom won 2nd place in case report poster presentation in the Beirut International Dental Meeting BIDM 2023 d. Hanan Rabih Danaf Naim won Best Research Award in the Beirut International Dental Meeting BIDM 2023

Dr. Ahmad Tarabaih	Dr. Ahmad Tarabaih form the Faculty of Dentistry was appointed President- Elect at the Lebanese Society of Pediatric Dentistry and member of the Organization for Caries Research (ORCA).

Faculty of Health Sciences

Dr. Mirna Fawaz	Dr. Mirna Fawaz, Head of the Nursing Department at the Faculty of Health Sciences has been listed in the top %2 ranking of the most influential researchers in the world according to Stanford University ranking. This ranking lists researchers which have generated the most impactful and cited research in the past five years. It includes only 180,000 researchers from around the world out of more than 8,000,000 active researchers in various fields of study.
Dr. Said El Shamieh	Dr. Said El Shamieh, Associate Professor of Human Genetics at the Department of Medical Laboratory Technology was named a strategic partner for the Center for Arab Genomics Studies (CAGS), UAE . The strategic partners are among the most active researchers in human genetics in the Arab World and beyond. They are suggested and endorsed by the Core Committee or the Board of Trustees and collaborate with the Committee to implement the CAGS›s vision.
Dr. Fatima Saleh	Dr. Fatima Saleh, Head of Medical Laboratory Technology Department, has been awarded the Competitive research grant by the University of Sharjah Research Board Led by the principal investigator Dr. Jalal Taneera, associate professor at the College of Medicine, on the research proposal entitled «Development of Three-Dimensional In Vitro Cell Culture Models of INS1- pancreatic β-Cells for pharmaceutical and functional studies.» Dr. Fatima Saleh was also recognized among the world's top %2 of most-cited researchers as published by Stanford University. This achievement is a further testimony to the high standing of Dr. Saleh in the field of biomedical research as well as to the BAU's commitment to world-class research.
Dr. Elie El Sokhn	Dr. Elie El Sokhn, Associate Professor of Clinical Microbiology at the Department of Medical Laboratory Technology was awarded significant research by the Global South Artificial Intelligence for Pandemic and Epidemic Preparedness and Response Network (AI4PEP), under the auspices of York University, CANADA, for the project entitled «Strengthening Lebanon›s pandemic surveillance system through AI-driven automation of laboratory data". Dr. Sokhn is the principal investigator working collaboration with the Lebanese Hospital Geitaoui-UMC and York University-Canada. The project aims at strengthening Lebanon's capacity in pandemic preparedness through leveraging AI driven tools that would be directly connected to laboratory data in order to enable more rapid detection of early trends of high-risk communicable diseases. Dr. Fatima Saleh was also recognized among the world's top %2 of most-cited researchers as published by Stanford University. This achievement is a further testimony to the high standing of Dr. Saleh in the field of biomedical research as well as to the BAU's commitment to world-class research.
Prof. Nada El Darra	Dr. Nada Darra, Head of the Nutrition and Dietetics Department, in collaboration with the Professor of Computer Science at Uni/Hospital Bonn Shadi N AlBarqouni conducted an AI Autumn School, in Bonn Germany from 14 till 18 of December 2023, within the framework of DAAD Ta'ziz Short Measures Grant entitled «Affordable Collaborative Learning for Global Digital Health (EEDA)». The participants engaged in a holistic learning experience, seamlessly blending cutting-edge AI advancements with diverse disciplines. This included lectures, hands-on labs, and a real-world hackathon where students actively collaborated on an interdisciplinary project, estimating polyphenols in Pomegranates collected from different regions in Lebanon. Dr. Nada Darra was also awarded DAAD Ta'ziz Partnership Grant for the project «Affordable collaboratIve learning for global Digital heAlth (EEDA)». This project strengthens the research cooperation between the Faculty of Health Sciences at Beirut Arab University, Lebanon and the University of Bonn, and Helmholtz Munich, Germany.

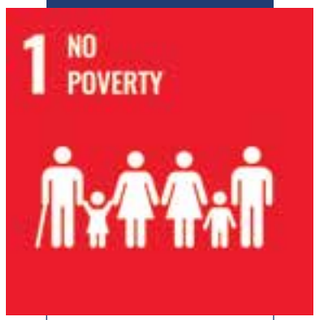
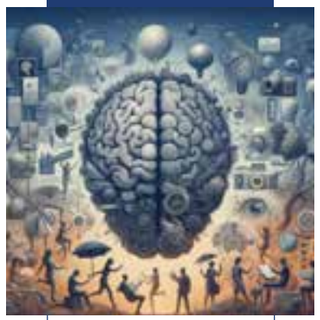
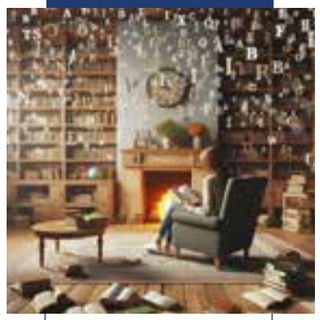
INTRAMURAL GRANTS

Beirut Arab University is committed to fostering a robust research environment, which has led to the provision of significant grants to its faculty members.
This support emphasizes BAU's dedication to advancing knowledge and innovation across various disciplines. Our University actively encourages its researchers to pursue projects that address pressing societal challenges and contribute to the global academic community aligning with the diverse Sustainable Development Goals.

Principal Investigator who Acquired the Intramural Grant	Co-PI	Faculty	Project Title
Dr. Ghada Khawaja	Dr. Bilal Azakir	Science/ Medicine	Therapeutic Potential of Leontopodic acid in Colorectal Cancer Cells lines and its potential for synergy with mainstream chemotherapeutics
Dr. Nawal El Hakawati	Prof. Ghassan Younes	Science	Chromogenic phenols: Probes for Quantitative and Naked Eye Detection of Amine Based Doping Substances
Dr. Said El Shamieh	-	Health Sciences	Uncovering the missing heritability of inherited retinal diseases through whole-exome sequencing and functional characterization

Faculty of

HUMAN SCIENCES

Prevalent SDG	Prevalent Theme	Prevalent Subtheme
		
SDG 1 **100%**	Society, Culture and Human Behavior **67%**	Language and Literature **67%**

23-24

RESEARCH REPORT

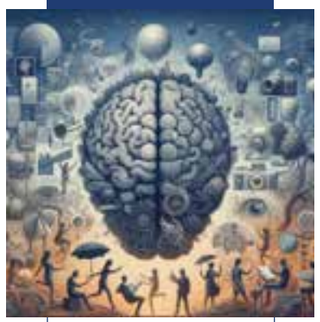
I. ARTICLES

ARTICLE TITLE	الأسطورة مسيرة من العشوائية إلى اللوغوس (مدخل إلى نظرية أدبية)
AUTHORS	**Itani S.**
JOURNAL	مجلة الفنون والأدب وعلوم الإنسانيات والاجتماع
YEAR	2024
PUBLICATION INFO	DOI: 10.33193/JALHSS.111.2024.1193
THEME / SUBTHEME	Society, Culture and Human Behavior/Language and Literature
ABSTRACT	يهدف هذا البحث إلى وضع مدخل لدراسة النظرية الأدبية المؤسسة في النصوص الأسطورية. وهذه النصوص لا تنضبط في وعاء نظرية المحاكاة وهي أقدم نظرية أدبية حاولت تفسير الأدب، وضعها أفلاطون وتلميذه أرسطو. انبثقت النصوص الأسطورية دون أدنى شكّ من نظرة الشعوب إلى الوجود، تلك الشعوب آمنت بنصوصها الأسطورية، واستمدت منها القوة معتقدة أنها تؤثر في الطبيعة، وتعدّلها بما يخدم الجماعة. وهذه النصوص قريبة جدًّا في نظمها من الشعر، إلا أنّها انبثقت كذلك من رؤية للوجود، وهذه الرؤية ليست واحدة طبعًا، إلا أنّها تنبثق من مَعين حلوليّ، وخاطبت القوى الإلهية، وكذلك جماعات المؤمنين، وهدفت إلى تعديل سلوك البشر وتعديل سلوك الطبيعة في آن معًا، وصولاً إلى نوع من التوازن بين الإنسان والطبيعة. ومن الغريب أن الباحثين في مجال نظرية الأدب لم يلتفتوا حتى الآن ـ حسب علم الباحث ـ إلى هذه الظاهرة، وما من محاولة ولو بسيطة لنظم إطار فكري منهجي ينظّر لهذا النتاج الأدبي انطلاقًا من أساليب عيش الناس في تلك الفترة، وطريقة فهمهم للوجود. لذا، يهتم هذا البحث في بلورة مدخل إلى نظرية أدبية تُعنى بالنصوص الأسطورية، وتبحث في نشأتها، وطبيعتها، ووظيفتها، وهذا ما تهتم به النظرية الأدبية. وقد خلص البحث إلى نتائج مفادها أن النصوص الأسطورية نصوص أدبية صاغها على مرّ العصور رجال دين قاموا على الديانات الأسطورية، وجرى تسليم هذه النصوص من جيل إلى جيل، ولكن مع مرور الزمن طوروها وعدلوا من منطلقاتها مع تطور الديانات نفسها، فما من مؤلف واحد معروف تُنسب إليه هذه النصوص. ومن ناحية أخرى فإنّ الجماعة شكّلت شريكًا في التأليف من خلال التوجهات الفكرية السائدة في المجتمع، كما شكّلت المتلقي بالتشارك مع الآلهة. أمّا الفلسفة السائدة في هذه المجتمعات فيمكن تسميتها بفلسفة العشوائية مع السعي إلى صوغ اللوغوس.

ARTICLE TITLE	الصراع الحضاري في شعر بدر شاكر السياب
AUTHORS	**Itani S.**
JOURNAL	المجلة الدولية لدراسات اللغة العربية وآدابها
YEAR	2023
PUBLICATION INFO	5(1):55-56
THEME / SUBTHEME	Society, Culture and Human Behavior/Language and Literature
ABSTRACT	انطلاقًا من رؤيتنا بوجود حضارتين فقط: حضارة التوحيد المعتمدة على الفكر التنزيهيّ، وحضارة ماديّة تنطلق من الوجود المادي للإنسان والموجودات في تفسيرها للوجود، فإنّ الصراع، إنّما يكون أساسًا بين هاتين الحضارتين. أمّا على الصعيد النفسي الداخلي للفرد فإنّ الانتماء إلى حضارة ما يُعدّ إشكاليّة، لأنّ الحضارة لمّا تصل إلى خواتيمها التي ترجوها انطلاقًا من رؤيتها وأهدافها بعد، فرسمت مشروعًا حضاريًّا. ولذلك، لا بدّ للإنسان من التأرجح بين الحضارتين، وتصبح الحضارتان، بناء على ذلك، متمثّلتين جدليًّا في وجدان الإنسان. وقد جرى تطبيق هذه الفكرة على مختارات من شعر بدر شاكر السيّاب (ت ١٩٦٤) للوقوف على الصراع الحضاري عنده.

Faculty of

LAW & POLITICAL SCIENCE

Prevalent SDG	Prevalent Theme	Prevalent Subtheme
		
SDG 1 **50%**	Society, Culture and Human Behavior **100%**	Contractual, Non-contractual Relationships and Trans-border Transactions **50%**

23-24

RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**Enforceability of the Emergency Arbitrator Decisions**
AUTHORS	**El Zein T., Chbaro M**
JOURNAL	**BAU Journal - Journal of Legal Studies**
YEAR	2023
PUBLICATION INFO	DOI: 10.54729/2958-4884.1126
THEME / SUBTHEME	Society, Culture and Human Behavior/ Dispute Resolution: Judiciary and Alternatives
ABSTRACT	This document aims to examine the enforceability of decisions made by emergency arbitrators in international arbitration. It will analyze the challenges and potential solutions within the current legal framework, including the nature of emergency arbitrator decisions and the mandatory and public order regulations in each jurisdiction. The study will assess the different approaches taken by various jurisdictions and arbitral bodies, as well as the role of national courts in enforcing or annulling emergency arbitrator rulings. Additionally, the analysis will consider the impact of these developments on the efficiency and effectiveness of the arbitration process. By thoroughly exploring these issues, this document seeks to improve understanding of the enforceability of emergency arbitrator decisions and provide valuable insights for practitioners, arbitrators, and policymakers in the field of arbitration law.

ARTICLE TITLE	**La Fusion des Sociétés en Droit Libanais**
AUTHORS	**El Zein T.**
JOURNAL	**Horizons du Droit**
YEAR	2024
PUBLICATION INFO	53(2024): 6-46
THEME / SUBTHEME	Society, Culture and Human Behavior/ Contractual, Non-contractual Relationships and Trans-border Transactions
ABSTRACT	Le législateur libanais, conformément à la loi n° 126 du 29 mars 2019, a modifié les dispositions légales régissant la fusion et la scission des sociétés. Cette mise à jour a entraîné la suppression des Articles 210 à 213 du Code de commerce et l›introduction d›un neuvième Chapitre, conformément à l›article 118 de la loi n° 126/2019 du 27 novembre 2019. 2. Il est indéniable que cette réforme législative, en particulier en ce qui concerne les fusions de sociétés, répond à une nécessité d'ordre économique. Le législateur a pris la bonne décision d›inclure ces dispositions dans le cadre du droit commercial actuel. Cependant, il est à noter que cette modification est intervenue relativement tard par rapport à d›autres pays arabes ou étrangers, qui avaient déjà promulgué des lois similaires. Par exemple, en 2011, la République arabe syrienne a approuvé un amendement de son droit commercial, intégrant des dispositions spécifiques pour la fusion de sociétés , suivi d›un droit dédié spécifiquement aux fusions de sociétés publiques par actions . En Égypte, la question de la fusion des sociétés a été traitée par le législateur en vertu de la loi 159/1981 , et de ses règlements d›application. Le Qatar a également mis en place une législation concernant les fusions des sociétés , tout comme le Royaume d›Arabie saoudite . 3. En ce qui concerne les pays occidentaux, les fusions de sociétés en France sont régies par plusieurs textes législatifs, le plus récent étant stipulé aux articles L. 236-1 et suivants du Code de commerce, modifié par le décret-loi n° 393 du 24 mai 2023 . La question des fusions de sociétés a également gagné en importance au sein de l›Union européenne, notamment pour les fusions transfrontalières dans l›Espace économique européen. Le législateur européen a édicté plusieurs directives à cet égard, la plus récente étant la directive de 2019. Par conséquent, l›expérience du droit libanais dans ce domaine est considérée comme moderne par rapport à celle d›autres pays, notamment arabes. En se basant sur ce qui précède, une évaluation de cette expérience nécessite tout d›abord un examen des textes relatifs à la fusion des sociétés (Titre II), après avoir abordé la question de leur intégration avec d›autres lois au Liban (Titre I). Le législateur libanais a-t-il réussi à répondre aux impératifs économiques par la modification des dispositions régissant la fusion des sociétés ?

ARTICLE TITLE	**Legal Drafting in Light of the Social Contract's Requirement**
AUTHORS	**Jaber L., El Zein T.**
JOURNAL	**BAU Journal - Journal of Legal Studies**
YEAR	2023
PUBLICATION INFO	DOI: 10.54729/2958-4884.1126
THEME / SUBTHEME	Society, Culture and Human Behavior/Contractual, Non-contractual Relationships and Trans-border Transactions
ABSTRACT	Legislation poses a challenge for every country, requiring a balance between societal needs for legislation and the achievement of desired objectives. The formulation of legislation is crucial where it exists. While theorists of the social contract disagreed about its concept (the social contract), they agreed that its purpose is to serve the public interest, which can only be achieved after the state concedes – at least in part – of some private interests. As long as the social contract aims to advance the public interest and the law is supposed to express that objective, according to the above, legislative drafting must be a means to controlling social reality. This reality is subject to constant rapid development, highlighting the need for legislative drafting as a factor devoted to social reality. Moreover, any development should reflect the values and transformations within society. Based on the above, adapting laws and legislative policies to address the unique needs of each society within a specific time context is necessary. Consequently, legislative drafting acquires its significance, as it is a technical, scientific and practical mechanism at the same time, requiring proficiency and a deep understanding of the science of law and political sociology. Achieving the objectives of the social contract, such as protecting individual rights and fostering justice and stability, relies heavily on these two dimensions.

ARTICLE TITLE	**The Impact of Anglo-American Law on the Vienna Convention on the International Sale of Goods**
AUTHORS	**El Zein T.**
JOURNAL	Social Contract Journal
YEAR	2023
PUBLICATION INFO	1(2023): 591- 617
THEME / SUBTHEME	Society, Culture and Human Behavior/Contractual, Non-contractual Relationships and Trans-border Transactions
ABSTRACT	There are various Anglo American legal system principles that regulate contracts at certain stages, and they are embodied in projects for the unification of international contract law. These principles reflect the philosophy of this legal system, especially when it comes to contract formation where it gives substantially more freedom to the parties. As an example, to liberate them from the obligation to fix the "price" at the moment of formation. Regarding termination of the contract, they provide the possible victim of non-execution of obligation with the possibility of terminating the contract in an anticipatory way, in addition to, imposing the creditor to mitigate damages. The spread of Anglo-American law worldwide has resulted from globalization and the economic and political influence of the United States. However, this is not the only reason. The Anglo-American legal system has characteristics that give it an advantage over other systems, such as the Romano-Germanic system. The flexibility and the constant evolution are the main features of the Anglo-American system.

2. PROCEEDING

PROCEEDING TITLE	الحق الطبيعي، أساس دولة الحق العروبية **Le Droit Naturel, Fondement de l'Etat de Droit Panarabe**
AUTHORS	**El'Alayli G.**
CONFERENCE TITLE	حفل تسليم جائزة ميشال اده Cérémonie de la Remise du Prix Michel Edde
DATE	13/01/2022
PLACE	Beirut, Lebanon
THEME / SUBTHEME	Society, Culture and Human Behavior/ Contemporary International and National Developments, Crises and Conflicts
ABSTRACT	Revisité, le panarabisme est le fondement juridique prospectif et opportun pour une renaissance efficace du monde arabe, et pour sauver son identité civilisationnelle de son déni par certains Arabes. Le terme fondement s'entend comme la base, le socle et l'élément essentiel et principal sur lesquels se fonde l'Etat de droit panarabe, à savoir: le droit naturel. Contenant les principes jusnaturels (fondamentaux et seconds), le droit naturel est un système de normes s'imposant tant aux communautés qu'aux individus, et qui engendre des descendants : les principes généraux du droit d'une part, et les droits fondamentaux correspondant aux droits naturels (au pluriel) d'autre part. Le droit naturel n'exempte pas les sociétés humaines de mettre en place des droits positifs. Au contraire, il les invite à « positiver » sa teneur. Ce faisant, le droit naturel fonde l'Etat de droit comme modèle de l'Etat qui déclare et applique effectivement les principes et descendants du droit naturel- selon un dosage convenable en fonction de chaque société. Qu'il soit arabe ou non, l'Etat de droit est qualifié de panarabe lorsqu'il œuvre pour, ou préconise, l'établissement des États de droit arabes. Le panarabisme consiste dans la pensée et l'activisme tendant à la réalisation complète et à l'affermissement continu d'une arabité qui, conçue en tant qu'identité de civilisation arabe, se plie au droit naturel. Le panarabisme est le renforcement progressif de l'arabité, et du droit naturel dans le monde arabe. Il s'agit d'un concept idéel, c'est-à-dire relatif au monde des idées et à leur nature, qui irrigue les divers pays arabes. Le panarabisme n'est ni un nationalisme ni un patriotisme : il ne correspond ni à l'idée d'une seule « patrie » ni à celle d'une seule « nation » qu'elle soit dite « arabe » ou « panarabe » : en réalité, le monde arabe embrasse plusieurs patries et nations arabes.

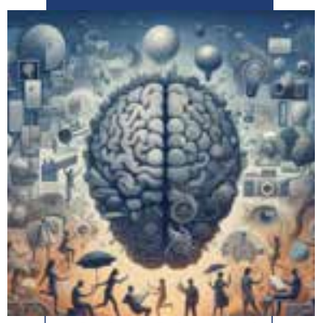
3. BOOK CHAPTER

BOOK CHAPTER TITLE	**Repealing Defamation Laws Weaponized Against Media Professionals in Lebanon: A Step Towards Upholding the Freedom of Speech, Defending the Freedom of Media and Fighting Back against the Oppressive State**
AUTHORS	**Mourad A.**
BOOK TITLE	Media Reform to Enhance Freedom of Expression in Lebanon
YEAR	2024
PUBLISHER	Maharat Association
ISBN	978-9953-0-3455-4
THEME / SUBTHEME	Society, Culture and Human Behavior/Dispute Resolution: Judiciary and Alternatives
ABSTRACT	Defamation laws must be repealed to ensure that the freedom of press, media, and speech are truly respected. Additional legal and judicial reforms are required in that regard. The proposed reforms consist in keeping fines and abrogate the sentence of imprisonment in all defamation and speech crimes, except in cases of incitement to violence, hatred or discrimination based on nationality, race or religion. Various legislations must be amended to protect journalists, uphold the right to criticize public instructions and introduce the notion of criticizing public officials at a wider scale in order to hold them accountable to their actions. Said amendments are also needed to enshrine the media outlets right to expose corruption, uncover crimes, and prove cases of mismanagement by public officials.

Prevalent SDG

SDG 9
23%

Prevalent Theme



Society, Culture and Human Behavior
77%

Prevalent Subtheme

Human Behavior in Organizations
71%

% of Highly Indexed Journals

26%

Faculty of

BUSINESS ADMINISTRATION

23-24

RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**Applying Consumer-Based Brand Equity in Private Universities Branding: An Empirical Study**
AUTHORS	*Ali A.*, **Bazzi A.**
JOURNAL	International Journal of Business Innovation and Research
YEAR	2023
PUBLICATION INFO	DOI: 10.1504/IJBIR.2023.135498
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	This paper investigates the influence of consumer-based brand equity (CBBE) dimensions on customers› brand attitude and purchase intention, along with the moderating effect for corporate social responsibility (CSR) on the relationship between customers› brand attitude and their purchase intention. The study sample consists of 375 students, which is considered as sufficient sample size for applying data analysis using partial least square-structure equation modelling (PLS-SEM). The current study findings reveal that three dimensions for CBBE out of four have a significant positive effect on customers› brand attitude (brand awareness, brand loyalty and brand image), while only brand loyalty has a direct positive influence on customers› purchase intention. Also, the results indicate that brand attitude partially mediates the relationship between brand loyalty and purchase intention, while it fully mediates the relationship between brand image and purchase intention. Furthermore, CSR does not moderate the relationship between customers› brand attitude and their purchase intention. Moreover, this paper contributes to CBBE literature.

* Names in Bold Indicate BAU Academic Faculty
* Names in Italic Indicate BAU Students

ARTICLE TITLE	**A Review of Socially Responsible HRM Practices in the Lebanese Healthcare Sector**
AUTHORS	*Houri M.,* **Beydoun A.**
JOURNAL	**BAU Journal - Creative Sustainable Development**
YEAR	2024
PUBLICATION INFO	5(1): 1-15
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This study reviews the existing literature on Socially Responsible Human Resource Management practices on both nurses› performance and their intention to stay which constitute important factors of nurses' decisions to stay in the healthcare sector in Lebanon. It also focuses on the current knowledge about existing literature in socially responsible HRM. This literature review highlights on the current knowledge about the determinant factor and the importance of socially responsible HRM practices and key outcomes for nurses. It suggests that socially responsible HRM practices, covering initiatives such as training, performance evaluation, compensation, work-family balance and occupational health and safety practices, may significantly impact nurses› performance and intention to stay. Through a blend of theoretical perspectives, the framework outlines how these practices may enhance nurses› intention to stay in the organization and ultimately leading to improved performance outcomes. It will add to the existing literature since it is a review grounded on evidence from prior literature reviews and studies connected to this topic and recommends additional future studies. The proposed framework provides a basis for future empirical research to investigate the causal relationships and dynamics between socially responsible HRM practices, nurses› performance, and intention to stay, thus informing evidence-based HRM strategies in healthcare settings. In conclusion, it highlights the importance of integrating social responsibility principles into HRM practices within healthcare organizations which can lead to a favorable work environment and outcomes to both the nurses and organizations in Lebanon.

ARTICLE TITLE	**Digital Leadership and Innovation Mediated by Employees' Satisfaction: A Recovery Strategy after the Pandemic**
AUTHORS	Mawlawi A., **El Fawal A.,** Massoud M. , Ramadan M. , Baydoun H. , Bou Zakhem N. , Ashaal A., Daouk A.
JOURNAL	**Review of Economics and Finance**
YEAR	2023
PUBLICATION INFO	21(1): 1849-1870
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	Due to the pandemic, organizations were forced to be acute in their crisis management strategies by seeking innovation. However, managers faced innovation problems due to social distancing, a lack of leadership, and increased employee dissatisfaction. Confronting those challenges implies direct actions. Therefore, digital leadership is a lever of satisfaction and innovation. Digital leadership and innovation are among the avenues to be explored. This article aims to broaden knowledge of the four innovation types. The objective is to assess the relationship between digital leadership, employee satisfaction, and four types of innovation, respectively. It gauges employees' satisfaction as a mediating variable. A questionnaire is a statistical tool for the EFA and CFA. The exploratory factor analysis is conducted on 283 users ensuring factor structure validity and scale. Scales were subject to normality tests. The confirmatory factor analysis confirmed the results. Results showed positive relationships between digital leadership, employee satisfaction, and innovation. This relationship is even significant when employees perceive managerial support.

ARTICLE TITLE	**DeFi Era: the Behavioral Intentions Toward Cryptocurrency in Lebanon**
AUTHORS	**Abou Ali A.**
JOURNAL	Innovation & Management Review
YEAR	2023
PUBLICATION INFO	DOI: 10.1108/INMR-02-2023-0022
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	Purpose – This paper examines the factors which impact the behavioral intentions toward cryptocurrency based on signaling theory. Design/methodology/approach – Data were collected through online questionnaire, and responses from 223 individuals in Lebanon were analyzed through SEM technique using Amos 24. Findings – The outcomes portrayed the positive effect of perceived benefits and trust in cryptocurrency on behavioral intentions toward cryptocurrency; while not supporting the hypothesized influence of herd behavior and regulatory support. Originality/value – This paper is among the first studies to adopt Signaling Theory (ST) in the cryptocurrency behavioral intentions research. Moreover, it is of the initial efforts in Lebanon and Middle East in evaluating behavioral intentions to use cryptocurrency, and it provide insights for future researchers, crypto project owners, crypto investors and crypto trading platforms.

ARTICLE TITLE	**Does Audit Oversight Quality Reduce Insolvency Risk, Systematic Risk, and ROA Volatility? The Role of Institutional Ownership**
AUTHORS	Abraham R., **El-Chaarani H.,** Deari F.
JOURNAL	Journal of Risk and Financial Management
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/jrfm17080335
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	The board of directors appoints the audit committee to assess the financial performance of the firm. The audit committee uses reports provided by audit firms, such as Form 10Ks, and annual reports to assess firm financial performance. The degree of audit oversight quality is a governance measure, which, if effective, may reduce firm risk. This study measures the effect of three measures of audit oversight quality on insolvency risk, systematic risk, and volatility of return on assets for a sample of U.S. pharmaceutical firms and energy firms from 2010 to 2022. All measures of audit oversight quality reduced firm risk, with the first measure reducing both systematic risk and volatility of return on assets, the second measure reducing systematic risk, and the third measure reducing volatility of return on assets. As institutional ownership is also a governance measure, we tested whether its joint effect with audit oversight quality reduced firm risk. This hypothesis was supported for all three measures of audit oversight quality for systematic risk and for the third audit oversight quality measure for volatility of assets. Robustness was established by replicating the regressions with an alternate governance measure, which yielded similar results. Endogeneity of all audit oversight quality measures was absent due to lack of significance of leverage, firm size, equity multiplier, and firm value in reducing risk through their effect on audit oversight quality.

ARTICLE TITLE	**Efficiency Redefined: A Deep Drive into HRM Practices and Organizational Success in Lebanon**
AUTHORS	**El Fawal A.**, Mawlawi A., Bou Zakhem N., **Rifi A.,** Baydoun H., Daouk A.
JOURNAL	**Migration Letters**
YEAR	2024
PUBLICATION INFO	21(4): 1349-1370
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This paper examines the influence of six human resource management practices on the efficiency of organizational performance in Lebanese SMEs across diverse sectors. The examined practices encompass training and development, selection and recruitment, compensation and benefits, performance appraisal, empowerment, and succession planning. Employing a quantitative deductive approach, data analysis employed SPSS to address study objectives, validate hypotheses, and tackle the research problem. The questionnaire, distributed among 360 respondents in various sectors, revealed that managing selection and recruitment, empowerment, and succession planning significantly impact organizational efficiency, while training and development, compensation and benefits, and performance appraisal show no discernible impact. The study›s findings provide insights into the specific HRM practices influencing the efficiency of organizational performance in Lebanese SMEs, contributing novel perspectives to the existing literature on this subject.

ARTICLE TITLE	**Evaluating Factors Affecting Continuance Intention toward E-Sports**
AUTHORS	Abbas A., **Kaakour S.**
JOURNAL	**التجارة والتمويل**
YEAR	2023
PUBLICATION INFO	DOI: 10.21608/caf.2023.303701
THEME / SUBTHEME	Science and Technology/Information and Communication Technology in Business

ABSTRACT	Nowadays, E-sports became a fast growing industry that have changed remarkably. E-sports is spread over the societies due to the dramatic environmental changes such as pervasiveness of the online trend. This paper investigated the role of the enjoyment, competence, perceived ease of use, perceived usefulness and satisfaction on continuance intention to adopt E-sports. A self-administrated questionnaire is developed using snowball sampling technique during January and February 2023 applying SPSS version 24 to test the current research hypotheses. The current paper revealed that enjoyment, perceived usefulness and satisfaction are positively affected continuance intention to adopt E-sports. However, the findings indicated that competence and perceived ease of use have insignificant effect of continuance intention toward E-sports. This study is considered as one of the few research conducted to analyze continuance intention toward E-sports. The current study introduce several contributions on the theoretical and practical levels that enhancing both marketing literature and decision makers in the domain of applications' designers, programmers and E-sport exercises trainers. Finally, the limitations and future research are also presented in this research.

ARTICLE TITLE	**Exploring Co-Creation and Co-Destruction in the Lebanese Banking Sector During the Financial Crisis**
AUTHORS	**Kaakour S.,** Ali A.
JOURNAL	**BAU Journal - Society, Culture and Human Behavior**
YEAR	2024
PUBLICATION INFO	5(1): 1-13
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This paper aims to comprehend co-creation/co-destruction value by studying in details the misbehavior incident between Lebanese private banks customers and frontline staffs during the financial crisis. The collected data includes 45 interviews in total, 20 frontline bank employees and 25 customers by structured interviews. The qualitative approach applied the thematic analysis (TA) to answer the research queries and A NVivo 11 software is applied to analyze the data coding. Findings indicated that co-creation exist when there is an effective communication between bank customers and frontline employees and when clients are delighted and feel valued while meeting his service. Co-destruction came from rude employee behaviors, restrictions on withdrawals and implementation of other unexpected capital control measures, rigid system and consumers' want for revenge. Practical implications suggest educating and training, staffs to be more helpful toward bank customers. Communication between banks and clients must boost client appreciation and happiness. This study is considered one of the few studies in applying a social platform perspective to discover front line employee and customer experiences of misbehavior incidents during banking service encounters in the financial crisis.

ARTICLE TITLE	**Exploring Cryptocurrency Adoption: A Study of Intention among Lebanese Users**
AUTHORS	*El Ali R.,* **Kaakour S.**
JOURNAL	Advances in Social Science and Culture
YEAR	2024
PUBLICATION INFO	6(1): 1-28
THEME / SUBTHEME	Science and Technology/ Information and Communication Technology in Business
ABSTRACT	This study aims to comprehensively investigate the determinants of cryptocurrency adoption. Employing a structured questionnaire, the research assesses factors influencing individuals'willingness to embrace cryptocurrencies, utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The study considers key determinants, namely performance expectancy, effort expectancy, social influence, and facilitating conditions. Employing quantitative analysis, the study focuses on a 272 sample of Lebanese participants, revealing significant effects of effort expectancy, financial literacy, perceived trust, personal innovativeness, and price value on the intention to use cryptocurrencies. The findings contribute both managerial and theoretical insights, offering guidance to enhance strategies for fostering cryptocurrency adoption.

ARTICLE TITLE	**Exploring the Influence of Gender Diversity and Women's Empowerment on Family Entrepreneurship Performance: The Moderating Impact of Firm Characteristic**
AUTHORS	Skaf Y., El Abiad Z., **El Chaarani H., El Nemar S.**
JOURNAL	Journal of Asia Business Studies
YEAR	2024
PUBLICATION INFO	18(2): 318-339
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations

ABSTRACT

Purpose
This paper aims to examine how gender diversity and women's empowerment influence the performance of family entrepreneurships and explores the role of firm characteristics as a moderating factor.

Design/methodology/approach
The study used a structured questionnaire as the survey tool to collect data from 91 women managers working in family entrepreneurships, which originated from entrepreneurial initiatives, located in various Lebanese regions. The validity of the construct was assumed using the fitness of extracted index, incremental fit-index, non-normal fit-index, root mean square of residuals and standard root mean square residual. Composite reliability, Cronbach›s alpha and value confirmatory factor analysis were used to measure the internal consistency. Data were analyzed using the structural equation modeling method.

Findings
This study reveals that gender equality, education level and family support significantly affect women›s empowerment while an insignificant association was found between empowerment and earning social status and achieving financial independence. This paper also showed a significant interaction between women's empowerment and the performance of family entrepreneurships. Additionally, the results showed that women holding managerial positions in family entrepreneurships is positively associated with firm performance. Finally, it was concluded that the location of the family firm moderates the relationship between gender diversity and firm performance.

ARTICLE TITLE	**How Does an Organizational Structure Create a Breeding Ground for Destructive Leadership? A Reflection Based on Peter Drucker's Systems View of Management**
AUTHORS	**Maroun S.**
JOURNAL	International Journal of Business Science and Applied Management
YEAR	2023
PUBLICATION INFO	9(8): 44-56
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This study aims at enhancing the harmonious role of leadership and management within organizations to achieve results. Specifically, I have explored the detrimental effect of the leadership process that does not take place in performing and responsible management. Drawing from the insights of Peter Drucker and Thorough good et al.›s studies on management and destructive leadership, I have proposed a conceptual framework comprising two figures.

ABSTRACT	The first figure outlines the key pillars of a performing structure as an integral part of management viewed as a system. The second figure highlights how these pillars can create an environment conducive to destructive leadership when they go wrong by strengthening the role of toxic, flawed, or ineffective leaders while making followers more susceptible to their influence. The research shows that while nothing can deter destructive leadership from emerging, a performing structure can prevent its development and harmful impact within organizations.

ARTICLE TITLE	**Exploring Student Satisfaction and Retention in Lebanese Private Universities**
AUTHORS	**El Fawal A.,** Mawlawi A., Massoud M, Yassine D.
JOURNAL	**TWIST Internatinal Multidisciplinary Journal**
YEAR	2024
PUBLICATION INFO	19(2): 547-558
THEME / SUBTHEME	Society, Culture and Human Behavior/ Social Psychology and Interpersonal Processes
ABSTRACT	This article evaluates student satisfaction antecedents› role in enhancing student retention in Lebanese universities. This descriptive study uses a quantitative methodology built on a deductive approach with a questionnaire as a survey tool. The questionnaire comprised 25 questions and was distributed on campus. Two hundred ninety valid questionnaires constituted the sample for the analysis through a self-administered questionnaire on the university campus of Lebanese universities. This article verified the positive effects on students› satisfaction and retention. The most significant influence on students› retention is the quality of their education (R2 = 0.53; P< 0.001). Thus, a one-unit improvement in learning quality could result in a 53% increase in student retention. The statistical significance of the effect and causal links for both variables at the 5% threshold is confirmed by the P-value and the t-test. Student retention is an organizational goal that spreads positive word of mouth. Private universities should translate the conceptual framework into strategies to enhance students› satisfaction and retention rates.

ARTICLE TITLE	**Factors Affecting Purchase Intention toward Solar System in Lebanon**
AUTHORS	**El Kaakour S.**
JOURNAL	**مجلة التجارة والتمويل**
YEAR	2023
PUBLICATION INFO	43(3): 152-184
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	Solar system technology plays a critical role in the creation of income generating activities, better health care, and contact to a contemporary and powerful bright source that could allow workers and people to work and study longer hours. Lebanon attempts to expand its countrywide electrical networks have been hindered by the absence of evaluating and organizational changes in the control industry, despite national initiatives backed by donors. This research aimed to investigate the impact of the five following factors environmental concern, environmental awareness, government initiative, technology anxiety and cost concern on the purchase intention of solar system. A quantitative approach was used, and data was gathered online using Google Forms. Survey questionnaire were distributed to Lebanese citizens from a variety of backgrounds. Only 300 of the 350 respondents were collected. The data has been analyzed by using statistical software SPSS, including reliability and validity assessments of the measurements and hypothesis testing results. The results showed that all hypotheses are positively related expect the association between technology anxiety and purchase intention of solar system. However, the study also revealed several limitations and identified potential directions for future research.

ARTICLE TITLE	**Factors Influencing Student's Intention to Use E-Learning Services: An Applied Study on Lebanese Private Universities**
AUTHORS	**Kaakour S.,** AlaaEldine A., Mostapha N.
JOURNAL	**BAU Journal - Society, Culture and Human Behavior**
YEAR	2022
PUBLICATION INFO	3(2): 1-22

THEME / SUBTHEME	Science and Technology/ Information and Communication Technology in Business
ABSTRACT	The study's purpose is to investigate the impact of selected factors (Computer self-efficacy (CSE), subjective norms (SN), perceived enjoyment (PE), perceived usefulness (PU), perceived ease of use (PEOU), attitude) on university students' intention to use e-learning. The objective of this paper is to advance a conceptual framework to better understand the factors that could affect the intention of students to use e-learning in Lebanese universities. The collection of the data was from 444 private universities students in Lebanon. The SEM analysis had been used to assess the influence of these components to intend e-learning system. All proposed relationships are accepted in the framework expected the relationships between Computer self-efficacy (CSE) and subjective norms (SN) on perceived usefulness are rejected. In addition, relationships between subjective norms and perceived enjoyment on perceived ease of use (PEOU) are rejected. Finally, results are discussed then conclusions and future research are presented.

ARTICLE TITLE	**Factors that Affect Online Shopping Intention: The Case of Lebanon**
AUTHORS	**Kaakour S.**
JOURNAL	**المجلة العملية التجارة والتمويل**
YEAR	2023
PUBLICATION INFO	43(3): 111-151
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	The present study aims to explore the relationship between perceived ease of use, perceived usefulness, enjoyment, self-efficacy, and perceived behavioral control among consumers. With data collected from a sample of 201 participants, the study utilized SPSS for data analysis. Using a quantitative approach, the findings of this investigation indicate that all hypotheses proposed in the study have been accepted. Based on these results, the study offers several valuable recommendations for businesses and marketers to enhance consumer satisfaction and engagement. Emphasizing the importance of addressing perceived ease of use and usefulness can increase consumer adoption rates. Moreover, creating enjoyable experiences and instilling a sense of self-efficacy among consumers can positively influence their purchasing decisions. Understanding perceived behavioral control can also help businesses optimize their offerings to cater to consumer needs effectively. The findings and recommendations offered in this study offer practical implications for businesses and pave the way for further research in this area. Therefore, future research should focus on expanding the sample size and diversifying the participant pool to ensure broader applicability.

ARTICLE TITLE	**Impact of Personal, Task, And Environmental Factors on Auditor's Judgment and Decision-Making: Evidence from Lebanese Certified Public Accountants**
AUTHORS	*Abdallah B.*, **Ghanem M,Mahboub R.**
JOURNAL	International Journal of Applied Economics, Finance and Accounting
YEAR	2024
PUBLICATION INFO	19(2): 284-300
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This study aims to examine how audit judgment and decision making (JDM) is impacted by personal variables, task factors, and environmental factors. Audit judgment is crucial for forming opinions on financial statements since it is not feasible to conduct an audit on every type of evidence. We sent a questionnaire to all auditors who are members of the Lebanese Association of Certified Public Accountants (LACPA) in order to collect the data. Before analysis, we collected and completed 310 questionnaires for the study. We employed various statistical analyses, such as multiple linear regression analysis, data quality tests, and regression assumptions tests, to examine the relationships between different factors and JDM. The findings of the study showed that there is a positive association between factors like professional skepticism, the use of decision aids, professional commitment, the structure of tasks, time pressure, and the effectiveness of corporate governance/internal controls, and audit JDM. Conversely, adverse correlations emerge between factors like knowledge levels, task complexity, and the level of accountability, and audit JDM. However, there were no statistically significant correlations between audit JDM and factors including skills, experience, familiarity, trust, professional development, relationships with audit firms, and group or individual information processing. By being aware of and recognizing these effects, audit companies in Lebanon may put strategies in place to improve the quality of JDM and the trustworthiness of audit results.

ARTICLE TITLE	**Technology and Service Quality: Achieving Insurance Industry Customer Satisfaction and Loyalty under Crisis Conditions**
AUTHORS	Skaf Y.,Eid C., Thrassou A., **El Nemar S.,** Rebeiz K.
JOURNAL	**EuroMed Journal of Business**
YEAR	2024
PUBLICATION INFO	DOI: 10.1108/EMJB-01-2024-0027
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations

ABSTRACT

Purpose
This research addresses the critical challenge of fostering customer loyalty within the highly competitive landscape of the insurance industry. The study investigates the interplay between customer satisfaction, loyalty, and the influence of technology and service quality in the context of insurance services and in periods of crisis.

Design/methodology/approach
A quantitative research approach was employed, utilizing a structured questionnaire distributed among diverse insurance customers in Lebanon during crisis conditions. The data were analyzed using SPSS-Amos, incorporating descriptive statistics, correlation analysis, and structural equation modeling (SEM).

Findings
This research emphasizes the crucial role of customer satisfaction in fostering loyalty in the insurance sector, especially during crises. High satisfaction levels, influenced by user-friendly online platforms, positively correlate with increased customer loyalty. Technology plays a vital role in maintaining and improving satisfaction, making it a key driver during challenging times. Positive interactions between service quality and satisfaction further highlight the multifaceted impact of technology on shaping customer loyalty.

Practical implications
The research findings provide valuable insights with practical implications for insurers aiming to boost customer loyalty. The study recommends strategic investments in critical areas like claims processing, customer service, communication strategies, digitalization initiatives, and employee training. The study provides insights applicable particularly to insurance companies navigating crisis conditions.

Originality/value
This research contributes both to academic understanding and practical applications by shedding light on the distinctive challenges and opportunities faced by insurers in cultivating customer loyalty within the insurance industry during crisis. The elucidations provided serve as a foundation for developing targeted strategies to address these challenges and to leverage opportunities for enhanced customer loyalty.

ARTICLE TITLE	**The Impact of Government Expenditure, Renewable Energy Consumption, and CO_2 Emissions on Lebanese Economic Sustainability: ARDL Approach**
AUTHORS	**Taher H.**
JOURNAL	**Environmental Economics**
YEAR	2024
PUBLICATION INFO	15(1): 217-227
THEME / SUBTHEME	Health and Wellbeing/ Environmental Business and Economics

ABSTRACT

Most of the recent environmental and economic studies focus on the influence of renewable energy consumption and effective government expenditure respecting global climate change in leading sustainable economic growth. The empirical studies showed variation in the relationship between these variables. Based on the Keynesian economic growth framework, this study aims to investigate the impact of government expenditure, renewable energy consumption, and carbon dioxide emissions on the sustainable economic growth of Lebanon. The study used the ordinary least square method to test the short- and long-run relationship between the model variables by employing the Autoregressive Distributed Lag Stationarity estimation. The research data are gathered from the World Development Indicators annually from 1990 to 2022. The empirical findings showed that all variables are stationary at first difference except for carbon dioxide emissions. A long-term relationship between the dependent and independent variables was shown by the model test simulation employing the bound test. The model test for model residuals showed no heteroscedasticity based on the White test. The residuals are normally distributed by applying the Shapiro-Wilk test, and the model is stable with no structural break at the period. According to the study results, government spending has a robust reverse relation with sustainable economic growth and positive significant results for both renewable energy consumption and carbon dioxide emissions. The study findings are consistent with some literature sources and raise attention to monitoring the nature of government spending and boosting green energy sources in an economy.

ARTICLE TITLE	**The Impact of Audit Oversight Quality on the Financial Performance of U.S. Firms: A Subjective Assessment**
AUTHORS	Abraham R., **El-Chaarani H.,** Tao Z.
JOURNAL	**Journal of Risk and Financial Management**
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/jrfm17040151
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	Audit committees are appointed by the board of directors of corporations to oversee the financial reporting process, monitor financial control processes, hire and assess independent auditors, and communicate findings with management and auditors. We propose two new measures of audit oversight quality. The first measure is purely subjective, in that it scores audit committees on a scale based on their ability to fulfill one or more of their responsibilities, as mentioned in annual reports, Form 10-K and DEF 13A. The second measure concerns audit committee activity, as it measures the number of times the term 'audit committee' is mentioned in these documents. Both measures were obtained for U.S. pharmaceutical companies and energy companies from 2010 to 2022. The audit oversight quality measures were regressed in regard to profitability (measured by return on assets and return on equity), debt capacity (measured by equity multiplier), and firm value (measured by Tobin's q and economic value added). Audit oversight quality, using both measures, reduces the return on equity. Audit oversight quality, using both measures, had a disciplining effect on debt. Increases in the oversight of increasing debt discourage the propensity to increase borrowing using collateral (debt capacity), and reduce investor returns through investment in debt-financed projects (return on equity). Audit oversight quality, using both measures, exhibited a size effect on the firm's value, in that an increase in the firm size with high audit oversight quality increases the firm's value. However, it is possible that only the first measure of audit oversight quality significantly increased the firm's value, as only the first measure exhibited robustness to the endogeneity effect of size.

ARTICLE TITLE	**The Impact of CEO Characteristics on the Financial Performance of Family Businesses Listed in the Euronext Exchange**
AUTHORS	Zouhour El Abiad Z., Abraham R., **El-Chaarani H.,** Skaf Y. ,Binsaddig R. , Jafar S.
JOURNAL	**Journal of Risk and Financial Management**
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/jrfm17030129
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This paper identifies the CEO characteristics that have an impact on the performance of family businesses listed in the Euronext in the post-COVID 19 period. CEO characteristics are evaluated on two dimensions, i.e., personal characteristics and corporate governance mechanisms. A sample of 137 firm-year observations from Portugal, Luxembourg, the Netherlands, Ireland, France, and Belgium was chosen. CEO attributes of age, gender, education, and family membership were combined with corporate governance mechanisms of ownership concentration, CEO duality, CEO directorships, and CEO tenure, to predict return on assets and return on equity, using OLS regression. GMM estimation and Two-Stage Least Squares were employed to establish the robustness of the results. Among CEO personal characteristics, CEO family membership has a positive impact on return on assets, and a positive impact on return on equity. Among corporate governance mechanisms, CEO duality had a negative impact on return on assets, and a negative impact on return on equity. CEO ownership, and CEO tenure had a positive impact on return on assets, and a positive impact on return on equity. This paper's value lies in its evaluation of the under-researched area of family businesses of Euronext-listed firms. It can be used by family businesses in the region, for the selection and training of CEOs to fulfill the goal of achieving superior financial performance.

ARTICLE TITLE	**Tam Extension in E-Learning System Applicable in Private Universities in Lebanon**
AUTHORS	**Kaakour S., Ali A., Mostapha N.**
JOURNAL	**BAU Journal - Society, Culture and Human Behavior**
YEAR	2022
PUBLICATION INFO	3(2): 1-18
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	The paper's purpose is to investigate the influence of selected elements (Accessibility, personal innovativeness (PI), resistance to change, facilitating conditions, perceived usefulness (PU), perceived ease of use (PEOU), attitude) on university students' to intend e-learning usage. The objective of this paper is to advance a conceptual framework to analyze and to recognize the intention of students to use e-learning in Lebanese private universities. The collection of the data was from 444 private universities students in Lebanon. The SEM analysis had been used to evaluate the influence of these components to intend e-learning system. The results stated that relationships between accessibility on perceived usefulness are not accepted. Furthermore, the associations between (PI) and PEOU are also not accepted. However, all other relationships are accepted in the framework model. Finally, results discussed then conclusions and future research are presented.

ARTICLE TITLE	**Online Consumer Purchasing during the Pandemic of COVID-19: An Applied Study in Lebanon**
AUTHORS	**Kaakour S.**
JOURNAL	**BAU Journal - Society, Culture and Human Behavior**
YEAR	2023
PUBLICATION INFO	4(2): 1-15
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations

ABSTRACT	Technological development essentially transformed the foundation of global businesses. Business operations started to move from traditional to advance digitalized practices which gave rise to the e-commerce business, making the online environment more competitive. Despite such changes, there remains a consumer that is not involved in online shopping especially in developing countries. The spread of COVID-19 pandemic has caused radical changes to the way the consumer form intention and behavior toward digitalized solutions. This paper analyzes the impact of buying impulse, attitude, subjective norms, enjoyment and trust on consumer purchasing intention during the pandemic using a sample of 306 Lebanese citizens. SPSS version 24.0 is applied as a statistical technique used; results found positive effect of all factors on consumer purchasing intention. Then, discussions, conclusions and recommendations are presented.

ARTICLE TITLE	**The Factors Affecting E-Customer Satisfaction Toward Online Shopping Experiences in Lebanon**
AUTHORS	**Kaakour S.,** El Waly K.
JOURNAL	**المجلة العلمية للدراسات والبحوث المالية والتجارية**
YEAR	2024
PUBLICATION INFO	5(1): 582-551
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This research study focused on investigating the factors that impact e-customer satisfaction with online shopping experiences in Lebanon. The study examined six independent variables: price perception, pay on delivery, social media interaction, website layout, security, and delivery performance, and their influence on e-customer satisfaction, which was the dependent variable. A quantitative research methodology was adopted, utilizing a structured questionnaire as the primary data collection instrument. The questionnaire was distributed to 323 participants, and the data were analyzed using SPSS. The findings of the study indicated that all hypotheses are supported expect the effect of the price perception on e-customer satisfaction which was negatively related. The results of the study have both theoretical and practical implications. Theoretically, these contributions enhance our comprehension of the factors influencing e-customer satisfaction, thus validating the pertinence of established theories within the distinct context of Lebanon. From a practical standpoint, the research outcomes offer valuable insights to e-commerce enterprises in Lebanon, aiding in the pinpointing of avenues for refining their online shopping platforms and strategies. This refinement ultimately leads to an elevation in customer satisfaction levels. Consequently, this process harbors the potential to catalyze the expansion and triumph of the e-commerce sector in Lebanon.

ARTICLE TITLE	**The Impact of AI Marketing Activities on Consumer-Based Brand Equity: The Mediating Role of Brand Experience**
AUTHORS	**El Fawal A.,** Mawlawi A., Bou Zakhem N., Baydoun H., Yassine D., Kassably C.
JOURNAL	**Journal of Infrastructure, Policy and Development**
YEAR	2024
PUBLICATION INFO	8(7): 1-16
THEME / SUBTHEME	Science and Technology/ Information and Communication Technology in Business
ABSTRACT	In today's rapidly evolving world, the integration of artificial intelligence (AI) technologies has become paramount, offering unparalleled value propositions and unparalleled consumer experiences. This study delves into the transformative impact of five AI activities on brand experience and consumer-based brand equity within the retail banking landscape of Lebanon. Employing a quantitative deductive approach and a sample of 211 respondents, the research employs structural equation modeling to analyze the data. The findings underscore the significant influence of four AI marketing activities on brand experience, revealing that factors such as information, accessibility, and customization play pivotal roles, while interaction has a less pronounced effect. Importantly, the study unveils that brand experience acts as a partial mediator between AI marketing activities and consumer-based brand equity. These revelations not only illuminate pathways for retail banks in Lebanon to refine their AI strategies but also underscore the importance of leveraging AI-driven marketing initiatives to bolster customer equity, acquisition, and retention efforts in an increasingly competitive market age.

ARTICLE TITLE	**The Impact of Cardinal Personality Traits on both Online Impulsive and Compulsive Buying Behaviors**
AUTHORS	**El Fawal A.,** Mawlawi A., Hamieh M.,Abdallah A.
JOURNAL	**TWIST Internatinal Multidisciplinary Journal**
YEAR	2024
PUBLICATION INFO	19(3): 296-306

THEME / SUBTHEME	Society, Culture and Human Behavior/Societal Change
ABSTRACT	This study highlights the role of hedonistic shopping experience in shaping both compulsive and impulsive buying behaviors in the online context. Hedonistic shopping experience plays a mediating role in this research between the five proposed cardinal personality traits and compulsive and impulsive buying behaviors. This research aims is to examine the impact of cardinal personality traits on both compulsive and impulsive buying behavior through hedonistic shopping experience. 523 questionnaires were and only 455 were considered. Data have been collected from customers who have already made at least one online purchase. To test hypotheses a conditional analysis was used through SPSS, PROCESS. Results showed that all the hypotheses of this study were accepted. Moreover, the results of this research shows that cardinal personality traits can directly impact compulsive and impulsive buying behaviors or partially through hedonistic buying experience.

2. PROCEEDINGS

PROCEEDING TITLE	**The Impact of Perceived Corporate Social Responsibility and Rewards on Employee Performance.**
AUTHORS	***Saleh R.,* Beydoun A.**
CONFERENCE TITLE	**The 10th International Conference on Business and Technology (ICBT)**
DATE	21/08/2024
PLACE	University of Jordan
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This study investigates the impact of perceived CSR and rewards on performance among managers and employees in Lebanese banks participating in CSR initiatives through the United Nations Global Compact (UNGC). The study analyzed data from 390 participants using a questionnaire, Statistical Package for Social Science (SPSS), and statistical methods such as correlation, regression, structural equation modeling (SEM), and a brief decision tree. The results show significant positive correlations between employees› perceptions of CSR, rewards, and performance. The study also considers demographic variations to identify distinct employee segments, suggesting the potential for directed interventions to improve outcomes.

ABSTRACT

The findings emphasize integrating CSR understanding and planned reward management for positive organizational impact, offering valuable insights for corporate strategies and providing a foundation for future research. However, the study also highlights the need for further research in this area to fully understand the complex relationship between CSR, rewards, and employee performance.

PROCEEDING TITLE	**The Impact of Socially Responsible HRM Practices on Intention to Stay. A Comparative Study Between Public and Private Healthcare Sector in Lebanon**
AUTHORS	*Houri M.,* **El Chaarani H., Beydoun A.**
CONFERENCE TITLE	**The 10th International Conference on Business and Technology (ICBT)**
DATE	07/08/2024
PLACE	University of Jordan
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This paper investigates the influence of Socially Responsible Human Resource Management (SRHRM) practices on nurses› intention to stay in Lebanon. It focuses on the impact of selected practices, including training, performance evaluation, compensation, work-family balance, and occupational health and safety. Survey data was collected from 389 nurses from public and private sector hospitals. Structural equation modeling was used for analysis. The findings reveal that sector type has no effect on the impact of SRHRM practices on nurses' intention to stay in Lebanese healthcare. At the academic level, it provides supplementary literature for the under-researched sector in Lebanon. It might thus open up additional research opportunities that aim to broaden the perspective of the topic. At the practical level, the findings offer hospitals the tool to be competitive in retain-ing nurses in both public and private sectors. It is also expected to aid policy-makers and HR practitioners in placing measures for better retention of nurses in both the public and the private sectors. The study presents Limitations and future research to enhance understanding and implementation of SRHRM practices in healthcare. It might be considered among the first studies to investigate the mentioned topic. Keywords: SRHRM practices, Intention to Stay, Public Healthcare Sector, Private Healthcare Sector Training, Performance Evaluation, Compensation, Work-Family Balance, Occupational Health and Safety.

PROCEEDING TITLE	**The Impact of IT Investments on the Performance of Largest Middle East Banks**
AUTHORS	**Mahboub R.,** Imeri A.
CONFERENCE TITLE	International Conference on Management Business and Economy
DATE	28/10/2023
PLACE	Pristina, Kosovo
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	IT investments lately have taken major role in Middle East banks. Hence, this study is adding to the discussion of impact of IT to the financial performance of ten largest Middle East banks, covering the period 2011-2021. The main source of the data is from annual reports of each bank. The study uses CAMELS model as dependent variable, whereas IT investments like Automated Teller Machine (ATM), Mobile Banking (MB), Internet Banking (IB), Point of Sale Terminals (POS) and Telephone Banking (TB) are the independent variables. The findings of the study show that the use of ATM, POS and TB has significant impact on financial performance of banks. Hence, the use of MB, IB does not have significant impact on financial performance of Middle East banks. The study concludes with recommendations for future studies.

3. BOOK CHAPTERS

BOOK CHAPTER TITLE	**Transforming Human Resources With AI: Empowering Talent Management and Workforce Productivity**
AUTHORS	Massoud M., Maaliky B., **Fawal A.,** Mawllawi A., Yahkni F.
BOOK TITLE	**Industrial Applications of Big Data, AI, and Blockchain**
YEAR	2024
PUBLISHER	IGI Global
ISBN	9798369310465
THEME / SUBTHEME	Science and Technology/Information and Communication Technology in Business
ABSTRACT	AI is an irreplaceable human resources technological tool in the era of new technologies. AI allows recruiters to face tense talent shortages and resignation peril. AI benefits include talent identification, working time optimization, productivity elevation, and empowerment. Machine learning and profound learning advances imply faster processing speeds for applications and efficient solutions endorsed by human-artificial intelligence collaboration. Artificial intelligence experts in artificial intelligence concluded that AI will never replace employees but will act as an intelligent assistant supporting them to attain the organization's mission. Therefore, the biggest challenge for AI adoption is not technical but human. Innovative technologies depend on experts to train employees to use these intelligent machinery and systems intelligently. AI and talented workforces are partners in supporting the human resources transformation. Ultimately, employees gain in productivity and use their expertise for strategic decisions.

BOOK CHAPTER TITLE	**Sustainable Technologies in Educational Settings**
AUTHORS	Mawlawi A., Massoud M., **El Fawal A.,** Ramadan M., Bouzakhem N.
BOOK TITLE	**Navigating the Intersection of Business, Sustainability and Technology**
YEAR	2024
PUBLISHER	Springer Singapore
ISBN	978-981-99-8572-2
THEME / SUBTHEME	Society, Culture and Human Behavior/Human Behavior in Organizations
ABSTRACT	This chapter investigates sustainable technology's influence on students' learning experiences. It outlines techniques and ideas for encouraging sustainable conduct in academic environments. This chapter is dedicated to exploring the role of universities in fostering sustainable technologies. Universities nowadays have a responsibility to maintain the highest standards in their operations and to take the lead in shaping the students' daily lives, who will make up the new generation of citizens. Projected change in students' behavior is due to the sustainability-focused education they received throughout their academic journey. Cutting-edge technology enhances the teaching–learning process. Innovations in technology have always led to significant contributions. Technology provides an infinite number of instructional resources available to support teaching. Virtual reality offers a model for adaptive learning systems to enhance students' learning experience. Socially responsible universities adopting sustainable practices and investing in green technologies benefit from an improved reputation, cost savings, and new growth opportunities. With a focus on the Green University, transformation has become one of the requirements that most economies worldwide are moving toward today due to the growing importance of the green economy. The Green University is an essential component of creating sustainable societies and economies that will be passed down to future generations due to its positive effects on various economic, social, and environmental issues in light of the current challenges to global sustainable development. With the global economy's different advancements and challenges, sustainable development seeks to build sustainable economies.

BOOK CHAPTER TITLE	**The Effect of Artificial Intelligence on the Accounting Profession**
AUTHORS	**Abdulhay D.**
BOOK TITLE	Artificial Intelligence Approaches to Sustainable Accounting
YEAR	2024
PUBLISHER	IGI Global
ISBN	9798369308479
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	This chapter examines how artificial intelligence (AI) is affecting the accounting sector with a particular emphasis on Lebanon. It examines the significant shifts that brought about information and communications technology (ICT)-based technologies and automation, in addition to the historical changes in accounting. The combination of AI awareness and accounting automation has resulted in a significant revolution in the industry, which has boosted AI-powered accounting education. The chapter suggests ongoing AI advancements as well as proactive cooperation between accountants and accounting companies in order to increase the effectiveness and efficiency of accounting procedures. AI can cut expenses and free up accountants› time so they may focus on making decisions using analytics and data. However, the Middle Eastern accounting sector is confronted with a number of potential risks, such as the loss of jobs, the spread of artificial intelligence in the sector, the decline in human bias, the impact on accounting education, and the recurrence of past accounting mishaps.

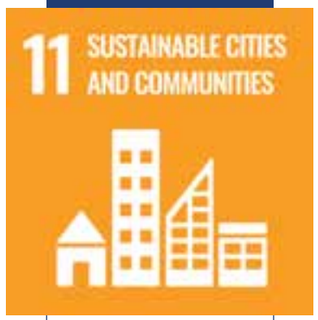
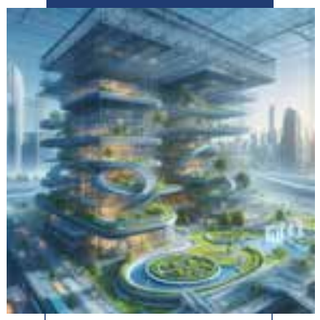
Faculty of

ARCHITECTURE

DSIGN & BUILT ENVIRONMENT

23-24

RESEARCH REPORT

Prevalent SDG	Prevalent Theme	Prevalent Subtheme
		
SDG 11 **67%**	Creative Sustainable Development **56%**	Environmental Studies & Sustainability in Architecture **56%**

I. ARTICLES

ARTICLE TITLE	**A Roadmap for the Implementation of Building Energy Efficiency Codes Compliance in Tripoli-Lebanon: Key Actions in the Familiarity Stage**
AUTHORS	Al-Sukkari T., **El-Daghar K,** Galal K. Afify
JOURNAL	**Revista de Gestao Social e Ambiental**
YEAR	2024
PUBLICATION INFO	18(2): 1-22
THEME / SUBTHEME	Creative Sustainable Development/Environmental Studies & Sustainability in Architecture
ABSTRACT	Objective: The objective of this study is to provide policy recommendations for strengthening governance and institutional capabilities to ensure effective climate action and sustainable development in Tripoli-Lebanon and to propose a multi-staged implementation framework for T-BEEC, focusing on familiarity, with the aim o To facilitate Lebanon›s transition towards sustainable energy sources by implementing an effective Building Energy Efficiency Code (T-BEEC) in Tripoli. Theoretical Framework: The study employs environmental science, urban planning, and socio-economic theories, focusing on policy adoption and the diffusion of technological innovations to enhance urban energy efficiency and sustainability. Method: A mixed-methods approach is adopted, incorporating both qualitative and quantitative research methods. Data collection involved semi-structured interviews with key personnel at the Tripoli Municipality Permit Office and thematic analysis of the barriers and facilitators to BEEC implementation. Comparative case studies from different geopolitical regions provide a broader perspective on the challenges and strategies of energy code compliance. Results and Discussion: Findings emphasize the critical need for infrastructure and resource optimization, including vehicle maintenance and replacements, spatial layout reorganization, and the prompt repair of computers and printers, to ensure operational efficiency. Additionally, the pursuit of diverse financial support sources highlights the reliance on municipal fees, international aid, NGO contributions, and educational partnerships to overcome financial and resource constraints Research Implications: This study impacts urban energy management theory and practice, providing key insights for policymakers and planners in similar settings. Originality/Value: This study outlines a unique approach to implementing energy codes during Tripoli›s familiarity period, enhancing urban sustainability and policy effectiveness.

* Names in Bold Indicate BAU Academic Faculty
* Names in Italic Indicate BAU Students

ARTICLE TITLE	**Applying Citizen Science Method for Odor Measurement in Urban Areas**
AUTHORS	*Amkieh Y.,* El-Bastawissi I., **Felix M.**
JOURNAL	**Renewable Energy and Sustainable Development**
YEAR	2024
PUBLICATION INFO	10(1): 153-168
THEME / SUBTHEME	Creative Sustainable Development/Environmental Studies & Sustainability in Architecture
ABSTRACT	Urban site analysis includes tangible factors such as the physical site features and intangible factors as the sensory site features like odors affect the inhabited area in the site. Environmental and chemical studies have much greater attention and studies to the odor effects in the urban areas than urban designers. The aim of this paper is to provide a validated and applicable method for the urban designers in odor measurement. The objective of this research is to present the various methods in measuring odors adopted in chemical and environmental studies to achieve an applicable odor measurement method in the urban design field. The odor measurement tools are usually dedicated to measure odor concentration at the odor source or at the receptor location, that are used in chemical and environmental studies. However, in the urban design studies the odor measurement could be performed using a method called the citizen science considering the FIDOL factor to evaluate the odor nuisance including odor frequency, intensity, duration, offensiveness, location, and hedonic tone. This research conducts a case study in a coastal area in Tripoli city and determine Tripoli landfill as a significant odor source that affect people in their inhabited areas. A questionnaire were distributed in the affected area by the odor source, and the respondents of the inhabitants ensured that the summer season is the most season that they can feel the odor in their places be associated with the wind direction. The results ensure that the citizen science method in measuring odors is validated, applicable, and available for urban designers to detect and estimate the affected area by odor source.

ARTICLE TITLE	**Examining Elevation Opening Ratio and Space Proportions in Lebanese Schools**
AUTHORS	*Traboulsi C.,* **Felix M.**
JOURNAL	**BAU Journal - Creative Sustainable Development**
YEAR	2024
PUBLICATION INFO	5(1): 1-12
THEME / SUBTHEME	Creative Sustainable Development/Environmental Studies & Sustainability in Architecture
ABSTRACT	The academic performance and outcomes of students are significantly impacted by the architecture of educational institutions. When designing learning spaces, two important considerations are the size of the room and the elevation opening percentage that describe how much daylight enters the space through windows. Previous studies showed that these factors have a important effect on student learning performance. This study explores the link between elevation opening percentage and space proportions in educational institutions. In order to assess daylight dispersal in a classroom in Lebanon that faced north—the direction required for the nation›s best solar exposure—a quantitative approach utilizing modelling software was employed. The investigation looked at four various room dimensions with ratios of 1:1, 1:1.5, 1:2, and 1:3, as well as six different height opening percentages varied from 10% to 100%. The simulations additionally demonstrated that the proportion of windows open has a noteworthy effect on natural light dispersion, with larger percentages leading to more uniform light distribution. The 1:1.5 space proportion is the most effective classroom ratio based on the simulation results.

ARTICLE TITLE	**Generating A Design Automation for Functional Relationship in Residential Building: Developing Plug In**
AUTHORS	**Belok F., Khalifa M. , Mohareb N.**
JOURNAL	**BAU, Architecture and Planning Journal (APJ)**
YEAR	2024
PUBLICATION INFO	30(1): 1-10

THEME / SUBTHEME	SDG 9: Industry, Innovation and Infrastructure
ABSTRACT	Designers, architects, and students face many problems in finding the optimum zoning or exploring different alternatives during early design stages, which consumes time and energy. To solve this problem, a computer editing tool will be an added value that helps users at this stage. The optimization of functional relationship is very important as many factors should be considered such as orientation; vertical and horizontal relationship; areas, view, building regulations, opening to wall ratio, form-to-form relationship, spaces proportions, circulation, and other related issues. In computer generative design, recent research has reached a goal to generate functional relationship in residential buildings and others, by using spatial relationship plug in, such as 'SYNTCATIC v-2.7' used in grasshopper software. This plug-in considers many of the mentioned factors, however it neglects other needed factors, such as vertical circulation and corridors. This paper aims to develop and optimize functional relationships in residential buildings, through developing an existing plug in and considering some neglected factors, especially the horizontal circulation. The existing grasshopper plug in 'SYNTCATIC v-2.7' will be developed, after analyzing its missing and ignored factors, to be able to help architects to take decisions for zoning in early design stages. Then this developed plug in will be tested and applied in a case study for verification. As an outcome the developed plug in will be able to facilitate architects' work, since it allows them to test various alternatives easily at the beginning of the design, to be able to select the optimum one. This enhanced plug in will consider especially horizontal circulation in residential buildings, which was neglected in the existing plug in.

ARTICLE TITLE	**Parametric Design as a T Tric Design as a Tool to Reduce Sol O Reduce Solar Penetration By Outdoor Sh by Outdoor Shades in Ho Ades in Hot Arid Clim T Arid Climate**
AUTHORS	*Aboulfaraj R.* , **Iman O. Khalifa M.**
JOURNAL	**BAU, Architecture and Planning Journal (APJ)**
YEAR	2024
PUBLICATION INFO	30(1):1-10
THEME / SUBTHEME	Creative Sustainable Development/Environmental Studies & Sustainability in Architecture
ABSTRACT	Conventional design methods and current tools infrequently link performance with the geometry of the design. These methods rarely enable backtracking through the design process and can›t achieve full performance criteria. In this context, using both procedural geometry and information from numerical assessments and performance simulations should be discussed to support the search for effective solutions.

ABSTRACT	Architects have gained control over the process of design by utilizing parametric methods to generate a sustainable design that interacts with sustainable, climatic, and environmental restrictions, particularly in hot arid zones where outdoor life is overlooked. This paper will discuss the performanceoriented design and a specific workflow empirical methodology that explores design alternatives of outdoor solar parametric shades for urban spaces with the aim of merging performance assessments in the initial phases of the design process to achieve maximum thermal comfort. This workflow includes parametric modelling using (Grasshopper) along with genetic algorithms (Galapagos), and the environmental tool (Ladybug). The design solutions were generated by evolutionary algorithms in accordance with the thermal performance requirements and simulations to evaluate their shading and thermal comfort efficiency. This will be illustrated through a case study of a bus stop static shade concentrating on the cladding of the geometry, especially on the solar radiation parameter. The study that will be discussed in this paper is a simulation study that will combine simulation techniques with a parametric approach and genetic algorithm optimization in a generative evaluation methodology for reducing the radiation under outdoor shades in hot dry climate areas. The optimum alternative /was determined based on the fitness value of incident radiation, and the process was iterated for a particular date and time.

ARTICLE TITLE	**Reviving Cultural Heritage Identity in Historical Areas Through Leftover Spaces – Application of a Cultural Park in Abu Ali River Region, Tripoli, Lebanon**
AUTHORS	*Trad A.*, **Khalifa M., Elsamahy E. ,El-Daghar K.**
JOURNAL	**BAU, Architecture and Planning Journal (APJ)**
YEAR	2024
PUBLICATION INFO	30(1)-70-85
THEME / SUBTHEME	Creative Sustainable Development/Environmental Studies & Sustainability in Architecture
ABSTRACT	Heritage being an inheritance from the past that is transmitted successively from one generation to the other plays a significant role in molding the memory of a country and forging its identity. As an element of heritage, architectural products are an expression of the cultural identity of communities. However, modern developments in historical regions ignore the presence of heritage buildings. Furthermore, the unorganized expansion of those areas led to the formation of leftover spaces. Abu Ali river is a historical region located in the city of Tripoli in Lebanon. Not long ago, this zone was considered the beating heart of the city before becoming a neglected area suffering from different social, economic, and environmental issues. One of the major problems the zone is currently facing is the loss of its cultural identity. In addition, the lack of green public spaces is noted. This paper attempts to revive the cultural heritage identity of Abu-Ali River area through the application of a cultural park using leftover spaces generated in the region as a site.

ABSTRACT

The paper starts with presenting the theoretical background related to the topic; Then related cases are compared to reach the optimum project elements; Next the selected area is analyzed through macro-analysis, community analysis, and micro-analysis to reach initial design decisions; Finally, the application is designed based on specific social and environmental simulation tools. The application is expected to breathe new life into the neglected historical area and revive its heritage.

ARTICLE TITLE	**The City and its Stream: Blue Urban Acupuncture as a Method for Neglected Spaces Regeneration in Lebanese Riversides The Case of Beirut River**
AUTHORS	*Chehab A.*, **Farhat B.**
JOURNAL	Research & Reviews: Journal of Ecology and Environmental Sciences
YEAR	2024
PUBLICATION INFO	12(2): 1-26
THEME / SUBTHEME	Health and Wellbeing/Quality of Life in the Built Environment
ABSTRACT	Urban rivers and waterfronts play a vital role in the ecological, social, and economic fabric of cities, providing not only aesthetic value but also serving as important ecosystems that contribute to the overall well-being of urban environments. However, many urban rivers, including the Beirut River in Lebanon, face challenges such as pollution, neglect, and the loss of recreational and ecological value due to urbanization and industrialization. According to the Lebanese MoE (Ministry of Environment), almost 70% of Lebanese rivers are polluted due to untreated waste management systems and which leads to undrinkable water and possible flooding disasters if not treated [1,2]. This study addresses the problem of abandoned and degraded spaces along the banks of Beirut River through the application of urban acupuncture, a strategic approach that targets specific points in the urban environment to stimulate positive change and regeneration.

ABSTRACT

The aim of the study is to assess the effectiveness of implementing small-scale 'sensitive urban points' known as urban acupuncture as the method for regenerating the Beirut River riverside, with the hypothesis that targeted interventions through Blue Urban acupuncture or aqua-puncture can lead to significant improvements in the ecological, social, and economic aspects of the area that re-connect the people of Beirut with its river. The methodology involves a multidisciplinary approach that integrates urban design, and community engagement, and analysing similar examples of different approaches through creating a comparative table 4. Data collection includes environmental assessments of water quality, biodiversity, and ecosystem health, as well as social surveys to understand community needs and perceptions. By applying urban acupuncture principles to the banks of Beirut River, this study seeks to demonstrate how strategic interventions can lead to the regeneration of abandoned spaces, improve the overall quality of the urban environment, and create sustainable and inclusive riverside landscapes that benefit both the environment and the community.

2. PROCEEDING

PROCEEDING TITLE	**The Design Process Workflow Between Robotics Methodology and Artificial Intelligence toward Optimum Digital Fabrication**
AUTHORS	Ragab M., **Khalifa M.,** Arnaouty S., Elsafty M.
CONFERENCE TITLE	**Arab Society for Computation in Architecture, Art and Design (ASCAAD2023) - Computation, Culture, and Context**
DATE	07/02/2024
PLACE	Amman,Jordan
THEME / SUBTHEME	Science and Technology/ Digital Technology in Architecture
ABSTRACT	Industrial robots and artificial intelligence in design and construction have rapidly transformed the architecture industry in recent years, offering revolutionary opportunities which intern change the execution methods of buildings. This paper explores how implementing robotics methodology and AI in the design process can improve efficiency and accuracy, especially to generate scripts and data, highlighting their benefits and exploring the challenges that must be addressed to optimize their use. It also automates certain tasks in the design process, such as model production and streamlining workflow; it is being used to produce intricate prototypes that manipulate materials and shapes that were previously difficult to create (Mahesh, Andrew John Wit, 2018).

ABSTRACT

It can produce more complex designs and achieve higher precision and accuracy in their work (Philip F. Yuan, Hua Chai, Chao Yan, Neil Leach, 2021).
Additionally, robotic arms can be programmed to perform repetitive tasks, freeing designers› time for more creative work (Mahesh, Andrew John Wit, 2018).Integrating AI into the design process will bring new possibilities for architects to generate and evaluate a wide range of design options more quickly than before where AI algorithms can analyze data from various sources, including user feedback and environmental data, to create design proposals that meet specific requirements (Philip F. Yuan · Hua Chai · Chao Yan · Keke Li ·Tongyue Sun, 2022). Also, AI can generate design scripts, providing robotics with infinite tasks (Leach, 2021). Hence, this research demonstrates the full computational process starting from the AI design phase and ending with robotic fabricated products. It explains the importance of embedded intelligent input into the algorithmic design process, enhancing these processes with infinite data and exploring the capability of the direct connectivity between the AI and robotic tasks monitoring to achieve the optimum solution for a specific product. As a result, the research will emphasize these processes fully documented phases, demonstrating the importance of integrating AI and robotics arm into computational design and fabrication methodologies to enhance finally the architecture and construction industries for more performative and optimized strategies. Providing new tools and methods to create buildings more efficiently. Furthermore, reducing waste and minimizing errors. Additionally, integrating robotics and AI in fabrication can reduce the 2 overall construction time and costs, making it more feasible for architects to create innovative and sustainable buildings.

3. BOOK CHAPTER

BOOK CHAPTER TITLE	**Expanding Child-friendly Spaces for the Community' Well-Being –A Humanitarian Architecture Model** ***(Joint Publication with Faculty of Human Sciences)***
AUTHORS	**Farahat B., Alaaeldin H.**
BOOK TITLE	Expanding Child-friendly Spaces for the Community' Well-Being –A Humanitarian Architecture Model
YEAR	2024
PUBLISHER	LAP LAMBERT Academic Publishing
ISBN	978-620-6-76746-6
THEME / SUBTHEME	Health and Wellbeing/Quality of Life in the Built Environment

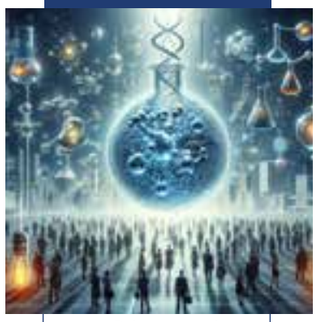
ABSTRACT

Architecture certainly reflects the welfare status of a society and its core values, but without an intense sense of community, it cannot be sustained. Community embodies the core values, spirituality, and deepest layers of society, and it is permanently interdependent with architecture. Architecture and community identify one another through enhancing, revitalizing, integrating, and conserving one other›s individual uniqueness while also enhancing their own qualities. Over the requirements, needs, hopes, and values of the community, architecture has to establish a structured vision. If architecture coincides with the community sense and reflects its needs, the subsequent step is to summon and inspire them. Architects have to identify with the community's values to whom their work is intended. Coordination between architects and experts from adjacent fields is essential for addressing initiatives in the community. Today›s architecture incorporates, on various levels, the cutting-edge elements from cross-disciplinary collaborations with fields including arts, psychology, sociology, medicine, media and communication, ecology, and engineering. There can be no doubt about a return once this transdisciplinary journey has been completed, but rather a constant becoming of fresh revelatory hypostases. Such responses are provided by the architecture, which also introduces new ways of thinking to society and the community. In the time we live in, collaboration with different disciplines is crucial since it leads to solutions that are organic and suitable for the expansion of the community.

Prevalent SDG

SDG 9
40%

Prevalent Theme



Science and Technology
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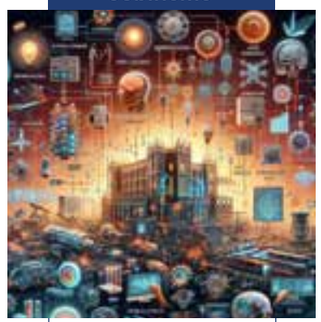
Prevalent Subtheme



Advances Technologies and Innovation
47%

% of Highly Indexed Journals

50%

Faculty of **ENGINEERING**

23-24 RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**Accelerated Carbonation Curing of Concrete Incorporating Calcium Carbide Residue**
AUTHORS	Bawab J., El-Hassan H., El Dieb A., **Khatib J.**
JOURNAL	**Journal of Building Engineering**
YEAR	2024
PUBLICATION INFO	88(109258): 1-18
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	The synergic effect of accelerated carbonation curing and cement replacement by calcium carbide residue (CCR) on the carbon sequestration potential and performance of concrete was examined. The concrete mixes included 0, 5, 10, and 20 % (by mass) CCR as partial cement replacement and were subjected to different initial air curing durations (0, 4, and 20 h) and subsequent carbonation curing durations (4 and 20 h). The performance was evaluated based on the CO2 uptake, 1-, 7-, and 28-day compressive strengths, and volume of permeable voids. Scanning electron microscopic (SEM) imaging was used to characterize the microstructure of the carbonated concrete. The environmental footprint of concrete produced herein was assessed. The experimental results showed that using CCR enhanced the CO2 uptake of concrete, with 5 and 10 % replacement levels providing superior outcomes in concrete subjected to 4- and 20-h carbonation curing. The compressive strength and a volume of permeable voids improved upon replacing cement with 5 % CCR. Such findings were validated by examining the void space in the SEM micrographs. Furthermore, prolonging the initial air curing and carbonation durations to 20 h each and incorporating 20 % CCR resulted in the highest CO2 uptake and lowest carbon footprint. Among the developed mixes, the most suitable was the mix subjected to 20 h of each initial air curing and carbonation curing with 20 % CCR replacement by mass. Nevertheless, all developed mixes satisfy the minimum strength requirement for concrete masonry unit applications.

ARTICLE TITLE	**A Numerical Investigation on Enhancing the Performance of a Diesel Engine Fuelled with Diesel-Biodiesel Blend Using a Diethyl Ether as An Additive**
AUTHORS	*Youssef A.,* **Ibrahim A.**
JOURNAL	**Engineering Report**
YEAR	2024
PUBLICATION INFO	DOI: 10.1002/eng2.12915
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	Globally, the encouragement of using renewable fuels like biodiesel for diesel engines is driven by concerns over the fossil fuel depletion and harmful emissions. Additionally, the utilization of renewable fuel additives like diethyl ether has the potential to enhance fuel properties and boost engine performance. The aim of this paper was to construct a computer simulation using Ricardo Wave program in order to predict the performance and nitrogen oxides (NOx) emission of a diesel engine fuelled by a diesel-biodiesel blend and a diethyl ether (DEE) as a fuel additive. The computer model was validated by comparing the simulation engine performance and NOx emission results against the corresponding experimental data for diesel, diesel-biodiesel blend with 30% biodiesel proportion (B30), and two blends of diesel-biodiesel-DEE with DEE proportions of 5% and 10% on a volume basis. Also, the effect of varying the inlet air pressure on engine performance and NOx emission was compared for all investigated fuels. It was numerically demonstrated that using the DEE with an optimum proportion of 5% enhanced engine performance as it decreased engine fuel consumption by 5.9% and increased engine thermal efficiency by 9.6% compared to diesel fuel at engine full load condition. Also, a significant reduction of 20.5% in NOx emission resulted from the addition of DEE. Increasing the inlet air pressure increased engine power and decreased engine fuel consumption for all investigated fuels. Increasing the inlet air pressure from 1 to 3 bar increased engine brake thermal efficiency by almost 20% for all tested fuels. However, NOx emission increased slightly within a range from 1.7% to 7% for the different investigated fuels.

ARTICLE TITLE	**A Numerical Investigation into the Effect of Altering Compression Ratio, Injection Timing, and Injection Duration on the Performance of a Diesel Engine Fuelled with Diesel–Biodiesel–Butanol Blend**
AUTHORS	*Yousef A.,* **Ibrahim A.**
JOURNAL	**Clean Energy**
YEAR	2024
PUBLICATION INFO	DOI: 10.1093/ce/zkae055
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Using renewable fuels for diesel engines can reduce both air pollution and dependence on fossil fuels. A computer simulation was constructed to predict the performance, combustion characteristics, and NOx emissions of a diesel engine fuelled with diesel–biodiesel–butanol blends. The simulation was validated by comparing the modelling results against experimental data and a good agreement between the results was found. The fuels used for the validation were diesel (B0), biodiesel (B100), diesel–biodiesel blend (B50), and two diesel–biodiesel–butanol blends with 45% diesel–45% biodiesel–10% butanol (Bu10) and 40% diesel–40% biodiesel–20% butanol (Bu20) by volume. Experimental results showed that the addition of butanol reduced NOx emissions but deteriorated the engine performance. The aim of the current work was the numerical optimization of the different parameters to enhance the engine performance while using butanol to decrease NOx emissions. The engine compression ratio (CR) varied from 14 to 24, in increments of 2. Fuel injection timing (IT) was reduced from 30° before top dead centre (bTDC) to 5° bTDC in increments of 5°. Also, the fuel injection duration (IDur) was extended from 20° to 50° in increments of 10°. Results showed that the increase in the CR improved engine performance for the two investigated fuels, Bu10 and Bu20. The maximum engine brake power (BP), thermal efficiency (BTE), and minimum brake-specific fuel consumption (BSFC) of 1.46 kW, 32.3%, and 0.273 kg/kWh respectively, were obtained when the Bu10 fuel was injected under the optimum conditions of 24 CR, 15° bTDC IT, and 40° IDur. Under these optimum conditions, the BP, BTE, and BSFC improved by 3%–3.5% for Bu10 and Bu20 fuel blends compared with the base engine conditions of a CR of 22, 30° IDur, and 10° bTDC IT. The heat release rate during the premixed phase increased when the IT was advanced, while the mixing-controlled combustion phase was enhanced when the IT was reduced. NOx emissions increased with increasing CR, while both an increase in IDur at constant IT and the reduction of the IT decreased the engine NOx emissions. Under the optimum conditions, the NOx emissions for Bu10 and Bu20 were further decreased by 2.2% and 0.9%, respectively, compared with the experimental results under base engine conditions. Reducing the IT from 15° to 5° bTDC at a CR of 24 and IDur of 40° caused the NOx emissions for Bu10 and Bu20 to decrease by 16%. When the IDur was increased from 20° to 50° at a CR of 24 and an IT of 15°bTDC, the NOx emissions for Bu10 and Bu20 decreased by 12.3% and 11.8%, respectively. The addition of butanol to the diesel–biodiesel blend under optimum conditions showed results that were comparable to those of pure diesel, with a decrease in NOx emissions.

ARTICLE TITLE	**Advancing Breast Cancer Diagnosis through Breast Mass Images, Machine Learning, and Regression Models**
AUTHORS	**J. Zaylaa A.,** Kourtian S
JOURNAL	**Sensors**
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/s24072312
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Breast cancer results from a disruption of certain cells in breast tissue that undergo uncontrolled growth and cell division. These cells most often accumulate and form a lump called a tumor, which may be benign (non-cancerous) or malignant (cancerous). Malignant tumors can spread quickly throughout the body, forming tumors in other areas, which is called metastasis. Standard screening techniques are insufficient in the case of metastasis; therefore, new and advanced techniques based on artificial intelligence (AI), machine learning, and regression models have been introduced, the primary aim of which is to automatically diagnose breast cancer through the use of advanced techniques, classifiers, and real images. Real fine-needle aspiration (FNA) images were collected from Wisconsin, and four classifiers were used, including three machine learning models and one regression model: the support vector machine (SVM), naive Bayes (NB), k-nearest neighbors (k-NN), and decision tree (DT)-C4.5. According to the accuracy, sensitivity, and specificity results, the SVM algorithm had the best performance; it was the most powerful computational classifier with a 97.13% accuracy and 97.5% specificity. It also had around a 96% sensitivity for the diagnosis of breast cancer, unlike the models used for comparison, thereby providing an exact diagnosis on the one hand and a clear classification between benign and malignant tumors on the other hand. As a future research prospect, more algorithms and combinations of features can be considered for the precise, rapid, and effective classification and diagnosis of breast cancer images for imperative decisions.

ARTICLE TITLE	**Aeroacoustic Coupling in Rectangular Deep Cavities: Passive Control and Flow Dynamics**
AUTHORS	***Jabado A.,*** El Hassan M., **Hammoud A.,** Sakout A., **Assoum H.**
JOURNAL	**Fluids**
YEAR	2024
PUBLICATION INFO	9(8): 187-200
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Deep cavity configurations are common in various industrial applications, including automotive windows, sunroofs, and many other applications in aerospace engineering. Flows over such a geometry can result in aeroacoustic coupling between the cavity shear layer oscillations and the surrounding acoustic modes. This phenomenon can result in a resonance that can lead to significant noise and may cause damage to mechanical structures. Flow control methods are usually used to reduce or eliminate the aeroacoustic resonance. An experimental set up was developed to study the effectiveness of both a cylinder and a profiled cylinder positioned upstream from the cavity in reducing the flow resonance. The cavity flow and the acoustic signals were obtained using particle image velocimetry (PIV) and unsteady pressure sensors, respectively. A decrease of up to 36 dB was obtained in the sound pressure levels (SPL) using the passive control methods. The profiled cylinder showed a similar efficacy in reducing the resonance despite the absence of a high-frequency forcing. Time-space cross-correlation maps along the cavity shear layer showed the suppression of the feedback mechanism for both control methods. A snapshot proper orthogonal decomposition (POD) showed interesting differences between the cylinder and profiled cylinder control methods in terms of kinetic energy content and the vortex dynamics behavior. Furthermore, the interaction of the wake of the control device with the cavity shear layer and its impact on the aeroacoustic coupling was investigated using the POD analysis.

ARTICLE TITLE	**An Experimental Study on The Effect of Salt and Sugar Combination on Mortar Properties**
AUTHORS	*El Khatib L.,* **Khatib J.Hassan A., Kassem M., El Kordi A.**
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2024
PUBLICATION INFO	DOI: 10.54729/2706-784X.1131
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	The most important engineering material nowadays, used in construction is concrete. Concrete consists mainly of sand, cement and aggregates. However, weather conditions play a crucial role in affecting concrete characteristics and its serviceability. Weather conditions could be the reason to delay or accelerate the setting time of the concrete. As a result, and in order to deal with weather conditions and its effect on the setting time of concrete, accelerators and retarders must be added to the concrete mix. This research paper focuses on the impact of the use of salt and sugar on the setting time of concrete. Accelerators, like salt, speed up the setting time, while retarders, like sugar, delay it. This paper specifically examines the effects of sugar and salt as separate materials on mortar mixes, with sugar and salt being cost-effective compared to traditional commercial admixtures in delaying setting time It also introduces a novel idea where the combined effects of salt and sugar on mortar is investigated. Different mortar mixes were prepared containing sugar or salt separate or combined. Tests included density, ultrasonic pulse velocity, compressive strength, and flexural strength. The dosages of sugar and salt are 0.15% and 0.3% by weight of cement. Tests are conducted at 7, 28, 56 and 90 days of curing where the water to cement ratio is set constant in all mixes at 0.5.

ARTICLE TITLE	**An Experimental Study on the Total and Capillary Water Absorption of Mortar Containing Phragmites Australis Ash**
AUTHORS	*ElKhatib L.,* **Khatib J., Elkordi A.,** Seyhan Firat S.
JOURNAL	**Turkish Journal of Engineering Research**
YEAR	2023
PUBLICATION INFO	2(1): 67-72
THEME / SUBTHEME	Science and Technology/Green and Bio-Materials
ABSTRACT	The use of biomass ashes as cement replacement have become a notable and trending aspect due to the huge increase in the pollution levels caused by the manufacturing process of cement. Phragmites Australis Ashes (PAA) can be an eco-friendly alternative to cement since it can be burnt in a closed container decreasing the CO2 emissions into atmosphere. Also, PAA is considered an economical material since it is available locally and grows massively on the banks of the rivers in Lebanon. The performance of mortar mixes produced by a partial replacement of cement were evaluated in this paper revealing a big potential for PAA to be used as cement replacement. Cement in mortar specimens was replaced by 0, 10, 20 and 30% by weight PAA. Mix proportions and water to binder ratio were set constant for all casted mixes. Durability properties, including total water absorption and capillary water absorption, containing different PAA percentages were evaluated at 1, 7, 28 and 90 days of curing ages in comparison to the control specimen. The test results show an increase in the total water absorption percentages as PAA percentage is enhanced in mixes. The same trend was also obtained for capillary water absorption test.

ARTICLE TITLE	**A Review on Aero-Acoustics and Heat Transfer in Impinging Jets**
AUTHORS	**El Zohbi B.,** *Afyouni N., Meraim K., Sakout A.,* **Assoum H.**
JOURNAL	**International Journal of Technology**
YEAR	2024
PUBLICATION INFO	DOI: 10.14716/ijtech.v

THEME / SUBTHEME	Science and Technology /Sustainability in Engineering
ABSTRACT	A summary of key discoveries regarding the industrial applications of impinging jets on a vertical plate. The summary explores the link between the dynamics and heat transmission on one hand, and the relationship between heat exchange and acoustic coupling on the other hand. The jet impingement technique finds widespread use in the industry, it serves purposes such as drying, cooling, and heating. The impinging jet system involves directing a fluid jet with high-velocity onto a surface. The jet impingement results in high heat exchange rates and mass transfer rates, making it an attractive technique in various industrial processes. The study of vortex dynamics in impinging jets is crucial for understanding the heat transfer mechanisms involved. The flow characteristics of impinging jets, such as the Reynolds number (Re) of the jet, the distance from the blowing mouth to the impinged wall, and the geometry of the blowing mouth, significantly affect the vortex dynamics and heat transfer rates. Therefore, optimizing these parameters can result in significant improvements in heat transfer efficiency. Several methods were proposed to enhance heat transfer, these methods can affect the flow dynamic, the surface of impingement, the nozzle's shape and size, and the impingement parameter such as the impact distance and the jet angle. The correlation between the flow dynamic and the heat transmission on one side, and the flow dynamics and acoustic emission on the other side, emphasizes the researcher to present acoustic-thermal coupled studies on the impinging jet; this topic needs more effort to understand the relation between the two phenomena. In order to find control mechanisms capable of reducing noise and enhancing heat transfer.

ARTICLE TITLE	**Assessment of Interfacial Mortar-Mortar Bond and Pure Shear Strength of Metakaolin-Based Geopolymer**
AUTHORS	Hachem A., **Khatib J., Dandachy M.**
JOURNAL	**International Journal of Building Pathology and Adaptation**
YEAR	2024
PUBLICATION INFO	DOI: 10.1108/IJBPA-02-2024-0031
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering

ABSTRACT

Purpose
This paper aims to investigate the bond strength of metakaolin-based geopolymer mortar with cement mortar.

Design/methodology/approach
The mortar-mortar bond strength is assessed by slant shear and split tensile tests; pure shear strength is evaluated by Mohr's criterion for result validation. Metakaolin-based geopolymer mortar is cast over the cured cement mortar specimen with two levels of surface roughness: smooth or grooved interface. The influence of the alkaline solution to metakaolin ratio on geopolymer bond strength is studied. Compressive strength, ultrasonic pulse velocity, permeability and flow table tests are also performed.

Findings
The paper's findings are highlighted as follows: (1) strong mortar-mortar bond properties achieved for geopolymer mortar in all tests and conditions and validated by Mohr's criterion and pure shear, (2) a lower alkaline solution to metakaolin ratio achieves higher bond strength to Portland cement mortar and (3) geopolymer mortar has higher compressive strength and ultrasonic pulse velocity than cement mortar at all curing ages; additionally, it is more flowable and less permeable.

Practical implications
The full replacement of Portland cement with metakaolin, a more sustainable cementitious material, will contribute to the decarbonization of the construction industry.

Originality/value
Limited research has been carried out on the bond strength of metakaolin-based geopolymer mortar to Portland cement mortar. Also, computing the pure shear using Mohr's circle criterion of metakaolin-based geopolymer to validate the results can be considered original.

ARTICLE TITLE	**Assessment of Soil–Structure Interaction Effects on the Beirut Port Silos Due to the 4 August 2020 Explosion: A Coupled Eulerian–Lagrangian Approach.**
AUTHORS	Jahami A., **Halawi J., Temsah Y.,Jaber L.**
JOURNAL	**Infrastructures**
YEAR	2023
PUBLICATION INFO	DOI: 10.3390/infrastructures8100147
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

Blast loadings have become the subject of research in recent decades due to the threats they pose to the surrounding medium. On 4 August 2020, a huge explosion occurred in the Port of Beirut that led to massive damages in the medium surrounding it. Researchers have conducted studies in order to estimate the equivalent explosive mass as well as the damage extent left on structures; however, the studies considered the soil–structure interaction by simple methods. For that, this paper aims to understand the effect of explosion on the grain silo structure present at the port with an emphasis on the soil–structure interaction effects. The structure consists of a group of silos resting on a raft footing that is supported by group of driven piles. A soil–structure model analysis is performed in order to investigate the soil behavior, the damage extent in piles, and the soil–structure interaction due to the Beirut explosion using the CEL (Coupled Eulerian–Lagrangian) approach that suits events involving large deformation. The analysis is performed using the ABAQUS/Explicit FEM software (version 6.14) taking into account the properties of soil medium, the contact algorithm at the soil–structure interface, and the boundary conditions in order to better simulate the real field conditions and ensure accurate results. The work is primarily validated through site data such as the crater size and silo damage.

ARTICLE TITLE	**A Power Electronic Controller Based Algorithm for Output Power Prediction of a PV Panel**
AUTHORS	**Tarnini M. , *Saab K.,* El Ghaly A.**
JOURNAL	**International Journal of Renewable Energy Research (IJRER)**
YEAR	2023
PUBLICATION INFO	13(3): 1194-1199
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	The utilization of renewable energy sources, such as solar and wind power, has gained significant momentum in recent years due to concerns about the environmental impact of traditional fossil fuels and the desire for energy independence. Governments, organizations, and individuals around the world are investing in and implementing renewable energy systems at an increasing rate. One such issue is the uneven power generation in large solar panel farms, where different zones are affected by varying weather and sun irradiance conditions. This results in a disparity in power generation between zones. In order to address this problem, this paper proposes a solution of incorporating small PV panels that will act like a PV detector in each zone, which are affected by the same weather and irradiance conditions and have the same azimuth and tilt angles to estimate the output power of PV panels. The PV detector will be loaded to their maximum capacity using a Power Electronic Controller (PEC) of MPPT algorithms cascaded with a well-designed topology that maintains the MPPT is working at its maximum load in all cases.

ABSTRACT

By comparing the instantaneous power generated and the maximum power that can be delivered by the PV detector to the PEC, the power of the zone can be accurately determined. In addition, our MATLAB simulation allows us to implement in real life our theory and being industry applicable with results approximately equal to results shown in MATLAB. Keywords Renewable Energy, Power Generation, Photovoltaic, Sustainability.

ARTICLE TITLE	**A Review on Chemical and Autogenous Shrinkage of Cementitious Systems**
AUTHORS	**Ghanem H., *Ramadan R.,* Khatib J., Adel Elkordi A.**
JOURNAL	**Materials**
YEAR	2023
PUBLICATION INFO	DOI: 10.3390/ma17020283
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Chemical shrinkage (CS) is an intrinsic parameter that may affect the early age cracking of paste, mortar and concrete. It is well known as the driving force of self-desiccation, autogenous shrinkage (AGS) and drying shrinkage. During the first stage of cement hydration (at the initial setting time), the CS and AGS are equal. In the hardened stages, there is a difference in values between the two shrinkage parameters. This paper is a comprehensive review on CS and AGS, measurement techniques, modeling and prediction of different cementitious systems. Based on the various experimental studies, chemical shrinkage depends on the water to binder ratio (w/b) and is proportional to the degree of hydration. A low w/b ratio leads to high CS and AGS. The composition of cement has an effect on both CS and AGS. Also, incorporating supplementary cementitious materials (SCMs) affects both shrinkage parameters. It is concluded that adding fly ash (FA) to concrete contributes to CS and AGS reductions. However, this is not the case when concrete contains slag. More than 170 references were consulted including 35 which were published after 2020. According to the author's knowledge, there is no published work on the effect of fibers, especially bio-fibers, on the chemical shrinkage of cement-based composites. Therefore, in addition to traditional chemical shrinkage of cementitious systems, this review includes a section on recent papers conducted by the authors on the effect of bio-fibers on the chemical shrinkage of cement composites. Keywords: autogenous shrinkage; chemical shrinkage; paste; mortar.

ARTICLE TITLE	**A Secure and Resilient Smart Energy Meter**
AUTHORS	***Hseiki H.,*** El-Hajj A., Ajra Y., Hija F., **Haidar A.**
JOURNAL	**IEEE Access**
YEAR	2024
PUBLICATION INFO	12(1): 3114-3125
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	The expansion of the Internet of Things (IoT), Smart Grids (SG), and renewable energy sources has created a greater need for effective cybersecurity measures. These systems need to be protected from all threats in order to maintain continuity and functionality. Smart grids are made up of integrated modules that rely on essential data communication. Each module is exposed to different cybersecurity issues that, if compromised, will affect the entire system. This study addressed the security and data integrity issues in smart energy meters (SEMs), which are critical components in smart grid networks. After a comprehensive review of existing products and their features, a security-focused design for the SEM was proposed. The proposed solution provides a multi-level design to ensure the hardware, communication, and data security of the SEM. The solution mitigates Distributed Denial of Service (DDoS) attacks, data integrity issues, data privacy and energy theft. The security of a smart meter depends on securing two-way data communication, data processing and data integrity. To achieve this goal, the authors leveraged LoRaWAN technology in smart grid communications and unidirectional data transmission to ensure network security and resilience.

ARTICLE TITLE	**A Strategic Framework for Attaining Golden Leed Certification for Resorts**
AUTHORS	**Mohamad Soliman M.,** *Jawad H., Younes M., El Hamaoui O., Ramadan S.*
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2024
PUBLICATION INFO	DOI: 10.54729/2959-331X.1126

THEME / SUBTHEME	Science and Technology/Environmental Issues
ABSTRACT	The contemporary landscape of engineering is witnessing a pivotal shift towards sustainability, encapsulated in the catchphrase «GO GREEN». This global trend underscores a strategic emphasis on sustainable design, where engineering projects prioritize a delicate balance among environmental, societal, and economic considerations." However, a persistent challenge in construction projects lies in their tendency to neglect environmental impact, contributing to increased contamination levels. This paper aims to introduce the «Lodge in the Green» project, meticulously aligned with LEED Certification principles. LEED, or Leadership in Energy and Environmental Design, stands as the foremost green building rating system, highlighting its relevance in contemporary sustainable engineering practices." Employing a qualitative approach, this paper systematically explores various facades of the «Lodge in the Green» project, commencing with a thorough illustration of the strategic pathway to attain the looked-for LEED certification. Subsequently, performing a detailed examination of the fixtures strategically selected in the project to fulfill LEED criteria. Additionally, the analysis delves into the project›s quantifiable achievements in energy efficiency, water conservation, and overall environmental stewardship. As for the impact of applying LEED criteria, it led to a 30% increase in water efficiency. In turn, this got translated into a decreased pumping demand for the water network resulting in 35% less greenhouse gas emissions. The former offered 18% savings over a 30-year period after assessing the short-term financial costs and the long-term savings. Last but foremost, by implementing the outlined strategy, "Lodge in the Green" innovatively attains 78 LEED points through its infrastructure design, which aligns with a Gold-LEED certification.

ARTICLE TITLE	**A Three-Phase Multilevel Inverter Synthesized with 31 Levels and Optimal Gating Angles Based on the GA and GWO to Supply a Three-Phase Induction Motor**
AUTHORS	Hussein T., Ishak D., **Tarnini M.**
JOURNAL	**Energies**
YEAR	2024
PUBLICATION INFO	17(5):1-22
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation

ABSTRACT

A three-phase multilevel inverter (MLI), synthesized with 31 levels in regard to its output voltage, is used to provide the AC supply to a three-phase, squirrel cage induction motor. The gating angles required for the 30 power switches on the MLI are optimized using both the genetic algorithm (GA) and the grey wolf optimizer (GWO), in which the optimal angles are determined through solving the trigonometric equations taken from Fourier analysis to target the minimum total harmonic distortion (THD) at the MLI output. A simulation model and an experimental prototype are developed for performance analysis and validation. The results demonstrate that the MLI is effectively able to produce 31 levels of three-phase AC output voltage, with the THD not exceeding 5% when loaded with a resistive load and a three-phase induction motor. The voltage and current are measured and recorded for different loads and operating conditions, including the amount of energy consumed by the load. The results of the frequency analysis demonstrate that most of the triple harmonics, which can harm the efficiency of the inverter, are cancelled.

ARTICLE TITLE	**Behavior of Concrete Mixes using Recycled Aggregate confined with Steel Sections confined with Steel Sections**
AUTHORS	*Kassem L., El-Masri A.,* **Wehbi N.**
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2024
PUBLICATION INFO	5(1): 1-13
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation
ABSTRACT	Concrete removal following the destruction of old buildings and roadways is frequently deemed useless and dumped as demolition waste. Breaking up the used concrete is how the Recycled Concrete Aggregate (RCA) created. The use of recycled aggregate has been the subject of studies aimed at «green» building for the past 50 years. In addition, the construction industry has seen an increase in demand for strong structures, particularly when seismic retrofitting of earthquake-prone structures is a common problem of great political and social significance that can be solved by steel wrappers around the column. Several studies had attempted to experimentally study the effect of using recycled aggregate in concrete. However, literature lacks the use of recycled concrete aggregate wrapped with steel rings. Therefore, the purpose of this study is to present a clear result for the circular concrete columns behavior and analytical flexural strength enhancement of the RC columns caused by the application of steel plates. Many studies have been investigated to reduce the harm resulted by construction applications on the environment and to promote recycling of crushed concrete. The behavior of recycled aggregate concrete with replacement percentages of 0%, 25%, 50%, 75%, and 100% was examined by N.K. Bairag et al., (1993) using three water cement ratios of 0.57, 0.50, and 0.43.

ARTICLE TITLE	**Characterization and Optimization of Mechanical Properties in Design Materials Using Convolutional Neural Networks and Particle Swarm Optimization**
AUTHORS	**Ali M.,** Hussein M.
JOURNAL	**Asian Journal of civil engineering**
YEAR	2023
PUBLICATION INFO	1(1):1-15
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Recent years have seen the rise of sophisticated materials in design and manufacture. They are crucial in many industries because of their strength, fexibility, and durability. While efective, conventional techniques of describing these qualities may be time-consuming and may not fully use the considerable quantity of data available. Integrating machine learning and intense learning with material science processes may solve the issue. In this research, we use convolutional neural networks (CNNs), known for image and pattern recognition, to understand material microstructure patterns and forecast their mechanical properties. PSO is used to enhance and optimize these predictions. Our technique uses a CNN-based system to create, train, and validate models for material property predictions and a unique PSO-CNN integration to maximize model parameters and prediction accuracy. Our studies showed that the dataset›s mean ultimate strength is 572.75 MPa, a standard for CNN training. Data variability necessitates complex CNN architectures with PSO-optimizing parameters. Poisson›s ratio and density fluctuations suggest material modification. This study establishes a framework for characterizing and optimizing mechanical characteristics in design materials and links computational methods to real-world material science applications.

ARTICLE TITLE	**Chemical Shrinkage, Autogenous Shrinkage, Drying Shrinkage, And Expansion Stability of Interfacial Transition Zone Material Using Alkali-Treated Banana Fiber for Concrete**
AUTHORS	**Al-Massria G., Ghanem H., Khatib J.,** Kırgız M., **Elkordi A.**
JOURNAL	**Journal of Structural Integrity and Maintenance**
YEAR	2024
PUBLICATION INFO	9(3): 1-17
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	It might be of interest for authors to learn more that in the early 1900s, fibers were used in cement-based material, as cement-based materials exhibit shrinkage cracking over time, which can be controlled by adding fibers. The main aim of the inserting natural fiber into cement-based material is to decrease the shrinkage of cement-based material, prevent the rising of shrinkage cracks, and develop low-cracking cement-based material. In the research, the same aim aforementioned was kept same way. For carrying out the aim, agricultural waste, known as banana fiber (BF), can be considered a shrinkage reducer, expansion stabilization, a renewable material and has potential to make cement-based material transformed into a green construction material. This research investigated the effect of BF incorporation on cement paste shrinkage. Thus, five mixes were developed with different BF additions based on the total volume of cement paste (0, 0.5, 1, 1.5 and 2%). For each mixture, four tests were carried out to assess the impact of BF addition on the paste's volume stability: chemical, autogenous, drying shrinkage and expansion. Testing was conducted for up to 90 days. Compared to the control mix, the addition of 2% BF reduced chemical shrinkage, autogenous shrinkage, drying shrinkage, and expansion by 27%, 57%, 47%, and 66%, respectively. Furthermore, a positive correlation was observed between chemical shrinkage and both autogenous and drying shrinkage and the percentage of BF content. Conversely, there was an inverse relationship between chemical shrinkage and expansion. The most significant conclusion to emerge from this study is that the incorporation of banana fiber (BF) into alkali-treated concrete results in a reduction in chemical shrinkage, autogenous shrinkage, drying shrinkage, and expansion. This is attributed to the molecular structure of BF, which is characterized by uninterrupted glycosidic linkages, leading to alkaline breakdown within the alkaline environment. Consequently, the alkali-treated BF can be described as a volume stability admixture in concrete technology.

ARTICLE TITLE	**Compensating Voltage Waveform Distortions Using a Practical Topology of Series Active Power Filters**
AUTHORS	**El Ghaly A., Tarnini M.,** Barakeh Z., Chahine K.
JOURNAL	**Results in Engineering**
YEAR	2024
PUBLICATION INFO	21(3):1-17
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation
ABSTRACT	Addressing harmonics, voltage sags, voltage swells, and asymmetrical variations is essential to seamlessly integrate renewable energy sources, electric vehicle charging stations, and power electronics devices into electric power grids. These issues can significantly impact the sinusoidal symmetry of voltage waveforms. Series Active Power Filters (APFs) present a promising solution that can dramatically improve power quality (PQ) by effectively addressing voltage distortions. This paper first identifies several topology-related impracticalities in the existing literature on series APFs, such as using nonlinear loads or linear loads with a current source. Secondly, to understand the motivations behind these impracticalities, commonly used reference extraction methods, namely, Instantaneous Reactive Power Theory (IRPT) and Synchronous Reference Frame (SRF), are tested on a practical topology consisting of a distorted voltage source and a linear RL load. Results conducted in the MATLAB/Simulink environment show that IRPT fails to extract the reference signal under the practical topology, and SRF leads to unacceptable THDs surpassing the 5% threshold mandated by relevant standards set forth for such applications. Thirdly, the matrix pencil method (MPM), a model-based parameter estimation technique that exploits a voltage waveform›s underlying exponential signal model to extract the series APF›s reference voltage, is proposed. Extensive simulations showcase the superior performance of the MPM-based series APF. It successfully reduces voltage total harmonic distortion (THD) to below 1.13% across various scenarios, including situations involving harmonic-polluted voltage sources, incorporating nonlinear loads, sag and swell phenomenon, and capacitor utilization in DC link implementation.

ARTICLE TITLE	**Control of a Novel Parallel Mechanism for the Stabilization of Unmanned Aerial Vehicles**
AUTHORS	**Chamas M.,** Amine S., Hanna E., Mokhiamar O.
JOURNAL	**Applied Sciences**
YEAR	2023
PUBLICATION INFO	13(5):1-20
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	The use of delivery drones is currently hindered by the inability of transported objects to maintain a steady position, which can result from roll-, pitch-, and heave-induced vibrations. This paper proposes a novel parallel manipulator for stabilizing the platform of unmanned aerial vehicles. The proposed mechanism builds upon an existing study of a 3-SRR/SRU parallel stabilizing mechanism by incorporating the dynamical properties of the system into the control model. The resultant control technique is then applied to both the 3-RRS and 3-SRR mechanisms, and a comparative study is conducted to identify the most reliable stabilizer for regulating the platform's orientation. The results demonstrate that the 3-SRR mechanism exhibits superior robustness and stability characteristics compared to the other two mechanisms. Additionally, the 3-SRR mechanism is controlled using artificial neural networks, which significantly improves the accuracy and stability of the system. Overall, this research presents a novel and effective solution for stabilizing the platform of unmanned aerial vehicles, with significant implications for the development of delivery drone technology.

ARTICLE TITLE	**Control of a Rectangular Impinging Jet: Experimental Investigation of the Flow Dynamics and the Acoustic Field**
AUTHORS	**Assoum H.,** El Kheir M., Afyouni N., El Zohbi B., Meraim K., Sakout A., El Hassan M.
JOURNAL	**Alexandria Engineering Journal**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.aej.2023.07.078

THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Passive control techniques of impinging jets are of high interest for many industrial applications and particularly for noise generation issues encountered in such configurations. Thus, an experimental study was carried out to simultaneously show the effect of a mechanism of control on the acoustic and the dynamic fields involved in a rectangular jet of air impinging on a slotted plate. A Reynolds number of Re = 5900 presenting an intense acoustic level was considered. The mechanism of control consists on a thin rod which was introduced in different positions of the flow. A total number of 1085 spatial positions of the rod were tested in order to identify the optimal position for noise reduction. Combined Stereoscopic Particle Image Velocimetry measurements were performed to obtain the kinematic field in the whole area of interest from the both sides of the introduced rod. A new representation of the acoustic levels (cartography of acoustic level as function of the location of the rod) is provided to identify the optimal positions of control. It was found that when the self-sustaining tone loop disappears, the sound pressure levels can drop by almost 23% depending on the location of the rod. A Dynamic Mode Decomposition (DMD) was established and cross-correlations were calculated between temporal modes and acoustic signals for both controlled and not controlled cases. The cross-correlations between the acoustic signal and the temporal modes were found to be insignificant in case of controlled flow. Moreover, in case of controlled flow, spatial modes were found to be significant far from the slot which plays a principal role in the self-sustaining tones by interacting with the passage of vortices through it. These results are of interest since the visualization of the flow dynamics and the corresponding vortex activity explains the disappearance of the selfsustaining loop and the sound pressure level changes. Such results are of high interest for developing new strategies of noise control.

ARTICLE TITLE	**Computational Simulation and Analysis of Local Thermal Comfort and Indoor Air Quality in Space with Displacement Ventilation**
AUTHORS	**Kanaan M.,** Amine S., Hanna G.
JOURNAL	**Engineering, Technology & Applied Science Research**
YEAR	2024
PUBLICATION INFO	14(5): 16383-16388
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation

ABSTRACT

Displacement ventilation has been known for its capacity to lower energy consumption and improve air quality, but it has major thermal comfort limitations. The aim of this paper is to optimize the DV supply conditions by using computational fluid dynamics modeling to achieve acceptable CO_2 concentration in the breathing layer at minimum energy cost while preventing local discomfort due to draft and air temperature difference between ankles and head. The results revealed that up to 44% energy savings can be achieved if the selection of supply conditions is optimized. The model can be put into practice to give recommendations on displacement ventilation preliminary design.

ARTICLE TITLE	**Dynamic Response of Steel-Concrete Beams With Partial Interaction Due To Moving Loads**
AUTHORS	**Ali M., El Dandachy M.,M. Ellakany A.**
JOURNAL	Revista Ciencia y Construcción
YEAR	2023
PUBLICATION INFO	4(4):6-22
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Purpose–The main purpose of this paper is to propose a numerical model, which represents the dynamic responses of elastic steel-concrete beams. Design/methodology/approach–The numerical model is based on the lumped system with the combination of the transfer matrix method (TMM) and the analog beam method (ABM). The composite beams that are widely used in the construction of highway bridges are composed of an upper concrete slab and a lower steel beam, connected at the interface by shear transmitting studs. The field and point transfer matrices for the beam element of the elastic composite beams are derived. The present model is verified and applied to study the dynamic response of elastic composite beams subject to both moving force and mass. The effects of shear stiffness between the upper slab and lower beam and moving load velocity on the steel-concrete beams deflection are shown. Findings–Results indicate that the maximum deflection in the composite beam subjected to moving load, is significantly affected by the level of interaction between sub-beams and by the load type and velocity. Originality/value–Recently, a numerical model based on the lumped system with the combination of the TMM and the ABM was proposed to study the response of elastic steel-concrete beams with partial interaction, limited to static loading solely. In this study, the current proposed model is developed to study the dynamic response of steel-concrete beams with partial interaction due to moving loads of various velocities. The advantage of the proposed model, unlike previous models that are based on the combination of (TMM) and (ABM), is the ability to study the dynamic behavior of the elastic steel-concrete beams with various end and intermediate conditions and different types and velocities of moving loads.

ARTICLE TITLE	**Effect of a Control Mechanism on the Interaction between a Rectangular Jet and a Slotted Plate: Experimental Study of the Aeroacoustic Field**
AUTHORS	Afyouni N., Alkheir M., **Assoum H.,** El Zohbi B., Meraim K., Sakout A., El Hassan M.
JOURNAL	**Fluids**
YEAR	2023
PUBLICATION INFO	8(12): 309-328
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	The aeroacoustic field of a rectangular subsonic jet impinging on a slotted plate was investigated experimentally using microphones and stereoscopic particle image velocimetry (S-PIV). The study was carried out with a Reynolds number of 6700 and an impact distance of 4 cm. The current configuration represents a benchmark standpoint, featuring high levels of generated noise. A control mechanism consisting of a thin rod was introduced downstream from the jet exit to suppress the self-sustained tones. A total of 1085 positions of the rod between the jet exit and impinging plate were tested to identify positions of optimal noise reduction. Two zones were distinguished in terms of control efficacy: a zone where the sound pressure level (SPL) dropped by up to 19 dB and another zone where the SPL increased by up to 14 dB. The velocity fields show that the presence of the rod divides the jet into two lateral secondary jets on both sides of the main jet axis. The outer part of the secondary jets expanded radially with less interaction with the plate compared to the case without the control. This behavior affected the deformation of vortices against the slot. Proper orthogonal decomposition was applied to the velocity field for a better understanding of the turbulence dynamics with and without the control rod.

ARTICLE TITLE	**Effect of Different Activation Techniques on the Engineering Properties of Cement-Free Binder Containing Volcanic Ash and Calcium Carbide Residue**
AUTHORS	Bawab J., El Dieb A., ElHassan H., **Khatib J.**
JOURNAL	**Construction and Building Materials**
YEAR	2024
PUBLICATION INFO	408(133734): 1-15
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering

ABSTRACT

This study developed a cement-free binder using volcanic ash (VA) and calcium carbide residue (CCR) as an alternative binder to cement. First, the optimal proportions of VA and CCR were determined to achieve superior flow, compressive strength, and bulk electrical resistivity. After that, various activation techniques, namely physical (sieving the CCR on sieve No. 325), chemical (adding 1 % NaOH by binder mass to the paste), and thermal (curing the paste in an oven at 65°C for 24 h), were used either exclusively or synergically to enhance the performance. The results show that the optimum VA:CCR was 95:5. The flow increased by chemical activation but decreased with physical activation. Using subsequent physical and chemical activation led to a slight increase in flow. Binders subjected to physical activation followed by thermal activation had the highest compressive strength of 31.2 MPa at 28 days of curing. In contrast, subsequent combined chemical and thermal activation produced superior bulk resistivity of 193 Ω.m at the same age compared to other activation techniques. Nevertheless, all activation techniques improved the strength and bulk resistivity. The calorimetric analysis confirmed that the emitted heat increased with different activation methods compared to the mix without activation, which agreed with compressive strength results. X-ray diffraction (XRD) analysis showed that the reaction products were calcium-silicate-hydrate and calcium-aluminate-silicate-hydrate gels. Scanning electron microscope (SEM) images confirmed that different activation techniques resulted in a denser microstructure than the inactivated VA-CCR paste. This cement-free binder contributes to the ongoing efforts to reduce the carbon footprint of cement-based materials by finding sustainable alternative binders to cement.

ARTICLE TITLE	**Effect of Elevated Temperatures on Compressive Strength, Ultrasonic Pulse Velocity, and Transfer Properties of Metakaolin-Based Geopolymer Mortars**
AUTHORS	**El Dandachy M.,** *Hassoun L.,* El-Mir A., **Khatib J.**
JOURNAL	**Buildings**
YEAR	2024
PUBLICATION INFO	7(2126): 1-21
THEME / SUBTHEME	Science and Technology/Green and Bio-Materials

ABSTRACT

This study aims to investigate the impact of moderate and elevated temperatures on compressive strength, mass loss, ultrasonic pulse velocity (UPV), and gas permeability of mortars made using metakaolin (MK) or Ordinary Portland cement (OPC). The geopolymer mortar comprises MK, activated by a solution of sodium hydroxide (SH) and sodium silicate (SS) with a weight ratio of SS/SH equal to 2.5. For most of the tests, the MK and OPC mortar specimens were cured for 7 and 28 days before exposure to elevated temperatures, ranging from 100 °C to 900 °C in increments of 100 °C. In the permeability tests, conducted at temperatures ranging from 100 °C to 300 °C in 50 °C increments, the results revealed significant findings. When exposed to 200 °C, MK geopolymer mortar demonstrated an increase in compressive strength by 83% and 37% for specimens initially cured for 7 and 28 days, respectively. A strong polynomial correlation between UPV and compressive strength in MK mortar was observed. Prior to heat exposure, the permeability of MK mortar was found to be four times lower than that of OPC mortar, and this difference persisted even after exposure to 250 °C. However, at 300 °C, the intrinsic permeability of MK mortar was measured at 0.96 mD, while OPC mortar exhibited 0.44 mD.

ARTICLE TITLE	**Efficient Energy Utilization: Harnessing Waste Heat in Injection Molding Machines**
AUTHORS	**Assoum H.**
JOURNAL	International Journal on Technical and Physical Problems of Engineering
YEAR	2024
PUBLICATION INF	16(60): 1-16
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT O	Waste heat management is gaining significance in contemporary industrial operations due to the interconnected goals of enhancing energy efficiency and promoting environmental sustainability. The current research was conducted with the main aim of examining the usage of waste heat for a plastic plant located in Lebanon. Using the ASPEN PLUS program, the study carefully assessed three different thermal cycles, namely the Lithium Bromide Absorption (LBA), the Ammonia-Water Absorption (AWA) and the organic Rankine cycle (ORC). The results indicated that the LBA and AWA cycles demonstrated a near alignment with the desired temperature output for cooling purposes in industrial settings. However, the LBA cycle emerged as the leading option upon analyzing efficiency. Therefore, this study shows that using LBA cycle has a significant potential for effectively managing waste heat in comparable industrial environments. This approach effectively addresses the critical considerations of temperature output and efficiency, offering a well-rounded solution.

ARTICLE TITLE	**Effect of Incorporating Cement and Olive Waste Ash on the Mechanical Properties of Rammed Earth Block**
AUTHORS	**Ghanem H.,** *El Bouz C., Ramadan R.,* Trad A., **Khatib J,. Elkordi A.**
JOURNAL	Infrastructures
YEAR	2024
PUBLICATION INFO	9(8): 1-20
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	Rammed earth blocks have recently gained substantial popularity in construction materials due to their environmental benefits, energy saving, and financial effectiveness. These benefits are even more pronounced if waste materials such as olive waste ash (OWA) are incorporated in rammed earth blocks. There is limited information on the use of OWA in rammed earth blocks. This paper investigates the use of OWA and cement in improving rammed earth block characteristics. OWA was incorporated to partially replace the soil by 10, 20, 30 and 40% of its weight and cement was added in percentages of 2, 4, 6 and 8% by the dry weight of the composite soil. Proctor, unconfined compressive strength (UCS), and California Bearing Ratio (CBR) tests were performed at 7, 28, and 56 days. Results indicated that OWA inclusion decreased the maximum dry density while it increased the optimum moisture content. However, cement addition improved the maximum dry density of soil. The UCS results revealed that OWA possessed cementitious and pozzolanic behavior, and soil mechanical properties improved by up to 30% due to OWA inclusion, after which there was a significant drop of 40%. The trend in the CBR results was similar to those of UCS. To further clarify the experimental results, a mathematical model was proposed to determine the variation in strength as a function of time. Furthermore, correlations between soil mechanical properties were conducted. Predicted equations were developed to determine the properties of rammed earth block. All in all, the inclusion of OWA in cement stabilized earth block suggests the potential to improve the properties of rammed earth blocks.

ARTICLE TITLE	**Effect of Adding Phragmites-Australis Fiber on the Mechanical Properties and Volume Stability of Mortar**
AUTHORS	**Khatib J.,** ***Ramadan R.,*** **Ghanem H., Elkordi A.**
JOURNAL	**Fibers**
YEAR	2024
PUBLICATION INFO	12(14):1-20
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	In this research, the investigation focuses on the influence of Phragmites-Australis (PA) fibers on the mechanical properties and volume stability of mortar. A total of four mixtures were employed with varying amounts of locally sourced PA fibers ranging from 0.5% to 2% (by volume). Testing includes flexural strength, compressive strength, chemical shrinkage, drying shrinkage, autogenous shrinkage, and expansion. The findings show that the use of PA fibers caused a reduction in compressive and flexural strength. However, beyond 3 days of curing, an increase in flexural strength ranging from 7 to 21% was observed at 1% PA fiber compared to the control sample. Furthermore, the addition of PA fibers up to 2% effectively mitigates the dimensional stability of mortar samples. A gradual decrease in chemical, autogenous, and drying shrinkage as well as expansion occurs in mortar samples when % of PA fibers increases. At 180 days, this reduction was 37, 19, 15 and 20% in chemical shrinkage, autogenous shrinkage, drying shrinkage, and expansion, respectively, for a mix containing 2% PA fiber. Additionally, a hyperbolic model is proposed to predict the variation of length change with time. Also, a strong relationship is observed between chemical shrinkage and other length change parameters. Consequently, the environmentally friendly utilization of PA fibers demonstrates its potential to significantly enhance mortar durability in construction applications.

ARTICLE TITLE	**Effect of Mix Design Parameters on the Properties of Cementitious Composites Incorporating Volcanic Ash and Dune Sand**
AUTHORS	Bawab J., El Dieb A., El Hassan H., **Khatib J.**
JOURNAL	**Developments in the Built Environment**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.dibe.2023.100258
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	This study examines the properties of cementitious composites incorporating volcanic ash (VA) and dune sand. The effect of five mix design parameters was studied using the Taguchi method. The fresh, mechanical, and durability properties of sixteen mixes were evaluated. To convert the evaluation from single criterion to multi-criteria, a hybrid Taguchi-TOPSIS was employed. Results showed that the optimum composite mix was made with a binder content of 500 kg/m3, a water-to-binder ratio of 0.5, VA replacement of 20%, dune sand replacement of 20%, and SP content of 0.75%. The optimum mix had a flow, final setting time, 28-day compressive strength, volume of permeable voids, and calcium leaching strength retention of 175 mm, 440 min, 50.5 MPa, 11.3%, and 78.8%, respectively. Portlandite, tobermorite, and gismondine were characterized as hydration products, while calcite and dolomite were also detected. This work provides an advanced understanding of the impact of mix design parameters on various properties while optimizing their levels for superior performance.

ARTICLE TITLE	**Effect of Plant-based natural fibers on the mechanical properties and volume change of cement paste**
AUTHORS	***Ramadan R.,*** **Ghanem H., Khatib J., ElKordi A.**
JOURNAL	**International Journal of Building Pathology and Adaptation**
YEAR	2024
PUBLICATION INFO	DOI: 10.1108/IJBPA-11-2023-0166
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering

ABSTRACT

Purpose
The purpose of this paper is to check the feasibility of using biomaterial such as of Phragmites-Australis (PA) in cement paste to achieve sustainable building materials.

Design/methodology/approach
In this study, cement pastes were prepared by adding locally produced PA fibers in four different volumes: 0%, 0.5%, 1% and 2% for a duration of 180 days. Bottles and prisms were subjected to chemical shrinkage (CS), drying shrinkage (DS), autogenous shrinkage (AS) and expansion tests. Besides, prism specimens were tested for flexural strength and compressive strength. Furthermore, a mathematical model was proposed to determine the variation length change as function of time.

Findings
The experimental findings showed that the mechanical properties of cement paste were significantly improved by the addition of 1% PA fiber compared to other PA mixes. The effect of increasing the % of PA fibers reduces the CS, AS, DS and expansion of cement paste. For example, the addition of 2% PA fibers reduces the CS, expansion, AS and DS at 180 days by 36%, 20%, 13% and 10%, respectively compared to the control mix. The proposed nonlinear model fit to the experimental data is appropriate with R2 values above 0.92. There seems to be a strong positive linear correlation between CS and AS/DS with R2 above 0.95. However, there exists a negative linear correlation between CS and expansion.

Research limitations/implications
The PA used in this study was obtained from one specific location. This can exhibit a limitation as soil type may affect PA properties. Also, one method was used to treat the PA fibers.

Practical implications
The utilization of PA fibers in paste may well reduce the formation of cracks and limit its propagation, thus using a biomaterial such as PA in cementitious systems can be an environmentally friendly option as it will make good use of the waste generated and enhance local employment, thereby contributing toward sustainable development.

ARTICLE TITLE	**Enhanced CPU Design for SDN Controller**
AUTHORS	**Haidar A., Bazzi H.**
JOURNAL	**Micromachines**
YEAR	2024
PUBLICATION INFO	15(8): 1-17
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

Software-Defined Networking (SDN) revolutionizes network management by decoupling control plane functionality from data plane devices, enabling the centralized control and programmability of network behavior. This paper uses the ternary system to improve the Central Processing Unit (CPU) inside the SDN controller to enhance network management. The Multiple-Valued Logic (MVL) circuit shows remarkable improvement compared to the binary circuit regarding the chip area, propagation delay, and energy consumption. Moreover, the Carbon Nanotube Field-Effect Transistor (CNTFET) shows improvement compared to other transistor technologies regarding energy efficiency and circuit speed. To the best of our knowledge, this is the first time that a ternary design has been applied inside the CPU of an SDN controller. Earlier studies focused on Ternary Content-Addressable Memory (TCAM) in SDN. This paper proposes a new 1-trit Ternary Full Adder (TFA) to decrease the propagation delay and the Power–Delay Product (PDP). The proposed design is compared to the latest 17 designs, including 15 designs that are 1-trit TFA CNTFET-based, 2-bit binary FA FinFET-based, and 2-bit binary FA CMOS-based, using the HSPICE simulator, to optimize the CPU utilization in SDN environments, thereby enhancing programmability. The results show the success of the proposed design in reducing the propagation delays by over 99% compared to the 2-bit binary FA CMOS-based design, over 78% compared to the 2-bit binary FA FinFET-based design, over 91% compared to the worst-case TFA, and over 49% compared to the best-case TFAs.

ARTICLE TITLE	**Enhanced Performance of Intensity Modulation with Direct Detection Using Golay Encoded Nyquist Pulses and Electronic Dispersion Compensation**
AUTHORS	Barakat J., **El Falou A.,** Gürkan Z., Alboon S.
JOURNAL	**IEEE Photonics Journal**
YEAR	2024
PUBLICATION INFO	DOI:10.36227/techrxiv.170629701.19828079/v1
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	The performance of intensity modulation (IM) with direct detection (DD) transmission systems is enhanced through a novel combination of multidimensional coding, Nyquist pulse shaping, and electronic dispersion compensation (EDC) at the transmitter using a finite impulse response (FIR) filter. A 24- dimensional (24D) extended Golay binary code effectively transforms each incoming 12-bit message into a 24-bit codeword, achieving a coding efficiency of 0.5 bits per symbol for a 56 Gb/s on-off keying (OOK) transmission over 80 km of single mode fiber. While this encoding process introduces a 50% overhead, the required bandwidth is maintained at 56 GHz through doubling the symbol rate and the application of Nyquist pulse shaping with a raised cosine (RC) profile and a roll-off factor of zero, resulting in a flat power spectral density.

ABSTRACT

This flat distribution contrasts with standard OOK transmission at 56 Gb/s with a roll-off factor of 1.0, where signal power is predominantly concentrated in the lower frequency range. One of the key advantages of the 24D Golay code is its substantial error correction capability. However, the benefits of this multidimensional coding and Nyquist pulse shaping extend beyond error correction. It is shown that, while both the proposed and standard OOK methods exhibit comparable performance in a white Gaussian noise channel at back-to-back, they differ significantly under frequency selective power fading conditions caused by the interplay of chromatic dispersion (CD) and direct detection. The misalignment between the frequency notches introduced by the FIR pre-EDC and those inherent in the channel response, especially severe at lower frequencies, favors transmission schemes with a flat power spectral density, like the 24D Golay-coded Nyquist pulses.

ARTICLE TITLE	**Evaluation and prediction of design-time product structural analysis assistance using XGBoost and Grey Wolf Optimizer**
AUTHORS	**Ali M.,** Mohammad Hussein M.
JOURNAL	**Asian Journal of civil engineering**
YEAR	2023
PUBLICATION INFO	1(1):1-15
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

To do this study›s goal, parametric modeling, fnite-element analysis (FEA), and advanced optimization techniques will be used to rate the features of fxator products. The application of Grey Wolf Optimization (GWO) and XGBoost is employed to improve the accuracy of forecasts. A total of 89 distinct fxator product cases were analyzed in this study, utilizing SolidWorks CAD and ANSYS FEA software. Six geometric features were collected, and calculations on physical attributes were conducted. Exploratory data analysis (EDA) is a systematic approach used to thoroughly examine and develop a full grasp of a dataset before making any substantial fndings or generating assumptions. This study provides evidence that notable enhancements in model performance can be attained. This basic version of the XGBoost model does a great job of predicting the future. Its mean absolute error (MAE) is about 0.213, its mean squared error (MSE) is about 0.084, its root-meansquared error (RMSE) is about 0.290, and its coefcient of determination (R2) is about 0.942. The application of Grey Wolf Optimization (GWO) has exhibited notable efectiveness in improving the hyperparameter optimization procedure. The enhanced XGBoost model exhibits noteworthy enhancements in multiple performance metrics. These improvements consist of a reduction in the mean absolute error (MAE) by 0.040, a decrease in the mean squared error (MSE) by 0.005, a decrease in the root-mean-squared error (RMSE) by 0.069, and an increase in the R-squared (R^2) value to 0.997.

ABSTRACT

Upon comparing the observed and predicted values, it becomes apparent that the GWO-optimized model has a greater level of precision and accuracy. This paper presents real-world evidence that supports the idea that creating datasets, doing exploratory analysis, and adjusting hyperparameters are very important for making structural evaluation work well during the design phase. The introduction of improved decision-making processes throughout the product design phase can lead to advancements in the reliability and performance of fixators.

ARTICLE TITLE	**Experimental and numerical investigation on the behavior of reinforced concrete walls strengthened by steel members**
AUTHORS	**Edlebi G., Masri A., Baalbaki O., Wehbi N.**
JOURNAL	Asian Journal of Civil Engineering
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s42107-023-00943-4
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

Reinforced concrete (RC) walls are commonly used in various structural applications due to their ability to withstand lateral loads and provide increased resilience. This study primarily focuses on understanding the bending characteristics and lateral resistance of RC walls, with a specifc emphasis on investigating a standard section compared to its enhancement through the incorporation of steel members. The research aims to examine the stifness, load-carrying capacity, displacement, and failure mode of RC walls through practical experiments and subsequent numerical validation using Abaqus software. The analysis involves a scaled specimen, which, after reaching the point of failure, underwent a strengthening strategy. This approach involved attaching diagonal steel plates to the upper part of the wall and steel members to the lower portion, referred to as the second specimen. The investigation explores how strengthening the wall with steel members afects both its resilience and failure mode. Notably, the Abaqus model efectively simulates the lateral response of the analyzed specimens, with slight variations from the experimental results that fall within an acceptable range. Then, the efect of steel plate thickness on the behavior of the studied strengthened specimen was conducted numerically. The incorporation of steel members on both the upper and lower parts of the wall has successfully prevented sudden failure, reduced cracking, increased load-carrying capacity, and enhanced stifness and ductility. Based on the presented results, this strengthening technique can be considered a practical retroftting method that ofers rapid implementation, a signifcant increase in the load-bearing capacity of damaged walls, and eliminates the need for building excavation.

ARTICLE TITLE	**Experimental Investigation of the Aero-Acoustics of a Rectangular Jet Impinging a Slotted Plate for Different Flow Regimes**
AUTHORS	El Zohbi B., **Assoum H.,** Alkheir M., Afyouni N., Meraim K., Sakout A., El Hassan M.
JOURNAL	**Alexandria Engineering Journal**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.aej.2023.12.047
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Impinging jets are found in many industrial applications and specifically in ventilation systems. Mostly, these jets are turbulent and under certain conditions can be a source of discomfort in closed areas due to the high level of noise it can generates. Therefore, it is very important to understand the flow dynamics that is responsible of generating the acoustic field in order to control and reduce such phenomenon. In this paper, an experimental study of a rectangular impinging air jet on a slotted plate is considered for three different Reynolds numbers producing self-sustaining tones (Re = 4100, 5100, and 5900). The sound pressure and spatial velocity field are obtained simultaneously using four microphones located at different locations and SPIV technique. Results show that Re = 5100 correspond to a critical regime where there is a significant drop in the sound pressure level (SPL) that reached 5 dB when compared to a lower Reynolds number Re = 4100. The flow dynamic analysis suggests that this drop in SPL could be contributed to the path followed by the large coherent structure at Re = 5100, where they are deviated in the transverse direction along the wall leading to low energy transfer from the dynamic field to the acoustic one. However, at Re = 4100 and 5900 the peak in SPL could be contributed to the two paths followed by the large coherent structures and particularly to the path where vortices hit the slotted plate before escaping through it. This path is responsible for the optimization of energy transfer from the dynamic field to the acoustic field. Moreover, at Re = 5900 the spectrogram of the instantaneous frequency and instantaneous flow dynamics results show that the acoustic frequencies (160 Hz and 320 Hz) are generated by symmetric and anti-symmetric modes respectively. This unusual aspect is related to the sudden changes in vortex mode.

ARTICLE TITLE	**Geothermal Energy Concept Applied to All-Air HVAC System**
AUTHORS	**Darwiche M.,** Rabih A., Faraj J., Keniar M., Akl I., Ali S., Murr R., Khaled M.
JOURNAL	**Journal of Physics: Conference Series**
YEAR	2024
PUBLICATION INFO	DOI: 10.1088
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	The novel method of combining geothermal energy with an all-air heating, ventilation, and air conditioning (HVAC) system is presented in this work. A building in Lebanon serves as the case study, which aims to determine the necessary mass flow rate for the conditioned space. Rather than permitting ambient air to enter the Air Handling Unit (AHU) directly, the plan calls for a 2-meter-deep geothermal duct to be buried. By adjusting the air temperature prior to it entering the AHU, this geothermal duct helps to improve the efficiency of the HVAC system and lowers the AHU›s yearly energy usage. Furthermore, the idea guarantees that there will always be 100% fresh air available, which means that the all-air HVAC system won›t need to recycle treated air from the conditioned space—also known as return air. According to the findings, the heat rate of the geothermal duct may reach 210 kW, which would result in a large decrease in CO2 emissions and cost savings for the HVAC system.

ARTICLE TITLE	**High Performance and Lightweight Single Semi-Lattice Algebraic Machine Learning**
AUTHORS	**Haidar I.,** Sliman L., Damaj I., **Haidar A.**
JOURNAL	**IEEE Access**
YEAR	2024
PUBLICATION INFO	DOI: 10.1109/ACCESS.2024.3376525
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

Algebraic machine learning is a novel parameter-free model that has demonstrated impressive accuracy in challenging tasks such as the MNIST dataset and N-Queens completion. However, its utilization of two semi-lattices can lead to significant computational demands. To tackle this issue, a solution has been proposed that employs a single semi-lattice model, resulting in reduced memory requirements and improved efficiency. This research endeavors to bridge the gap between algebraic concepts and programming concepts, thereby making them more accessible to a broader range of researchers. This paper presents the development of a lightweight single semi-lattice algebraic model. The implementation achieved remarkable accuracy on the MNIST dataset of handwritten digits, with an error rate of 2.7%, a False Positive Rate (FPR) of 2.5%, and a False Negative Rate (FNR) of 4.4%. This work holds great significance due to its ability to explain the algebraic model in a simpler manner compared to the original work, while also serving as a proof of concept. Additionally, it studies the memory and time performance of the novel model with an average of 383 MB and 3 hours per digit.

ARTICLE TITLE	**Improved Flow Regime Identification and Novel Scaling Approach to Construct Type Wells for Multiply-Fractured Horizontal Wells**
AUTHORS	**Harkouss R.,** Jha H., Lee J.
JOURNAL	**Arabian Journal for Science and Engineering**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s13369-024-09315-9
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation

ABSTRACT

This paper introduces a robust framework for applying multi-segment Arps production decline models, specifically for ultra-low-permeability resource development with multi-fractured horizontal wells. In contrast to the industry's common use of two- or three-segment Arps models for production forecasting, this study outlines four distinct flow regimes: early ramp-up, transient flow with constant b, transition flow over a log cycle with continuously changing b, and boundary-dominated flow with constant b (typically $0.3 < b < 0.5$). The methodology estimates the durations of these flow regimes and predicts their start and end times, significantly enhancing individual well forecast accuracy. Additionally, the paper suggests a simple approach to scale production histories from wells to common reference conditions, including average permeability in the stimulated reservoir volume, fracture half-length, stage spacing, and lateral length. It involves identifying transient flow end time, comparing observed and dimensionless rates in Wattenbarger's solution. This technique adeptly handles variations among wells in a region, crucial for constructing representative type wells and minimizing uncertainty in statistical analyses.

ABSTRACT

This is achieved by expressing transient linear flow variables in dimensionless terms, enabling the normalization of rate-time profiles to selected reference conditions, ultimately proving effective in constructing representative type-well production profiles from groups of analog wells. Determining the end of transient flow presents a challenge, with permeability estimates reflecting an average across fracture stages influenced by treatments introducing microfractures and re-opened natural fractures. We also advise caution in interpreting fracture half-length. Further research is needed to explore the impact of production from outside the stimulated reservoir volume, inter-well interference, and to validate scaling methods in other oil fields.

ARTICLE TITLE	**Innovative Model-Free Onboard Diagnostics for Diesel Particulate Filter**
AUTHORS	**Youssef B.**
JOURNAL	**SAE International Journal of Engines**
YEAR	2023
PUBLICATION INFO	17(3):1-12
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

Recent legislations require very low soot emissions downstream of the particulate filter in diesel vehicles. It will be difficult to meet the new more stringent OBD requirements with standard diagnostic methods based on differential sensors. The use of inexpensive and reliable soot sensors has become the focus of several academic and industrial works over the past decade. In this context, several diagnostic strategies have been developed to detect DPF malfunction based on the soot sensor loading time. This work proposes an advanced online diagnostic method based on soot sensor signal projection. The proposed method is model-free and exclusively uses soot sensor signal without the need for subsystem models or to estimate engine-out soot emissions. It provides a comprehensive and efficient filter monitoring scheme with light calibration efforts. The proposed diagnostic algorithm has been tested on an experimentally validated simulation platform. 2D signatures are generated from soot sensor signal for nominal and faulty configurations. Gaussian dispersions on soot estimator (30%) and sensor model (15%) have been considered. Based on a statistical analysis, a relevant threshold is defined satisfying a compromise between non-detection and false alarm rates. The selected threshold is then used for online DPF diagnostic using NEDC cycle. The obtained results are promising and clearly show the performance of the proposed method in terms of non-detection and false alarm rates. The resulting diagnostic scheme can be easily integrated in the ECU for onboard DPF monitoring.

ARTICLE TITLE	**Length change of mortar containing Phragmites Australis Ash (PAA)**
AUTHORS	**Jamal M,. Khatib J., ElKhatib L., Elkordi A.,** Sonebi M.
JOURNAL	**Materials Today: Proceedings**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.matpr.2023.07.105
THEME / SUBTHEME	Science and Technology/Green and Bio-Materials
ABSTRACT	This research is part of an ongoing investigation on the use of Phragmites Australis Ash (PAA) in cementitious systems after the CO2 emissions reached an alarming level. The use of bio-ash materials to replace cement in mortar could benefit the environment by decreasing the dangerous gas emissions since they might be considered as eco-friendly materials. PAA was manufactured in a totally closed container where no CO2 was emitted to the atmosphere. This paper examines the dimensional stability of mortar containing different amounts of PAA as partial cement replacement. Cement was replaced with 0, 10, 20 and 30% PAA (by weight) at a constant water to binder ratio of 0.55. Prismatic specimens were prepared and exposed to different environmental conditions in order to determine the drying shrinkage, autogenous shrinkage and expansion. For the drying shrinkage, specimens were left exposed to ambient conditions. The specimens for autogenous shrinkage were wrapped in order not to allow moisture to leave or penetrate into the specimens. For the expansion measurements, specimens were immersed in water tank. The length change was monitored up to 90 days where its values decreased with the increase in PAA percentage in the mortar mix. The results indicate that PAA can be used to partially replace the cement and recommendations were made for future research.

ARTICLE TITLE	**Mechanical and Durability Properties of Geopolymer Concrete–A Review**
AUTHORS	**Khatib J., Elkordi A.,** *Al Aridi F., El Khatib L.*
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2022
PUBLICATION INFO	DOI: 10.54729/SUIQ7034

ABSTRACT

Owing to the ongoing increase in human population, there is a need for more construction projects including residential buildings and other amenities. Concrete is by far the dominant material used in construction and cement is a main ingredient. Cement manufacture is an energy intensive process and emit large amounts of carbon dioxide into the atmosphere. A reduction in the amount of cement used in construction is greatly beneficial. The use of geopolymer or alkali activated materials can serve this purpose as it attempts to totally replace cement in concrete. Geopolymers are materials that consist mainly of silica and alumina materials and activated using alkali such as sodium silicate and sodium hydroxide. This paper attempts to review recent articles on the production and properties of geopolymers and alkali activated materials. Different hardened, structural, and durability properties are studied. These include; compressive strength, flexural strength, modulus of elasticity, ultrasonic pulse velocity, shrinkage, expansion, creep, weight loss, carbonation, sulfate, and corrosion.

ARTICLE TITLE	**Methods and Surface Materials Repair for Concrete Structures – A Review**
AUTHORS	*ElKhatib L.,* **Elkordi A., Khatib J.**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2023
PUBLICATION INFO	DOI: 10.54729/2706-784X.1099
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Nowadays, concrete is considered to be the most used building material all over the whole world. This is due to a variety of reasons including the wide availability of concrete raw materials, low relative cost compared with other construction materials and the unique properties of concrete such as, the ability to be formed in many different shapes and its good mechanical and durability properties if proper curing is employed. However, one of the biggest and most significant problems facing the concrete structures is the occurrence of cracks (Cusson, 2009; Alexander et al., 2008). Concrete structures should be inspected periodically, with a possible repair if required, in order to avoid the propagation of cracks that may lead to structural problems and results in the failure of the structure or building (Dehn et al., 2015). These cracks may occur due to several problems ranging from inadequate design details, rebar corrosion, fatigue, chemical attack, settlements, etc… (Recommendation, 1994). Also, one of the most hazardous issues leading to the existing of cracks is the natural disasters such as earthquakes (Ma et al., 2017; Nandakumar, 2020). The presence of cracks is not always risky and adequate repair strategy can be implemented to rehabilitate the structure.

ABSTRACT

In order to ensure the safety of structures and buildings, early inspection is necessary for early detection of cracks (Kannan et al., 2022; Verma et al., 2022). Despite the fact that cracks cannot be prevented completely, they can be controlled with appropriate repair techniques and materials (Yanez, 2018; Delatte, 2009; Silva et al., 2017). A good repair will avoid the risks and improves the function of the concrete structure and its performance. However, the main parameters that should be considered and studied when examining the cracks. These include the dimensions of the cracks, location and the environment surrounding the cracks. Also, the selection of the material used to repair certain crack is of high importance since each material have its unique properties and can be used in specific locations only. In addition, in recent years, concrete mixes contain cement replacement materials (ElKhatib et al. 2021, Khatib et al., 2021; Katman et al., 2022; Laidani et al., 2022; ElKhatib et al., 2022; Khatib et al., 2020;) and recycled materials (Bawab et al., 2021; Ramakrishnan et al., 2021; El Bast et al., 2021; Bawab et al., 2021; Ghanem et al., 2023). This may affect the presence of cracks and the repair strategy.

ARTICLE TITLE	**Multi-Criteria Optimization of SBR-Modified Mortar Incorporating Polyethylene Terephthalate Waste**
AUTHORS	El-Mir A., Fayad T., Assaad J., **El Dandachy M., Khatib J.,** El-Hassan H.
JOURNAL	**Case Studies in Construction Materials**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.cscm.2024.e03295
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	Thermosetting post-consumer plastics like polyethylene terephthalate (PET) raise serious recycling challenges, leading frequently to disposal through incineration or landfilling. This study assesses the feasibility of cementitious materials containing PET additions including the influence of cement content, water-to-cement ratio (w/c), styrene-butadiene rubber (SBR) polymer additions, and PET volume on the fresh and hardened properties. The mixture proportioning followed the Taguchi methodology, which entailed the utilization of four factors, each possessing three different levels to create an L9 orthogonal matrix. The assessment included diverse performance indicators such as flow, compressive strength, flexural strength, bond strength, water absorption, and resistance to carbonation. Test results revealed that the incorporation of SBR and PET degraded the compressive strength, albeit this can be restored by increasing the cement content and/or reducing w/c. The addition of SBR significantly improved the flexural and bond strengths yet curtailed the water absorption and resistance to carbonation due to increased closed porosity that facilitated the transport properties.

ABSTRACT

The multi-criteria optimization approach (TOPSIS) indicated that superior performance can be achieved using a cement content of 525 kg/m3, w/c of 0.55, SBR of 3.5 %, and PET incorporation of 4.5 %. These parameters were subsequently employed in the development of multivariate regression models, allowing for the prediction of fresh and hardened properties in SBR-PET mortar.

ARTICLE TITLE	**Physical, Mechanical and Transfer Properties at the Steel-Concrete Interface: A Review**
AUTHORS	*Hachem Y.,* **El Dandachy M., Khatib J.**
JOURNAL	**Buildings**
YEAR	2023
PUBLICATION INFO	13(4):10-100
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	The steel-concrete interface (SCI) is extensively acknowledged to affect the durability of reinforced concrete. The main objective of this paper is to conduct a state-of-the-art review that contributes to sufficient knowledge on the determination of the SCI properties and its effect on the overall performance of reinforced concrete elements. The physical characteristics at the SCI are influenced by segregation, flow, hydration, and drying shrinkage of concrete, hence affecting the presence of voids and cracks within this interface. The bond strength is one of the measures of the SCI and this is conducted through pull-out, push-in, and tie-beam testing. It was shown that the rebar shape and diameter, the anchorage length, the concrete grade strength, binder type (geopolymer concrete), and the distribution of aggregates have a significant effect on the interface properties and behavior, where geopolymer concrete offered improved bond behavior over conventional concrete. Various studies have demonstrated that the presence of the steel-concrete interface and the application of mechanical stresses contribute to the flow transfer (inflow/outflow) through the reinforced concrete structure. Some of these studies focused on the initial state of the SCI within the structure, and some conducted tests with shear loading on the SCI. Regarding the transfer properties at the SCI, it was shown that the presence of steel rebar, crack dimensions, degree of saturation of concrete, and the concrete mix design, influence the permeability of the concrete, specifically at the vicinity of the SCI, because of the development of micro-cracks at the interface. In other studies, the shear stresses were also found to affect the transfer properties through the SCI. Researchers have implemented several software solutions such as finite element models on ABAQUS and mesoscale numerical simulations and have used machine learning models that predict and verify the effects of bond failure behavior at the SCI. Good agreement was established between the numerical and actual experimental results.

ABSTRACT

The influence of different exposure conditions on the steel-concrete interface that change throughout time needs to be dealt with, which includes moisture-related environmental conditions, variation in temperature, and chemical exposure. Furthermore, the influence of structural loading, such as “creep effect”, deterioration (ageing) of material must be studied at the interface. The studies were limited to short-term behavior.

ARTICLE TITLE	**Prediction of an Efficient Energy-Consumption Model for Existing Residential Buildings in Lebanon Using an Artificial Neural Network as a Digital Twin in the Era of Climate Change**
AUTHORS	**El-Gohary M.,** El-Abed R., Omar O.
JOURNAL	**Buildings**
YEAR	2023
PUBLICATION INFO	13(2):1-21
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Environmental factors, such as climate change, have serious consequences for existing buildings, including increased resource consumption and footprint, adverse health effects, and reduced comfort for the occupants. To promote sustainability and address climate change, architecture must embrace digitalization. Buildings can be built digitally, analyzed in real time, optimized for energy consumption, and utilized to reduce carbon emissions and achieve zero energy consumption using digital twin technology. Currently, Lebanon’s residents are turning to solar power to generate renewable energy as a result of a lack of energy supplied by the government. In this study, a digital twin model was designed using an artificial neural network (ANN) to investigate the energy consumption of residential buildings. The main idea was to assist architects and engineers in forecasting energy consumption for different design materials by selecting the most effective alternate design for materials with building envelope characteristics, such as exterior walls, roof insulation, and windows, to minimize the consumption of energy in a residential building, hence resulting in a green building. The data simulations used in the digital twin model were carried out using Quick Energy Simulation Tool (eQuest) software; 1540 simulation results were used for different thicknesses of insulation material, values of conductivity, and window types. The digital twins were designed using an artificial neural network model. The results of the investigation and the accompanying eQuest output results were found to be precise and very similar.

ARTICLE TITLE	**Preliminary Water Quality Assessment Using Canadian Water Quality Index of Ras El-Ain Ponds, South Lebanon *(Joint Publication with Faculty of Science)***
AUTHORS	*Fayad H.,* **Baydoun S., Soliman M.**
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2024
PUBLICATION INFO	DOI: 10.54729/2959-331X.1108
THEME / SUBTHEME	Science and Technology/ Environmental Issues
ABSTRACT	Water quality deterioration in Lebanon is a pressing national issue and there is a high need for continuous water quality assessment and monitoring of water bodies in the country. This study aims at assessing water quality of Ras El-Ain Ponds, a major natural water resource for domestic use in Tyre district, South Lebanon by using the widely applied Canadian Council of Ministers of the Environment Water Quality Index (CCME WQI). Sampling was conducted during February-March, 2023 and physiochemical and microbiological water quality parameters were determined using standardized methods. Assessed parameters in our study are temperature, turbidity, electrical conductivity (EC), total dissolved solids (TDS), pH, ammonia, nitrite, nitrate, chloride, hardness, sulfate, orthophosphate, total organic carbon, fluoride and E. coli which is considered as a main indicator of fecal contamination of waterways. CCME WQI was calculated following the Canadian Water Quality Guidelines in view of the permissible levels set by the World Health Organization (WHO), Lebanese Standards Institution (LIBNOR) and CCME. With the exception of marginal levels of EC and TDS according to WHO and CCME, assessed water quality parameters were within the permissible ranges of standards for domestic water use. As for the CCME WQI, the obtained values fell between 90.73 and 94.42 % which indicates a “Good Quality” level confirming the suitability of water for domestic use. This research presents the first attempt to evaluate the CCME WQI of Ras El-Ain Ponds for quality monitoring and proper decision making. More comprehensive validation of CCME WQI that covers temporal and climatic variabilities is recommended for the assessment process.

ARTICLE TITLE	**Properties of Mortar Containing Phragmites Australis Ash**
AUTHORS	**Khatib J.,** *ElKhatib L.,* Assaad J., **El Kordi A.**
JOURNAL	Journal of Engineering, Design and Technology
YEAR	2023
PUBLICATION INFO	DOI: 10.1108/JEDT-12-2022-0610
THEME / SUBTHEME	Science and Technology/ Green and Bio-Materials
ABSTRACT	Purpose – The purpose of this paper is to examine the use of phragmites australis ash (PAA) in cementitious systems to achieve sustainable construction. Design/methodology/approach – In this paper, the properties of mortar containing PAA as partial cement replacement are determined. The PAA is produced through slow burning in a closed system to minimize the CO2 emission. A total of four mortar mixes are prepared with PAA replacement levels ranging from 0% to 30% by weight. The water to binder and the proportions of binder to sand are 0.55 and 1:3 by weight, respectively. The properties tested are density, compressive strength, flexural strength, ultrasonic pulse velocity, water absorption by total immersion and capillary rise. Testing is conducted at 1, 7, 28 and 90 days. Findings – While there is a decrease in strength as the amount of PAA increases, there is strong indication of pozzolanic reaction in the presence of PAA. This is in agreement with the results reported by Salvo et al. (2015), where they found noticeable pozzolanic activities in the presence of straw ash, which is rich in SiO2 and relatively high K2O content. At 90 days of curing, there is a decrease of 5% in compressive strength at 10% PAA replacement. However, at 20% and 30% replacement, the reduction in compressive strength is 23% and 32%, respectively. The trend in flexural strength and ultrasonic pulse velocity is similar to that in compressive strength. The water absorption by total immersion and capillary rise tends to increase with increasing amounts of PAA in the mix. There seems to be a linear relationship between water absorption and compressive strength at each curing age. Research limitations/implications – The Phragmites australis plant used in this investigation is obtained from one location and this present a limitation as the type of soil may change the properties. Also one method of slow burning is used. Different burning methods may alter the composition of the PAA.

ARTICLE TITLE	**Refractory Concrete Properties—A Review**
AUTHORS	*ElKhatib L.,* **Khatib J.,** Assaad J., **Elkordi A. , Ghanem H.**
JOURNAL	Infrastructures
YEAR	2024
PUBLICATION INFO	9(8): 1-37
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Due to the large increase in human population, the need for more buildings and other amenities is widening. Concrete is considered one of the most abundant and popular materials used in the structure and construction fields. It is known as a composite mix composed of cement and aggregates including fine and coarse and water. Despite its good properties, its capability to be formed in different shapes and its ability to resist severe conditions, concrete will struggle with the presence of extremely high temperatures. So, different types of concrete must be found to resist those challenging conditions. Refractory concrete can be considered a good choice to be used in places exposed to elevated temperatures and severe conditions. Mainly, refractory concrete is made up of ordinary Portland cement replacement well known as refractory cement, specific types of fine and coarse aggregates and are known as refractory or temperature-bearing aggregates and water. To the best authors' knowledge, review papers about refractory concrete are rare. For this reason, more than 65 papers were consulted including many recently published. This review describes the different types of materials used in refractory concrete. Furthermore, the different fresh, hardened, structural, durability and thermal properties of refractory concrete are also included such as slump, density, compressive strength, flexural strength, tensile strength, modulus of elasticity, ultrasonic pulse velocity, shrinkage, mass loss, porosity, water absorption, damage level and thermal conductivity.

ARTICLE TITLE	**Relationships between Mortar Spread and the Fresh Properties of SCC Containing Local Metakaolin**
AUTHORS	Barkat A., Kenai S., Menadi B., El-Kadri H., **Khatib J.**
JOURNAL	**Infrastructures**
YEAR	2023
PUBLICATION INFO	DOI: 10.3390/ infrastructures8100137
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Self-compacting concrete (SCC) production is a complex operation that requires finding a good combination and suitable dosages for its constituents. Several formulation methods have been developed to meet the workability requirements of SCC. Mortar spread is used to estimate SCC's rheological properties, but the use of supplementary cementitious materials, such as metakaolin, could affect the accuracy of the estimation. In this paper, the relationships between the fresh properties of local-metakaolin (MK)-based SCC and the spreading of its mortar portion were investigated. The results showed the existence of good correlations between the spreading of mortar portion of SCC and its fresh state properties. The partial substitution of cement with MK did not affect these correlations. The mortar flow should be chosen according to the required rheological properties of the SCC. This can be achieved by using an appropriate viscosity-enhancing agent (VEA).

ARTICLE TITLE	**Restoration of Qaraoun Lake Aquatic Life Based on Wetland Treatment Concept**
AUTHORS	Khatib M., **Kahil M., Soliman M.**
JOURNAL	**Heliyon**
YEAR	2023
PUBLICATION INFO	9(1): 1-7
THEME / SUBTHEME	Science and Technology/Environmental Issues
ABSTRACT	Qaraoun Lake, the largest artificial lake in Lebanon, suffered severe environmental issues due to discharging untreated domestic and industrial wastewater into it, throwing garbage, which transformed this lake into waste storage instead of using the water for agricultural purposes and making the surrounding places attractive for tourists as was before. Moreover, the violations on Litany River, Lebanon›s main artery, also affected Qaraoun Lake. Therefore, this main reservoir suffers from annual blooms of potentially toxic cyanobacteria. Recently, tons of fish are washed up at the surface of the water, agricultural areas are irrigated with polluted water and the Qaraoun Lake is no longer an attractive touristic place. Besides, the climate change represented in lower precipitation and higher evaporation rates in the past few years in addition to the increase in the water demand due to the growth in the local population and the refugees from nearby countries have affected the vulnerability of the water sector in Lebanon. All these issues have resulted in the deterioration of the water quality, generating environmental issues, and seriously affecting the ecosystem. The purpose of this research is to investigate possible remediation strategies, which could help in the restoration of the Qaraoun reservoir. For this purpose, the Litani River water quality and hydrological data are collected from the Litani River Authority (LRA). Moreover, a hydrodynamic water quality model has been developed using Mike21 in order to restore the lake›s aquatic life by eliminating the Litani River nutrients through constructed wetland concept, which reasonably simulated the water quality parameters of Qaraoun Lake. Consequently, the wetland could remarkably reduce the Litani River pollutants by 85%, 43.7%, 57%, and 56% for BOD, Phosphorous, Nitrate, and Ammonia, respectively. The resulted treated water, after passing the wetland, successfully improved the lake water quality and may lead to re-originate its ecosystem.

ARTICLE TITLE	**Rheological, Mechanical and Durability Performance of Some North African Commercial Binary and Ternary Cements**
AUTHORS	Mokhtaria Benkaddour M., Kenai S., Yahiaoui W., Bensaci H., **Khatib J.**
JOURNAL	**Case Studies in Construction Materials**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.cscm.2023.e02689
THEME / SUBTHEME	Science and Technology/Green and Bio-Materials

ABSTRACT

Mineral additions are used in most cement plants for ecological and economic reasons. The variation in the type and source of these mineral additions has a strong influence on the characteristics of cements, which makes it difficult for site engineers to predict the performance of self-compacting mortars and concretes based on these cements and choose the appropriate type for a particular application. This study aims at contributing to the characterization of two binary (limestone or pozzolan) and two ternary (limestone with pozzolan or limestone-slag) commercial cements in North Africa and their influence on the rheology and mechanical and durability performance of self-compacting mortars (SCM) at early age and long term. V-Funnel, the Marsh cone and a rheometer were used to measure the rheological properties. Also, the heat of hydration, total shrinkage, mechanical strength, capillary water absorption and resistance to acid (HCl and H2SO4) and sulfate (Na2SO4 and MgSO4) were evaluated. The results showed the need for the appropriate choice of cement according to the desired performance at the fresh and hardened state. The benefit of using ternary cement with improved workability, decrease in viscosity and yield stress, reduced sorptivity, and higher compressive strength at long term and better resistance to sulfate and acid attacks has been proven. It has been shown that CEM II/A (L+S) improves workability as it significantly decreases viscosity (60 %) and yield stress (76 %); reduces sorptivity (22 %), improves compressive strength at a long term (19 %) and enhances resistance to sulfuric acid (32 %). The CEM II/A (L+Z) reduces porosity (19 %) and increases resistance to sulfate attack by 25 % and 57 % under Na2SO4 and MgSO4 respectively). The best behavior towards HCl attack is that of CEM II/A-Z which presents the lowest values of total shrinkage and hydration heat.

ARTICLE TITLE	**Simplified Control for Torque and Speed Ripple Mitigation in Brushless DC Motors**
AUTHORS	**El Ghaly A., Tarnini M.**
JOURNAL	**International Journal of Smart Grid**
YEAR	2023
PUBLICATION INFO	8(1): 12-19
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Brushless DC motors are characterized by their reliability, low inertia, fast response, and low maintenance. Unlike the conventional DC machines, the BLDC uses permanent magnets in place of brushes, resulting in lower maintenance requirements. Brushless DC motors produce constant torque under ideal conditions, with a trapezoidal back electromotive force (emf). Utilizing power electronic components for commutation in brushless DC motors causes harmonics in the armature current leading to large output torque ripples. This paper proposed a simplified circuit to minimize torque and speed waveform ripples.

ABSTRACT

The circuit incorporates a simple filter, PI controller, and PWM, eliminating the need for a high computational processor. This enables easy execution and reduces the control circuit›s energy footprint, resulting in low running costs with a simple design. The proposed circuit was simulated using PSIM software and the results confirm the ability of the circuit to minimize the torque and speed ripples to acceptable values for real and sensitive applications.

ARTICLE TITLE	**Structural and Magnetic Investigation of novel oxide/ ferrite (1-x)MgFe 2O4/(x)Mn1.95Sn0.05O3 nanocomposites**
AUTHORS	*Noureddine S.,* **El Ghouch N., Awad R.**
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2024
PUBLICATION INFO	DOI:/10.1016/j.physb.2023.41541
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	Oxide/ferrite nanocomposites are gaining great attention due to the induced exchange interactions between the different phases. Herein, the weak ferromagnetic MgFe2O4 nano-ferrites are combined with antiferromagnetic Mn1.95Sn0.05O3 nano-oxides, via co-precipitation and ball milling. The synthesized samples demonstrated the combination of ferrite and oxide phases, as confirmed by XRD analysis. This combination also generated two distinct morphologies and particle size distributions, as seen in TEM images. The SAED images depicted the polycrystalline nature of the samples. The XPS technique detected the spin-orbit doublets of the main spectral lines, revealing their different oxidation states. FTIR assisted the merged phases by the presence of multiple vibrational bands. The nanocomposites exhibited weak ferromagnetic nature, emerging from the uncompensated surface spins, as seen in M – H loops. Besides, the switching field distribution curves indicated the exchange coupling between the two phases. EPR spectra showed a decrease in g values as Mn1.95Sn0.05O3 content increased.

ARTICLE TITLE	**Synergetic Impact of Volcanic Ash and Calcium Carbide Residue on the Properties and Microstructure of Cementitious Composites**
AUTHORS	Bawab J., El-Hassan H., ElDieb A., **Khatib J.**
JOURNAL	**Construction and Building Materials**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.conbuildmat.2024.137390
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	The synergetic impact of using volcanic ash (VA) and calcium carbide residue (CCR) on the engineering properties of cementitious mortar was assessed. Cement was replaced with VA at 0–40 % by mass and/or CCR at 0–20 % by mass. Blended mortars were tested for flow, setting time, compressive strength, and ultrasonic pulse velocity (UPV). The flow increased when using VA but decreased with the inclusion of CCR. Compared to the cement-based control mix, ternary mixes had a lesser flow. The impact of VA replacement on the initial and final setting times was marginal until a substitution rate of 40 %, after which the setting times were prolonged. Similarly, the setting time was extended with CCR replacement. The compressive strength and UPV improved with the use of 10–20 % VA and/or 5 % CCR for binary and ternary mortar mixes, with the highest strength of 55.4 MPa and UPV of 4490 m/s being recorded for the mix comprising 20 % VA and 5 % CCR. Mixes were further analyzed through isothermal calorimetry, X-ray diffraction, and scanning electron microscopy. The cumulative heat generation was reduced for binary and ternary mixes except for those containing 20 % VA only. The microstructure analysis highlighted the formation of C-S-H and C-A-S-H as reaction products and the consumption of Ca(OH)2. This study provides novel insights into optimal combinations of VA and CCR for superior mortar performance, offering practical approaches to reducing cement content and lowering carbon emissions without compromising performance.

ARTICLE TITLE	**The Stabilization of Clayey Soil by using Sawdust and Sawdust Ash**
AUTHORS	**Fawaz A., Alhakim G., Jaber L.**
JOURNAL	**Environmental Technology**
YEAR	2024
PUBLICATION INFO	DOI: 10.1080/09593330.2024.2304674
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Soil stabilisation by waste materials has been recently employed to enhance soil engineering properties. The purpose of this study is to compare the impact of utilising sawdust in its raw form versus sawdust ash as a soil stabiliser. This is to determine if sawdust (SD) can be considered as a substitute for sawdust ash (SDA) in order to reduce incineration and air pollution. To fulfil this aim, the Atterberg limits, modified Proctor test, and Direct Shear test were performed on both stabilised and non-stabilised mixtures of clayey soil. The soil was treated with 2%, 5%, 8%, 12%, 15%, and 20% by soil dry weight of both SD and SDA. The findings show that the use of SD and SDA leads to a reduction in the plasticity index and the maximum dry unit weight of the soil while increasing its optimum moisture content. The bearing capacity of the soil was greatest at 5% for both SD and SDA, with SD exhibiting a greater enhancement (31.89%) than SDA. Therefore, it is recommended to utilise SD instead of SDA for soil stabilisation due to its superior effectiveness and less harmful environmental impact.

ARTICLE TITLE	**Trapped Mass Estimation in Automotive Diesel Engines Based on in-Cylinder Pressure Signal Projection**
AUTHORS	**Youssef B.**
JOURNAL	International Journal of Adaptive Control and Signal Processing
YEAR	2023
PUBLICATION INFO	1(1):1-17
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Cylinder pressure signal provides key feedback information that allows for several engine monitoring and control capabilities. During the last few years, the use of cylinder pressure traces for advanced combustion strategies has become the focus of several research works. This is primarily due to the availability of reliable and inexpensive cylinder pressure sensors with expected durability that meets the vehicle lifetime. In this context, several approaches have been proposed to determine the engine trapped mass from the cylinder pressure measurements. A recent innovative approach for trapped charge determination based on a two-dimensional graphical signature is proposed in a previous work. The resulting estimator uses cylinder pressure signal as a unique input and allows to deduce the trapped mass on a cycle by cycle basis in steady and transient operating conditions. It has been validated in a wide range of engine operating conditions using instrumentation and industrial cylinder pressure sensors. This paper provides a theoretical framework and in-depth analysis for the signature based trapped mass estimator. A state-space model for in-cylinder conditions during the compression phase that complies with the signature modeling structure is developed. Extensive numerical investigations using an experimentally validated simulation platform are then performed. The objective is to select the optimal signature generation interval that reduces the impact of cycle to cycle fluctuations in terms of intake valve closing temperature and polytropic index. The obtained results are promising and clearly show the performance and robustness of the signature based trapped mass estimator that can provide relevant feedback information for adaptive engine control systems. It can be easily implemented for real-time monitoring and control in industrial automotive applications.

ARTICLE TITLE	**Uncertainty Analysis for the Dynamic Modulus of Recycled Asphalt Mixtures using Unclassified Fractionated RAP Materials**
AUTHORS	Barraj F., Hatoum A., **Khatib J.,** Assaad J., , Alberte C., **Elkordi A.**
JOURNAL	Construction and Building Materials
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.conbuildmat.2024.135721
THEME / SUBTHEME	Science and Technology /Sustainability in Engineering
ABSTRACT	The use of unclassified reclaimed asphalt pavement (RAP) is limited due to concerns about raw material variability, impacting RAP mixture performance consistency. Space constraints lead to aggregating recycled materials from various projects into “unclassified RAP,” hindering its potential benefits. The evaluation of uncertainties, particularly in dynamic modulus |E*|, is crucial for assessing performance and reliability in asphalt mixtures containing unclassified RAP. In this research, A systematic approach for calculating the coarse and fine RAP ratios based on unclassified RAP content, along with regulated processing and fractionation meeting standards was implemented. Then, a probabilistic model was established, utilizing the sigmoidal function, to analyze the uncertainty in |E*| as a function of the reduced frequency for asphalt mixtures with varying unclassified RAP contents (0%, 15%, 25%, and 45%). The findings revealed that |E*| uncertainty was minimal at low temperatures, reasonable at service temperatures, and critical (COV > 30%) at high temperatures for standard and RAP mixtures. Importantly, increasing unclassified RAP content doesn›t worsen |E*| uncertainty. Mixes with high unclassified RAP content showed similar or lower COV values across analyzed frequencies. The proposed approach can reduce COV values in high unclassified RAP content mixes, offering a practical solution to leverage these materials› benefits.

ARTICLE TITLE	**Unveiling Novel APLIS Model for Identifying Groundwater Recharge Zones in Semi-Arid Regions: A Case from Lebanon**
AUTHORS	*Tadmouri R.,* Shaban A., Baghdady K., **Soliman M.**
JOURNAL	**Alexandria Engineering Journal**
YEAR	2024
PUBLICATION INFO	DOI:10.1016/j.aej.2024.04.015
THEME / SUBTHEME	Science and Technology/Environmental Issues
ABSTRACT	The Bekaa Plain in Lebanon, is a major agricultural region known for its fertile soil and extensive crops cultivation using groundwater resources which is recently became under stress due to population growth, urbanization, and climate change. The main aim of this study is to investigate the rate of groundwater recharge (GwR) into this region using APLIS Model which principally depends on altitude, slope, lithology, infiltration, and soil type. Using GIS-based for a multicriteria mapping approach, in this study additional factors were added to the model, by incorporating rainfall rates, stream density, and fracture density. Results revealed various recharge potential area in the Bekaa Plain, with 52 % classified as high to very high GwR zones, equivalent to approximately 42.5 % of precipitated water, which is a testament to the exceptional capacity of the region to replenish groundwater aquifers. The geographic distribution of GwR categories primarily depends on altitude and lithological characteristics. The exceptional GwR potential of the Bekaa Plain holds immense promise for mitigating water scarcity, fostering agricultural productivity, and ensuring the socioeconomic well-being of communities reliant on groundwater resources.

ARTICLE TITLE	**Using Fly Ash-Plastic Mesh Bags Wastes Mixture as A Recoverable Resource for Soil Stabilization**
AUTHORS	*Al Bitar M., Alhakim G. , Jaber L.*
JOURNAL	**International Journal of Geotechnical Engineering**
YEAR	2024
PUBLICATION INFO	DOI: 10.1080/19386362.2024.2345460
THEME / SUBTHEME	Science Technology / Sustainability in Engineering

ABSTRACT

Soil stabilization by waste materials such as fly ash and plastic waste is a sustainable approach that has shown promising improvements. However, research has primarily focused on their individual effects and on the use of conventional plastic materials possessing smooth surface, leaving a gap in understanding the individual and combined influence of plastic mesh textile bags (WPTB), known for their rough texture. The current study aims to assess the soil compaction and shear behaviors treated with fly ash (10-30%) and WPTB at varying lengths and concentrations (0.5-1.5%). Subsequently, a combination of the optimal 25% fly ash with WPTB was evaluated. The results when compared with the untreated soil, indicated significant improvements by 8.93% for dry unit weight, 80.26% for cohesion and 148.4% for angle of friction when combining 25% fly ash with 0.5% plastic strips of 5 cm length. Overall, these materials hold potential for enhancing construction and mitigating environmental hazards.

ARTICLE TITLE	**Variable Speed Induction Motors' Fault Detection Based on Transient Motor Current Signatures Analysis: A Review**
AUTHORS	**Yakhni M.,** Cauet S., Sakout A., **Assoum H.,** Etien E., Rambault L., **El-Gohary M.**
JOURNAL	**Mechanical Systems and Signal Processing**
YEAR	2023
PUBLICATION INFO	184(2023): 1-20
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Induction motor is a major component in the industrial sector. It is experiencing great development concerning size, market share, and technological design. Any sudden failure in this element may lead to great damage. Condition monitoring is a fast emerging technology for the online detection of induction motor incipient faults. It avoids unexpected failure of a critical system, by increasing the life expectancy of the concerning elements while reducing operation and maintenance costs. This paper presents the condition monitoring techniques used with these machines, focusing on the Transient Motor Current Signatures Analysis method that has proven its effectiveness in diagnosing faults of electrical rotating machines, gathering a review on the most important applications that can be used with this technology, and how to process these signals to find out the type and cause of the fault. What distinguishes this paper is that it focuses on applications with variable speeds, so two promising techniques that will be effective in non-stationary signals frequency estimation are presented, which are the Adaptive Notch Filtering method and the Adaptive-Observer approach. Challenges and future goals are also discussed to guide researchers wishing to delve into this field.

ARTICLE TITLE	**Volume Stability and Mechanical Properties of Cement Paste Containing Natural Fibers from Phragmites-Australis Plant at Elevated Temperature.**
AUTHORS	**Ghanem H.,** ***Ramadan R.,*** **Khatib J., ElKordi A.**
JOURNAL	Buildings
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/buildings14041170
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	The utilization of bio-fiber materials in building components has become imperative for improving sustainability, controlling global warming, addressing environmental concerns, and enhancing concrete properties. This study is part of a wide-range investigation on the use of Phragmites-Australis (PhA) fibers in construction and building materials. In this paper, the volume stability and mechanical properties of paste containing PhA fibers and exposed to high temperatures were investigated. Four mixes were made with 0, 0.5, 1, and 2% fibers by volume. To evaluate the volume stability and mechanical properties, the chemical shrinkage, autogenous shrinkage, drying shrinkage, expansion, ultrasonic pulse velocity, compressive strength, and flexural strength were tested. The curing duration and temperature were 180 days and 45 °C, respectively. The results indicated that an addition of PhA fibers of up to 2% resulted in a reduction in all the shrinkage parameters at 180 days. The presence of PhA fibers in the paste tended to reduce the compressive strength, with the lowest value observed at 2%. Apart from the values at 90 days, the optimal flexural strength seemed to be achieved by the paste with 1% PhA fibers. To further elucidate the experimental results, a hyperbolic model was employed to predict the variation in the length change as a function of the curing age with a high accuracy. Based on the results obtained, PhA fibers can play a crucial role in mitigating the shrinkage parameters and enhancing the mechanical properties of cement paste.

ARTICLE TITLE	**Volume Stability of Pervious Concrete Pavement Containing Municipal, Solid Waste Incineration Bottom Ash**
AUTHORS	***Eddine Z.,*** Barraj F., **Khatib J., Elkordi A.**
JOURNAL	International Journal of Pavement Research and Technology
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s8-00379-023-42947
THEME / SUBTHEME	Science and Technology /Environmental Issues
ABSTRACT	Shrinkage is a common cause of cracking in various types of concrete. Several factors can affect the degree of shrinkage, including the use of waste materials like municipal solid waste incineration bottom ash (MSWI-BA) in concrete production. Incorporating MSWI-BA can increase the recycling rate of waste materials in construction, making it a sustainable option. This study particularly focuses on pervious concrete, which has gained popularity as a pavement material for low-volume road applications due to its favorable environmental characteristics. In this study, MSWI-BA aggregates are used to replace natural aggregates (NA) at varying percentages (0%, 25%, 50%, 75%, and 100% by volume). To assess the effect, three volume stability tests (drying, autogenous shrinkage, and expansion) were performed for each mix. These tests were monitored daily for the first week, then once a week until 90 days. The results showed that drying shrinkage increased with MSWI-BA content, especially during the first 2 weeks. However, MSWI-BA aggregates improved autogenous shrinkage by increasing the concrete mix›s moisture content. Additionally, expansion decreased with increased MSWI-BA content because porous MSWI-BA could accommodate the expansion volume.

2. PROCEEDINGS

PROCEEDING TITLE	**A Compact UWB antenna with Dual-Reject Band**
AUTHORS	*Akila H.,* **Halabi H.**
CONFERENCE TITLE	4th IEEE International Multidisciplinary Conference on Engineering Technology (IMCET 23)
DATE	12/12/2023
PLACE	Beirut, Lebanon
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	A compact ultra-wideband antenna with two band-reject characteristics is proposed. Dual rejected frequency bands are attained by etching a psi-shaped slot in the square radiating patch and embedding a pair of E-shaped resonators around the feeding line. The substrate material used is RO4003C with relative permittivity of 3.55 and thickness of 0.813 mm. The designed antenna operates within the 3.4-10.6 GHz frequency range with one reject frequency band at 4.4–5.2 GHz (INSAT-band) and a second reject frequency band at 8.2–9.2 GHz (ITU-8 band). The proposed antenna is compact in size occupying an area of 29 x 22 mm2 and is suitable for ultra-wideband systems.

PROCEEDING TITLE	**Artificial Intelligence-Powered System for Detecting, Diagnosing, and Rehabilitating Strabismus Disorder**
AUTHORS	**Daher A., Ayache M., Zaylaa A.,** *Abo Hadba M., Ayacha Y., Hmadeh H.*
CONFERENCE TITLE	Seventh International Conference on Advances in Biomedical Engineering (ICABME)
DATE	12/10/2023
PLACE	Beirut, Lebanon
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Artificial Intelligence (AI) and machine learning analyze strabismus via Electro-oculography (EOG) signals, addressing eye muscle irregularities. Detecting this disorder›s manifestation in both eyes is challenging, impacting the vision and the 3-dimensional perception. To this purpose, the aim is to develop an ophthalmologist-assisting system that reduces costly interventions like eyewear, lasers, and drugs. EOG signals from electrodes on the face reveal insights, focusing on the Center of Mass (CoM) of the ocular movements. The CoM determines the ocular misalignment extent due to muscle irregularities. Using the same device, ophthalmologists guide patient recovery through gamified exercises. Results highlighted the system›s efficacy in differentiating between normal and aberrant conditions, quantifying deviation, and treating strabismus. In essence, AI and machine learning with EOG signal analysis offer a transformative solution for strabismus, providing early detection, accurate classification, and tailored rehabilitation for this ocular condition. The results of this study also suggested that the K-Nearest Neighbors (KNN) and wavelet decomposition tree methods may be effective for the classification and feature extraction of EOG data in the detection and diagnosis of eye diseases. These methods showed high levels of accuracy, with 98.3 and 98.5% respectively. However, further research is needed to confirm and extend these findings, and to explore the potential of these methods in the context of EOG and eye disease detection.

PROCEEDING TITLE	**Automatic Radial Routing Protocol for Public Transport System**
AUTHORS	**Koleilat H., Doughan Z.,** *Attallah Y.*
CONFERENCE TITLE	2019 Fourth International Conference on Advances in Computational Tools for Engineering Applications
DATE	12/09/2024
PLACE	Beirut,Lebanon
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This paper introduces a new routing methodology for the public transportation system design using Big Data. The new radial routing procedure proposed provides a fast scheme manipulation of a public transport system on a geographic location, which relies directly on the history of daily trips of the citizens associated with their geographic location retrieved from anonymous data provided by mobile operators. The idea behind this procedure is to provide a tool that automatically generates a public transport network by retrieving the points of attraction in a city from GIS maps that holds geographic databases of all important locations in a specific city. When all the points are located, the system starts to analyze the movement of the citizens based on their GSM devices location in this geographic area, and covers all possible required trips to generate a final schedule plan of the Advanced Public Transport System being studied.

PROCEEDING TITLE	**Building a (BCI) Electroencephalogram (EEG) Signals' Classification**
AUTHORS	**Younis M.,** *Sleiman S. ,Khadra S.,* **Zaylaa A. ,Daher A., Ayache M.**
CONFERENCE TITLE	2023 Seventh International Conference on Advances in Biomedical Engineering
DATE	12/10/2023
PLACE	Beirut,Lebanon
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation
ABSTRACT	Development of Brain Computer Interface (BCI) has been rapid since the mid 1990's. There are three criteria for BCI, (i) comfortability and possession of a suitable signal acquisition device, (ii) system validation and dissemination, and (iii) reliability and potentiality. As there are no BCI possessing the optimal criteria, it was essential to consider building a new one. Thereby, the paper investigates building BCI based on the utilization of EEG signals to translate brainwave patterns into actionable commands. The primary objective is to enhance communication capabilities for individuals afflicted with neurological disorders, empowering them to command external devices and engage more effectively with their surroundings. We built our model on EEG online dataset for the purpose of feature extraction and classification. Statistical features and Discrete Wavelet Transform (DWT) have been applied for feature selection. Multi-Layer Perceptron (MLP) and Radial Basis Function (RBF) were the classifiers involved. Results showed that the proposed architecture of MLP and RBF were able to classify the EEG signals into two classes (open eye and closed eye). Results also showed that the proposed approach, which is based on the combination of statistical features and DWT for features selection using AF3 and AF4 channels by the application of MLP, has 98% succession rate. BCI system based on Arduino circuit has been built after the classification Further algorithms and system evaluation need to be considered as future work.

PROCEEDING TITLE	**Behavior of Externally Reinforced Post-Tensioned Shear Walls under Lateral Loads**
AUTHORS	*Edlebi G., Masri A.,* **Wehbi N.,** *Baalbaki O.*
CONFERENCE TITLE	9th International Conference on Civil Structural and Transportation Engineering
DATE	29/8/2024
PLACE	Toronto,Canada
THEME / SUBTHEME	Science and Technology/Environmental Issues
ABSTRACT	In high seismic regions, numerous older reinforced concrete (RC) buildings, constructed before modern seismic codes require strengthen to withstand major earthquakes. This research presents an experimental and numerical investigation of strengthen technique for shear walls that are susceptible to brittle failure modes due to deficient detailing or a lack of properly confined boundary elements. The strengthen process involves the addition of steel members. This study primarily focuses on comprehending the flexural characteristics and lateral resilience of a scaled specimen: post-tensioned (PT) walls. Following testing until failure, a strengthening strategy was implemented by attaching steel components to the lower section in the PT wall. These modified configurations are now recognized as the other specimen. Importantly, the ABAQUS model effectively simulates the lateral response of the tested specimens, with minor variations compared to the experimental results falling within an acceptable range. The strengthened walls exhibited ductile failure, as opposed to the original walls that experienced brittle failure. Furthermore, the incorporation of steel components had minimized cracking, increased load-bearing capacity, and improved stiffness and ductility. This enhancement is anticipated to minimize earthquake-induced damage, leading to shorter repair times.

PROCEEDING TITLE	**Correlation Between Length Change and Mechanical Properties of Mortar Containing Phragmites Australis Ash (PAA)**
AUTHORS	Khatib J., *Khatib L.,* Sonebi M., **El Kordi A.**
CONFERENCE TITLE	International Conference on Bio-Based Building Materials
DATE	29/8/2024
PLACE	Vienna, Austria
THEME / SUBTHEME	Science and Technology/ Green and Bio-Materials
ABSTRACT	Due to the high increase in pollution levels, the use of biomass ashes become a fundamental need. These ashes are considered to be environmentally friendly since they emit less CO2 to the atmosphere than other cementitious materials. This paper is a part of a wide investigation for the use of phragmites australis ashes (PAA) as a cementitious material in mortar mixes. It examines mechanical, durability and length change properties. Length change include drying, autogenous and expansion tests. The test results for total and capillary water absorption at 24 h, at all curing ages 1, 7, 28 and 90 days, show an increase as the percentage of replacing cement by PAA increases from 0 to 30% in increment of 10. Correlations between mechanical and length change properties are also examined.

PROCEEDING TITLE	**Effect of Phragmites Australis Ash (Paa) on the Mass of Mortar Exposed to Dimensional Stability Study**
AUTHORS	**ElKhatib L., Khatib J., Ghanem H., Elkordi A.**
CONFERENCE TITLE	4th International Turkish World Engineering and Science Congress
DATE	3/12/2023
PLACE	Turkey
THEME / SUBTHEME	Science and Technology/ Green and Bio-Materials

ABSTRACT

This research is a part of a wide and ongoing investigation performed on the use of Phragmites Australis Ashes (PAA) as partial cement replacement in mortar mixes. Replacing cement in mortar or concrete by bio-ash materials can be beneficial for the environment after the CO2 emissions due to cement manufacturing process have reached hazardous levels. PAA is burnt in a totally closed container where no CO2 is emitted to the atmosphere. So, PAA can be considered as an environmentally friendly material. This paper examines the mass change of mortar specimens exposed to dimensional stability tests such as drying shrinkage, autogenous shrinkage and expansion containing PAA as partial cement replacement. Cement is replaced by 0%, 10%, 20% and 30% (PAA) by weight with a constant water to binder ratio 0.55 and binder:sand ratio 1:3. The mass change due to drying shrinkage, autogenous shrinkage and expansion is monitored up to 28 days where the results showed a high potential for PAA to be used to partially replace cement in mortar or concrete. Different correlations between mass changes due to different dimensional stability properties are also examined. Results reveal that there is a high relationship between different mass change properties where high correlation coefficients are obtained.

PROCEEDING TITLE	**CFD Study of Prism-Shaped Vortex Generators' Impact within a Coaxial Heat Exchanger**
AUTHORS	El Hassan M., Bukharin N., Alotaib N.i, Matar M., **Assoum H.**
CONFERENCE TITLE	**9th AIGE-IIETA International Conference and 19th AIGE Conference**
DATE	03/06/2024
PLACE	Italy
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation
ABSTRACT	The heat exchanger, as the main element in various types of energy systems, is widely studied in technological and production processes to improve their performance and efficiency. There are various techniques available to enhance the performance of heat exchangers, but in recent years, vortex generators have gained significant attention. Vortex generators (VGs) is a passive control method that can improve heat transfer if properly designed. Vortex generators achieve enhancement by creating transverse, longitudinal, or normal twiddle flows, disrupting the flow field, and improving transport phenomena. The improvement in convective heat transfer coefficient is achieved by increasing fluid mixing, breaking down the thermal boundary layer, and enhancing mean velocity and temperature gradient. In this paper, a coaxial counter-flow heat exchanger was considered.

ABSTRACT

Prism shape vortex generators were installed on the outer surface of the inner tube of the heat exchanger and resulting performance was compared to that of the same heat exchanger without vortex generators. RANS CFD study (SST k-ω turbulence model was used; this model predicts well near-wall turbulence, which is crucial when investigating the impact of vortex generators) demonstrated 13% improvement in heat transfer rate in case of heat exchanger with vortex generators.

PROCEEDING TITLE	**Data-Driven Modeling using Convolutional Neural Network for Experimental Velocity Fields of an Impinging Jet**
AUTHORS	Mjalled A., El Hassa M., **Assoum H.,** Mönnigmann M.
CONFERENCE TITLE	European Modeling and Simulation Symposium, EMSS
DATE	20/09/2023
PLACE	Athens,Greece
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Modeling and analysis of complex flow behavior of impingement jets is a problem of significant importance in many engineering applications. Due to the nonlinear nature of these flows, traditional modeling methods often struggle to provide accurate representation of the flow features. Therefore, the goal of this work is to build a data-driven model for the available data to uncover the hidden features of the underlying dynamics, and to improve analysis and modeling of impinging jets. The available data consist of experimental velocimetry results of a circular impinging jet at a Reynolds number of 1260. The time-resolved particle image velocimetry (TR-PIV) technique was used to obtain velocity field data. An Autoencoder (AE) which is a special type of convolutional neural network is used for data compression and thus to learn the hidden features of the jet. The accuracy for reconstruction purposes was evaluated for various dimensions of the AE latent vector. According to the findings, the flow field image can be reconstructed using only one variable in the latent vector, which corresponds a reduction to 0.0015% in the size of the original flow image. The analysis of the spectral content of the AE variables revealed two primary frequency peaks, which coincided with those identified in the transverse velocity spectrum extracted from the main vortices› path. This suggests a connection between the AE variables and the vortical structures.

PROCEEDING TITLE	**Early Diagnosis of Osteoporosis: An Artificial Intelligence-Based Framework**
AUTHORS	**Amira J., Zaylaa A., Daher A., Ayache M., Omeirat N.,** *Mahmoud R.,* Abou Hawili B.
CONFERENCE TITLE	Early Diagnosis of Osteoporosis: An Artificial Intelligence-Based Framework
DATE	13/10/2023
PLACE	Beirut, Lebanon
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Osteoporosis is a common disease characterized by low bone density and structural deterioration of bone tissue. For a successful course of treatment and fracture avoidance, early diagnosis of this disease is essential. The aim was to provide a novel method for osteoporosis prediction using Artificial Intelligence (AI)-based framework. The purpose was to predict the likelihood of osteoporosis based on the Bone Mineral Density (BMD), along with other characteristics such as age, weight, height, gender, and Body Mass Index (BMI) extracted from medical reports and images collected from a comprehensive medical center in Lebanon. Three machine-learning algorithms were implemented and tested, Logistic Regression (LR), Support Vector Machines (SVM), and Decision Trees (DT). Variety of quantitative statistical metrics were used to evaluate the performance of our framework, upon training and testing our algorithms. The metrics that were employed to evaluate our results included accuracy, precision, sensitivity, and F-score, in addition to the Receiver Operating Characteristic (ROC) Curve and the Area Under the Curve (AUC). Experimental Results demonstrated that both the SVM and LR algorithms achieved the highest accuracy of detection of osteoporosis as compared to existing algorithms applied in this field, with an accuracy of 89%. The sensitivity of diagnosis obtained was 98% by LR and 97% by SVM and surpassed the sensitivity obtained by DT. As such LR showed the best performance. The output of the algorithms could help medical doctors assess patients automatically. These findings demonstrated the potential of AI in osteoporosis prediction and thus prevention, highlighting the significance of early diagnosis. Thereby as a future prospect, choosing carefully the framework is crucial and additional algorithms have to be considered and tested.

PROCEEDING TITLE	**Effect of Elevated Temperatures on the Mechanical Properties of Metakaolin-based Geopolymer Mortars**
AUTHORS	**El Dandachy M.,** *Hassoun L.,* **El-Khatib J.**
CONFERENCE TITLE	4th International Turkish World Engineering and Science Congress, Antalya, Turkey
DATE	30/11/2023
PLACE	Antalya, Turkey
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This experimental study aims to investigate the impact of elevated temperatures up to 900 °C on compressive strength of Metakaolin-based geopolymer mortars compared to Ordinary Portland cement (OPC) based mortar. It employs two distinct experimental approaches: destructive testing to assess compressive strength before and after exposure to heat, and nondestructive testing to evaluate mass loss resulting from heat exposure. The study considers specimens of both OPC and Metakaolin based geopolymer mortars aged for 7 and 28 days, subjected to elevated temperatures, for two-hours in unsealed conditions, ranging from 100 °C to 900 °C with 100 °C increment. Results for 7 days of age are discussed herein, other tests are still ongoing. For the geopolymer mixture, the binder comprises metakaolin, activated by an alkaline solution of sodium hydroxide (SH, NaOH) and sodium silicate (SS, Na2SiO3) with a ratio of SS/SH equals 2.5. Notably, the experiments demonstrate a continuous decrease in compressive strength for 7-day old OPC mortar when subjected to temperatures exceeding 100°C compared to ambient conditions. A decrease of more than 50 % is observed at temperature of 450 °C for OPC mortar of 7 days age. The OPC specimens were completely burst at temperature of 600 °C. However, the metakaolin-based geopolymer exhibits an impressive 45% increase in strength when subjected to up to 400°C compared to ambient conditions, highlighting its superior ability to retain strength at higher temperatures. Additionally, the mass loss for 7-day old OPC mortar exceeds that of the Metakaolin-based geopolymer mortar by approximately 14.33%, while the latter demonstrates minimal mass loss despite exposure to elevated temperature.

PROCEEDING TITLE	**Hexagonal Patch Antenna for Ultra Wide Band Applications**
AUTHORS	**Halabi H.,** *Itani A., Al Khatib M., Kahwaji K.*
CONFERENCE TITLE	2023 IEEE 4th International Multidisciplinary Conference on Engineering Technology
DATE	12/12/2023
PLACE	Beirut, Lebanon
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This work proposes a hexagonal shape patch antenna suitable for ultra-wide band (UWB) applications. The antenna is simulated using CST software and built over Roger RO0043C substrate having a relative permittivity of 3.55, and a height of 0.813 mm. The antenna is fed by a quarter wavelength transformer. Radiation and impedance properties are presented and discussed. Results show that the impedance bandwidth reaches 5 GHz defined by return loss (S11) value of -10 dB. Rectangular slot is utilized in the partial ground plane to improve the bandwidth. The agreement between the measured and simulated values of the antenna return loss proves that the proposed antenna is suitable for UWB applications covering the range between 3.4 GHz to 8.4 GHz.

PROCEEDING TITLE	**Groundwater Recharge Potential and Identifying Suitable Aquifer Recharge Techniques in the Bekaa Plain, Lebanon**
AUTHORS	*Tadmouri R.,* Shaban A., Baghdady K., **Soliman M.**
CONFERENCE TITLE	5th Arab Water Conference, Riyadh
DATE	12/09/2024
PLACE	Riyadh, Saudia Arabia
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	The demand for water in the northern Bekaa Plain is of utmost significance, especially given the substantial portion of land dedicated to irrigated agriculture. Additionally, the region experiences population growth, further exacerbating the water supply challenge. Understanding the groundwater potential zones and identifying appropriate recharge areas are crucial steps towards sustainable water resource management. The study focuses on reaching the best solutions for the study area, by utilizing advanced Geographic Information System (GIS) tools, including overlying slope, rainfall, lithology, attitude, soil, fracture, and stream maps, a Groundwater Potential (GWP) map was generated using ArcGIS. This map serves as a valuable resource in identifying areas with high potential for groundwater recharge. The identified recharge techniques include recharge basins, recharge trenches, recharge dams, and investment in deep aquifers. Each technique offers distinct advantages and considerations, which were carefully evaluated to ensure the most suitable and effective approach for each region. The outcomes of this study will empower water resource planners and decision-makers to make informed choices regarding the implementation of suitable techniques for aquatic recharge in the northern Bekaa Plain. By adopting these strategies, the sustainable management and availability of water resources will be ensured, addressing the current and future water demands of the region. This research contributes to the broader goal of securing water resources for present and upcoming generations while fostering environmental sustainability.

PROCEEDING TITLE	**Identifying Flow Regimes Improves Arps Decline Curve Analysis**
AUTHORS	**Harkouss R.,** Lee J.
CONFERENCE TITLE	4th International Symposium of Scientific Research and Innovative Studies
DATE	16/04/2024
PLACE	Bandirma, Turkey
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This paper establishes a comprehensive framework for applying multi-segment Arps's production decline models in multi-fractured horizontal wells. While the industry employs twoor three-segment Arps models for production forecasting, this study propels into a minimum of four segments. Investigations of controlling flow equations for idealized conditions reveals the anticipation of early transient linear flow (b ≡ 2), a transition flow regime with regularly varying b, and boundary-dominated flow with b ≡ 0 for fluids with small and constant compressibility. We have found that b values usually range from 0.3 to 0.4 and from 0.4 to 0.5 for depletiondrive oil wells and gas wells respectively. For multi-fractured horizontal wells, the study identifies at least four distinct flow regimes: an early ramp-up, a transient flow regime with constant b, a transition flow regime lasting over a log cycle with continuously changing b, and boundary-dominated flow with constant b (0.3 < b < 0.5 in most cases). Forecasting should involve estimating the durations of these flow regimes and predicting when they are expected to begin and end, significantly enhancing the accuracy of individual well forecasts and the construction of typical well production profiles.

PROCEEDING TITLE	**Interaction of a Rectangular Jet with a Slotted Plate in Presence of a Control Mechanism: Experimental Study of the Aeroacoustic Field**
AUTHORS	Alkheir M., **Assoum H.,** Afyouni N., El Zohbi B., Meraim K., Sakout A., El Hassan M.
CONFERENCE TITLE	Advanced Topics in Mechanics of Materials, Structures and Construction - AToMech2023-1
DATE	14/03/2023
PLACE	Al Khobar,KSA
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	The acoustic comfort inside residential buildings is of high interest. HVAC systems employ different shapes of diffusers to ensure air mixing. The interaction between the airflows and the blades of these terminals may result in intense noise radiation. In this work, an experimental study was carried out to investigate the aero-acoustic production of a rectangular jet impinging on a rectangular plate with a slot. For certain flow regimes, such configuration results in whistles with high acoustic levels, called «self-sustaining tones». These tones result from the interaction between the Aerodynamic modes of the jet and acoustic modes. The impact of the vortical structures on the rectangular plate results in pressure waves that re-excite the jet near its exit. This feedback mechanism and the aero-acoustic coupling are responsible for the high-energy tones and can lead to structural fatigue through vibrations. A control mechanism consisting of a thin rod was introduced between the jet nozzle and the impinging wall to disturb the vortex dynamics responsible for the loop of the self-sustaining tones. A total of 1085 positions of the rod were tested between the nozzle and the impinged plate to identify positions of optimal noise reduction. Simultaneous Stereoscopic Particle Image Velocimetry (SPIV) and unsteady pressure measurements were conducted to characterize both the kinematic and the acoustic fields. Two zones were distinguished in terms of control efficacy. In the first one, the sound pressure level dropped by 19 dB, while in the second zone, the sound pressure level increased by 14 dB. The velocity fields show that the presence of the rod divides the main jet into two lateral jets from both sides of the axis of the convergent. The presence of the cylinder creates an artificial expansion of the jet and divides it into two shear flows or jet-like flows. The outer part of these flows expands radially with less interaction with the plate as compared to the case without control. This behavior affects the deformation of vortices against the slot and results in a disappearance of the loop of self-sustaining tones. The main novelty of this work relates to the implementation and analysis of a control mechanism using 2D3C (SPIV) velocity measurements simultaneously with the acoustic radiation produced by the interaction of this flow with a slotted impinging wall.

PROCEEDING TITLE	**Investigation of the Bond Strength of Metakaolin-based Geopolymer Mortar as a Repair Material**
AUTHORS	**El-Khatib J., El Dandachy M.,** Hachem A., Abou Ali M., Mustafa A.
CONFERENCE TITLE	International Conference on Civil, Architectural and Environmental Engineering
DATE	17/11/2023
PLACE	Guangzhou,China
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This research work investigates the bonding characteristics of metakaolin-based geopolymer mortar with Portland cement mortar by conducting several destructive tests such as the slant shear test, the split tensile test, three-point bending test, on mortar-to-mortar specimens. Other tests were also done to assess the flowability, and compressive strength at various ages (7, 28 and 56 days) for both Portland cement and metakaolin-based geopolymer mortars. Portland cement mortar substrates' surfaces were prepared with two levels of roughness at the interface, smooth or rough, overlaid by Portland cement or metakaolin-based geopolymer mortar. Flow values for both mortars were found alike at around 17 cm. Compressive strength results revealed that geopolymer mortars exhibit superior values compared to Portland cement mortar. Slant shear tests results have shown that geopolymer mortars overlays, compared to Portland cement mortars overlays, exhibit shear strength with cement mortars substrates, at least 2 times higher, namely at early ages. Results have shown that substrate surface roughening improves significantly shear bond strength (up to 1.5 times higher) but does not contribute to the tensile bond strength. Split tensile tests and three points bending tests have shown better results when GPM is applied as an overlay on cement mortar. Overall, results showcased that metakaolin-based geopolymer mortar has extraordinary bond properties compared to Portland cement mortar for several conditions of mortar-tomortar bond.

PROCEEDING TITLE	**Investigation of the Density, Ultrasonic Pulse Velocity and Strength Properties of Metakaolin Based Geopolymer Mortars**
AUTHORS	*Hawa L.,* Khatib J., El Dandachy M.
CONFERENCE TITLE	1st International Conference on Civil and Environmental Engineering for Resilient, Smart and Sustainable Solutions
DATE	03/11/2024
PLACE	Al Khobar, Saudi Arabia
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	Ordinary Portland Cement (OPC) remains a cornerstone of construction, but its production carries a significant environmental burden due to greenhouse gas emissions. This paper investigates Metakaolin-based geopolymer mortar (GPM) as a promising replacement for OPC mortars, focusing on its potential for reduced environmental impact. The study explores the influence of two main factors on the properties of geopolymer mortar: the Alkaline to Metakaolin ratio (A/M) and the Sodium Silicate to Sodium Hydroxide solution ratio (SS/SH). The molarity of sodium hydroxide was fixed at 16 for all samples, and the curing temperature was maintained at 60°C for 24 hours after demolding. The effect of these variations on the unit weight, ultrasonic pulse velocity, and compressive strength of the geopolymer mortar was evaluated. Notably, geopolymer mortars have been shown to 20 exhibit compressive strengths exceeding those of traditional OPC mortars. The investigation focuses on the interplay between A/M and SS/SH ratios. A higher A/M ratio, with a higher amount of alkaline activator in the mix, can enhance the mechanical properties of geopolymer mortars. Moreover, the additional alkalinity promotes further geopolymerization and the formation of crystalline materials within the geopolymer structure, ultimately leading to improved strength. However, maintaining a controlled amount of silica is crucial. While sodium silicate is a necessary component of the activator solution, an excessive amount of soluble silicate can hinder the formation of these beneficial crystalline structures. A high SS/SH ratio can lead to a more open and porous structure within the geopolymer, potentially compromising its mechanical performance. The results of this study will provide valuable insights into optimizing the composition of geopolymer mortars for achieving desired mechanical properties and durability while contributing to the development of more sustainable construction materials. The findings will highlight the delicate balance between the A/M and SS/SH ratios for maximizing the potential of geopolymer mortars as a viable and environmentally friendly alternative to traditional cement-based materials.

PROCEEDING TITLE	**Investigation of Drying shrinkage, Water Absorption and Strength Properties of Metakaolin Based Geopolymer Mortars**
AUTHORS	*Allam R.,* **Jamal Khatib J., El Dandachy M.**
CONFERENCE TITLE	1st International Conference on Civil and Environmental Engineering for Resilient, Smart and Sustainable Solutions
DATE	03/11/2024
PLACE	Al Khobar, Saudi Arabia
THEME / SUBTHEME	Science and Technology/Sustainability in Engineering
ABSTRACT	This paper investigates strength and selected durability properties (drying shrinkage and water absorption) of metakaolin-based geopolymer mortar (GPm). Four geopolymer mixes of different proportions are prepared using metakaolin as precursor with sodium hydroxide and sodium silicate as activators. The ratio of alkaline activator to precursor, the ratio between activators Na2SiO3 to NaOH and the curing temperature, varied (1.2, 1.4), (2, 3), (30, 45, and 60°C) respectively between these mixes to assess their influence on the properties. Geopolymer mortar exhibited significant improvement in shrinkage and compressive strength with values of 482 μm/m and 35 MPa compared to ordinary Portland cement-based mortar (OPCm) that shows results equal to 1820 μm/m and 15 MPa respectively. A significant disparity in the performance of GPm mixes is observed, which refers to the variation of the ratios and of the oven curing temperature between mixes. Results reveal that the optimum alkaline to binder ratio should be first considered to obtain a dense mortar structure. For a more complete geopolymerization, the increase of alkaline activator content should be coupled with an increase in curing temperature to block any successive dissolution.

PROCEEDING TITLE	**Legacy Versus Algebraic Machine Learning: A Comparative Study**
AUTHORS	**Haidar I.,** Sliman L., Damaj I., **Haidar A.**
CONFERENCE TITLE	2021 IEEE 19th International Symposium on Antenna Technology and Applied Electromagnetics
DATE	22/04/2024
PLACE	Winnipeg, Canada
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Over the last few decades, researchers have become increasingly interested in machine learning. The field has progressed from classical techniques to neural networks (NNs) and fuzzy neural networks. A novel approach that employs an algebraic model has recently emerged, which enables data conceptualization through generalization and formalization. This parameter-free model has not been shown to suffer from overfitting. This chapter provides an overview of various artificial intelligence methods, including classical methods, fuzzy logic AI, neural networks, continuously constructive neural networks, and neuro-fuzzy networks. The chapter explains the algebraic model in detail and presents it in a simple formal language, rather than using a complex algebraic demonstration. Additionally, the paper compares these approaches qualitatively and quantitatively using the widely used MNIST dataset. This comparison highlights the advantages of the algebraic model over other approaches and illustrates how knowledge propagates through each approach. The research also determines the level of human intervention required.

PROCEEDING TITLE	**Overview of Nano-Sphere and Nano-Rod Geometries for Localized Surface Plasmon Resonance Biosensing**
PROCEEDING TITLE	*Moussilli M.;* **El Falou A.**
CONFERENCE TITLE	2021 IEEE 19th International Symposium on Antenna Technology and Applied Electromagnetics
DATE	22/04/2024
PLACE	Winnipeg, Canada
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	Localized Surface Plasmon Resonance (LSPR) biosensors utilize the extinction spectra resulting from the interaction between incident light photons and metallic Nano-Particles (NP) to study the variation in the surrounding medium Re-fractive Index (RI). In this paper, we will discuss the re-sponse of the LSPR extinction spectra to the nano-sphere and nano-rod NP geometries of differing dimensions. We will also discuss the response of the LSPR extinction spec-tra to variations in the Refraction Index (RI) of the medium surrounding the metallic NP. Also, we will explain the sensitivity, Detection Accuracy (DA) and Figure of Merit (FoM) performance parameters for LSPR sensors. We will also compare the sphere and Rod NP geometries.

PROCEEDING TITLE	**ResNet-Based Detection of SYN Flood DDoS Attacks**
AUTHORS	**Bazzi H., Nassar A., Haidar I., Haidar A., Doughan Z.**
CONFERENCE TITLE	2024 IEEE International Conference on Computing, Power and Communication Technologies
DATE	09/02/2024
PLACE	Dankaur, Greater Noida , Uttar Pradesh , India
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation
ABSTRACT	This paper presents a novel approach to detect SYN flood Distributed Denial of Service (DDoS) attacks using the ResNet 50 architecture. DDoS attacks, known for their ability to disrupt normal network traffic through overwhelming floods, have evolved in complexity, rendering traditional detection methods inadequate. Our methodology is threefold: data acquisition from both simulated and real-world environments, data processing where network traffic data is converted into 2D images, and attack detection using a Convolutional Neural Network model. The model's performance was rigorously evaluated, demonstrating exceptional accuracy of 97.5%, which indicates the model's effectiveness in controlled environments. The ResNet-50 based model shows promising results in accurately classifying network traffic and identifying DDoS attacks. This not only validates the effectiveness of deep learning in cybersecurity but also opens avenues for more robust and adaptable network defense mechanisms.

PROCEEDING TITLE	**SVPWM Inverters for Photovoltaic Systems Applications**
AUTHORS	**Tarnini M., El Ghaly A.,** Moubayed N.
CONFERENCE TITLE	2023 IEEE 4th International Multidisciplinary Conference on Engineering Technology
DATE	12/12/2023
PLACE	Beirut, Lebanon
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	The utilization of solar energy through photovoltaic systems has become increasingly popular in both residential and commercial buildings. This expanding market for renewable energy has created a high demand for power electronics and modulation techniques. Among these techniques, space vector pulse width modulation (SVPWM) stands out as a vector-based approach to the traditional PWM technique employed in inverters for photovoltaic systems. In this paper the concept of SVPWM will be introduced and simulated in line with a full system description using PSIM. The simulated results reveal a better performance with lower percentage total harmonic distortion (%THD) when compared to PWM. The %THD has been reduced from 3.15% to 0.54% for RL when using SVPWM compared to sinusoidal PWM, and reduced from 3.4% to1.4% when using RLC load.

PROCEEDING TITLE	**Thermo-Economic Comparison of Solar Thermal Cooling and Solar Photovoltaic Cooling Systems for a Typical Residential Building – Lebanese Case Study**
AUTHORS	Lahoud C., Lahoud C., Brouche M., **Hmadi M.**
CONFERENCE TITLE	2023 IEEE 4th International Multidisciplinary Conference on Engineering Technology
DATE	12/12/2023
PLACE	Online
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This paper aims to investigate the performance of a solar cooling system for a typical residential building in moderate climates. A comparative energy and financial analysis was performed between a solar driven LiBr-H2O single effect absorption chiller and solar photovoltaic cooling system. In Lebanon, very few studies have been done on solar thermal cooling and its application. So a typical residential building with a four floors of 100 m2 each located in Fanar, Lebanon was taken as a case study. After cooling load calculation, simulations on “TRNSYS” and “MATLAB” were conducted to determine performance of the solar thermal cooling system, followed by a Hooke and Jeeves optimization to size it. As for the solar photovoltaic cooling system, “PVsyst” was used to find the optimal equipment sizes covering the cooling load needed. To complete the comparison, a feasibility study and CO2 emissions’ reduction were calculated for both systems. The results showed that the solar thermal system has a payback period of 7 years 5 months, and saves 16 tons of CO2 each year. While, the solar PV cooling system has a payback period of 5 years and 1 month and will save 43 tons of CO2 per year. To summarize, the PV system required to cover the same cooling load takes more space, but it has a better payback time, energy, and CO2 savings each year. Since Lebanon has a suitable climate for solar energy, such a study provides design guideline on which system is more convenient, while taking the different parameters into consideration.

ARTICLE TITLE	**Logic-Based Neural Network for Image Compression Applications**
AUTHORS	**Doughan Z.,** *Kassem R., El-Hajj A.,* **Haidar A.**
JOURNAL	2021 IEEE Middle East and North Africa COMMunications Conference
YEAR	12/9/2022
PUBLICATION INFO	Agadir,Morocco
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation
ABSTRACT	This paper presents a new lossy image compression technique using Logic-based Weightless Neural Networks, which underwrite two novel network architectures. The system endorses three processing phases, image optimization, inflation, and skimming. This research demonstrates an untraditional approach of auto-compression network guided by horizontal and vertical pixel intensity wavering trend. The performance of this new approach aligns with human's perception of singularities in a certain pattern. The potential of trend analysis in image compression incorporates with information storage techniques and knowledge accumulation. The weightless network models generate images underlying fairly enough distinct features that preserve the originality of a particular pattern but give superior levels of compression.

ARTICLE TITLE	**Turbulent flow and heat transfer characteristics of resonant impinging jets. State of the Art Review**
AUTHORS	*Matar M.,* El Hassan M.,Bukharin N., Sakout A., **Hammoud A., Assoum H.**
JOURNAL	9th AIGE-IIETA International Conference
YEAR	19/08/2024
PUBLICATION INFO	Italy
THEME / SUBTHEME	Science and Technology/ Advances Technologies and Innovation

ABSTRACT

Impinging jets are encountered in many industrial applications. Previous studies have considered different parameters that affect the flow and enhance mass and energy transfer of these flows, such as Reynolds number, nozzle geometry, nozzle-to-plate distance, wall material and angle, and the flow regime at the jet exit. Furthermore, the dynamics of these jets could be a source of a high level of noise when the transfer of energy is optimized between the aerodynamic and acoustic fields. This can lead to a resonant jet producing self-sustained tones. Self-sustained tones are related to aero-acoustic coupling and occur in impinging jets when a feedback loop is present between the jet exit and the impinged plate. Few studies that deal with the heat transfer of an impinging jet in the presence of an acoustic resonance have been conducted. This state-of-the-art review and discussion will focus on the heat transfer and flow dynamics in such noisy and resonant configurations. Such investigation will allow us to understand how a similar regime characterized by acoustic instabilities could be useful in enhancing heat transfer at the wall.

2. BOOK CHAPTERS

BOOK CHAPTER TITLE	**Advance upcycling of By-products in Binder and Binder based materials**
AUTHORS	Kenai S., **Khatib J.**
BOOK TITLE	Advance upcycling of By-products in Binder and Binder-based materials
YEAR	2024
PUBLISHER	Elsevier
ISBN	978-0-323-90791-0
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Construction materials—concrete, geopolymer material, cement, and mortar—are the most manufactured structural materials. Sometimes, they substitute one another, and sometimes, they contest with one another so that similar structure types and functions could be built by any of the materials. However, scientists often focus more on advanced upcycling processes, in which by-products are made in various industrial manufacturing. Today's building construction is totally different because the point the construction technology has reached involves the constructions printed with three-dimension printers using either cement paste or cement mortar, water and sand and binder.

ABSTRACT

It is clearly true that manufacturers give guarantee regarding binder quality in a manner similar to that of other construction materials—tiles, brick, steel, wood, and so on. Nevertheless, the topic of advanced upcycling of byproducts in binder and binder-based materials is not limited to cement since there appear a number of novel binders everyday, such as geopolymer binder systems. The disparity in the methods of upcycling making is, therefore, unique, and the significance of the control of the quality of materials work on the site is apparent. Furthermore, since the trade of a materialist has not yet become the education and the convention of anumber of other building trades, a scientist supervision is essential on the site.
These facts must be considered in mind by the researcher and scientist as careful and intricate design could be easily vitiated if the properties of the actual materials differ from those assumed in the design calculation.

BOOK CHAPTER TITLE	**Online Condition Monitoring of a Vacuum Process Based on Adaptive Notch Filters**
AUTHORS	**Yakhni M.,** Cauet S.,Sakout A., **Assoum H. , El-GoharyM.**
BOOK TITLE	**European Workshop on Advanced Control and Diagnosis**
YEAR	2023
PUBLISHER	Springer Science and Business Media Deutschland GmbH
ISBN	21984182
THEME / SUBTHEME	Science and Technology/Advances Technologies and Innovation
ABSTRACT	Vacuum systems play an essential role in industrial installations. This system is subject to various operating conditions, making it susceptible to failures that can cause real damage in the working environment. Online condition monitoring is therefore necessary to quickly detect any malfunction and avoid its consequences. It increases the life of system components while reducing maintenance costs and downtime. Various techniques can perform this task. In this paper, we have relied on the transient motor current signature analysis. The system studied is a vacuum system located in the Municipal Technical Center of Poitier, France. Matlab/Simulink program was used to build a digital twin of this system and create several types of faults at different operating speeds. Four Adaptive Notch Filter techniques were developed, based different structures, which are: Chambers' all-pass structure, Regalia's all-pass solution, Cho, Choi & Lee's all-pass method, and M'Sirdi's structure, in order to identify the system faults. M'Sirdi's structure, which is the most recent technology, was discussed in detail.

ABSTRACT

The comparison between the results of the four methods was presented, where the simulation results proved their effectiveness in achieving the desired goal, with the superiority of the M'Sirdi structure.

BOOK CHAPTER TITLE	**Machine Unlearning, A Comparative Analysis**
AUTHORS	**Doughan Z.,** *Itani S.*
BOOK TITLE	**Communications in Computer and Information Science**
YEAR	2024
PUBLISHER	Springer
ISBN	1865-0937
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	This paper investigates the effectiveness of machine unlearning techniques in removing sensitive data from pre-trained Resnet-18 models using the CIFAR-10 dataset. Specifically, it compares the performance of Fine-Tuning and Fisher Noise-based Impair-Repair methods in minimizing data leakage and preserving model performance. The study evaluates the techniques' ability to reduce Membership Inference Attack (MIA) scores while maintaining comparable accuracy on the retained data. The findings demonstrate that the Impair-Repair technique significantly reduces MIA scores compared to Fine-Tuning, showcasing its potential for responsible AI development. This approach allows for data privacy protection without compromising the model's performance. The research contributes to advancing techniques that address the challenges of data privacy in machine learning.

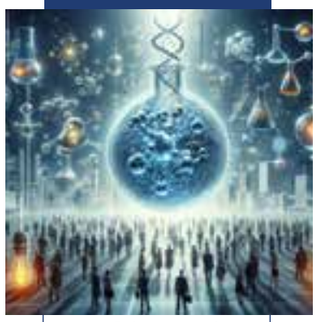
BOOK CHAPTER TITLE	**Sustainability of Natural Resources**
AUTHORS	Prakash P., **Khatib J.**
BOOK TITLE	**Sustainability of natural resources**
YEAR	2024
PUBLISHER	Taylor&Francis
ISBN	9781032295312
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	Agriculture is the backbone of the economy in most countries and its output can be impacted by climate change effects. India, as well as other countries which are predominantly agricultural are facing various challenges due to increasing population which can be met by technological innova- tions for sustainable agriculture. Advanced and innovative technologies in agriculture will not only solve the problems of fulfilling the food requirement of the growing population but also sustain agriculture in the future. Sustainability of Natural Resources Planning and Management addresses the advancement of innovative techniques to address the issues of water scarcity and agricultural yield. It discusses various aspects of natural resource management, agriculture micro irrigation, Al applications for water management, and impacts of climate change on water resources. This book also deals with water resource exploration, planning, recent geographic information system-based studies, groundwater modeling, and related applications. It highlights the optimal strategies for sustainable water resource management and development. It also examines precision farming using remote sensing and GIS techniques.

BOOK CHAPTER TITLE	**Sustainable Concrete Materials and Structures**
AUTHORS	Bawab J., **Khatib J.,** El-Hassan H.
BOOK TITLE	**Sustainable concrete Materials and Structures**
YEAR	2024
PUBLISHER	Elsevier
ISBN	978-0-443-15672-4
THEME / SUBTHEME	Science and Technology/ Sustainability in Engineering
ABSTRACT	While there are sustainability challenges associated with traditional concrete production, ongoing research and development efforts are progressing to make concrete more environmentally responsible while preserving its essential qualities. However,as shown in Fig. 1.5, the sustainable development of concrete materials and structures faces the following challenges (Ding et al., 2023; Figueira et al., 2021; Hanet al., 2014, 2019): 1. Carbon emissions—Portland cement industry alone is responsible for about 5% 8% oftotal human-driven CO2 emissions, causing a serious environmental concern. 2. Excessive use and depletion of natural resources—The extraction of raw materials for concrete production can lead to habitat destruction and resource depletion. Furthermore,some concrete raw materials, such as natural river sand and fresh water, are scarce in some countries or regions. 3. High energy consumption and pollution—The process of fabricating cement clinkers requires a great amount of energy. Moreover, the process of aggregate extraction and construction process are usually accompanied by dust and noise pollution. 4. Waste generation—Construction and demolition waste, which often includes concrete, is a significant contributor to landfills. 5. Low tensile strength—The tensile strength of traditional cementitious materials is quite low, leading to formation of cracks in concrete structures. These cracks compromise the ability of concrete to prevent corrosion in steel reinforcements, thereby reducing the extended durability of concrete structures.

Prevalent SDG

SDG 3
41%

Prevalent Theme



Science and Technology
70%

Prevalent Subtheme

Mathematical and Computational Science
27%

% of Highly Indexed Journals

75%

Faculty of **SCIENCE**

23-24 RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**AI: The Future of Humanity**
AUTHORS	**Rawas S.**
JOURNAL	**Discover Artificial Intelligence**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s44163-024-00118-3
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	Artificial intelligence (AI) is reshaping humanity›s future, and this manuscript provides a comprehensive exploration of its implications, applications, challenges, and opportunities. The revolutionary potential of AI is investigated across numerous sectors, with a focus on addressing global concerns. The influence of AI on areas such as healthcare, transportation, banking, and education is revealed through historical insights and conversations on different AI systems. Ethical considerations and the significance of responsible AI development are addressed. Furthermore, this study investigates AI›s involvement in addressing global issues such as climate change, public health, and social justice. This paper serves as a resource for policymakers, researchers, and practitioners understanding the complex link between AI and humans.

* Names in Bold Indicate BAU Academic Faculty
* Names in Italic Indicate BAU Students

ARTICLE TITLE	**Alteration of Magnetic Behavior of (Mg0.9Ni0.1O) x/ (CoFe2O4)1-x Nanocomposites**
AUTHORS	*Sharrouf M.*, Awad R., **Habanjar K.**
JOURNAL	**Journal of Nanoparticle Research**
YEAR	2024
PUBLICATION INFO	26(96): 1-21
THEME / SUBTHEME	Science and Technology/Advanced Materials
ABSTRACT	Nanocomposites of $(Mg_{0.9}Ni_{0.1}O)_x/(CoFe_2O_4)1\text{-}x$, with $0 \leq x \leq 1$ in weight fractions, were synthesized through the co-precipitation method followed by high-speed ball milling. The investigation of the structural, optical, and magnetic properties was conducted for the synthesized samples. X-ray diffraction (XRD) analysis confirmed the formation of $CoFe_2O_4$ and $Mg_{0.9}Ni_{0.1}O$ distinct phases in the nanocomposites without any detectable impurities or minor phases. Transmission electron microscopy (TEM) and high-resolution TEM (HRTEM) revealed the presence of spherical particles in both the individual phases and their nanocomposites. Raman spectroscopy exhibited strong, well-defined modes for $CoFe_2O_4$, indicating its spinel phase formation, while $Mg_{0.9}Ni_{0.1}O$ displayed two broad peaks (G and D bands). X-ray photoelectron spectroscopy (XPS) was utilized to analyze the elemental compositions and oxidation states (Co^{2+}, Fe^{2+}, Fe^{3+}, Mg^{2+}, Ni^{2+}, and O^{2-}). The magnetic measurements revealed the soft ferromagnetic behavior of pure cobalt ferrite and a combination of weak ferromagnetism and paramagnetic behavior at high magnetic fields for pure $Mg_{0.9}Ni_{0.1}O$.

ARTICLE TITLE	**Analysis of the Mental Workload Associated with the Use of Virtual Reality Technology as Support in the Higher Educational Mode**
AUTHORS	Criollo S., Cerezo J., Guerrero-Arias A., Dwingo Samala A., **Rawas S.,** Luján-Mora S.
JOURNAL	**IEEE Access**
YEAR	2024
PUBLICATION INFO	1(1): 1-16

THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	In recent years, the continuous development of digital technologies has expanded the possibilities for their application in the educational environment, allowing to improve the learning experience by making it more interactive, visually appealing, and accessible to different learning styles. The use of technologies, such as augmented reality (AR) and virtual reality (VR), is transforming the educational model, offering more immersive, personalized, and effective educational experiences for students. However, it is important to consider the mental workload that students may experience when using immersive technologies. This load can manifest itself as difficulty in understanding concepts, frustration, cognitive effort, time demands, among others. Therefore, mental workload of immersive educational experiences must be addressed, as it can negatively affect the learning experience for students. If students feel overwhelmed or frustrated, they are less likely to retain information and improve their learning. There is currently research on how to design user interfaces in VR applications to reduce mental workload. This includes the use of usercentered design techniques and the implementation of more intuitive interaction strategies. Nevertheless, the research presented in this paper is not only focused on the appropriate development of a VR application to support the educational model, but also on the analysis of the mental load perceived by students. For this purpose, the NASA-Task Load Index (TLX) tool was used in a group of volunteer students from a university in Ecuador. The main findings are encouraging and show that the mental load experienced by students is relatively low. However, to mitigate the mental workload associated with the use of immersive technologies, it is important to design educational experiences to be intuitive, easy to use and not overload the student with unnecessary information. In addition, it is important to provide breaks and limit continuous use to avoid mental fatigue.

ARTICLE TITLE	**An Initial Assessment of Community Values, Rules, and Traditional Ecological Knowledge of Mount Hermon, Lebanon: Key Perspectives towards Biocultural Conservation**
AUTHORS	**Baydoun S.,** Hani N., El Zein H., Zaidan R., Ghanem H., Mhanna M., Chalak L.
JOURNAL	**Human Ecology**
YEAR	2023
PUBLICATION INFO	DOI: 10.21203/rs.3.rs-3495640/v1
THEME / SUBTHEME	Society, Culture and Human Behavior/Societal Change

ABSTRACT

Mount Hermon, Lebanon, is a biodiversity hotspot of high cultural value making biocultural perspective highly relevant towards conservation context of this mountain territory. This study aims at identifying a community values, rules and knowledge (VRK) framework heuristic for decision-making. Semi-structured interviews with 126 local informants were conducted during 2022–2023. Findings illustrate that while instrumental values (e.g. water source through snow melt and rain, tourism and recreational activities, land and soil for crop production) were most frequently expressed by informants (63% of expressions), relational values (e.g. social identity, sense of place, spiritual way of life) representing preferences, principles, and virtues about human-nature relationships scored second but still high (41.72%) and subjective intrinsic values of nature (e.g. right to exist) as an end in itself followed last (7.65%). Co-occurrence of formal (indicated by 62.26% of the informants) and informal rules (indicated by 37.74% of the informants) with informants having prevalent local ecological knowledge in resource use were identified in a 70.27% of the informants. Grouping by PCA method demonstrates five strong correlations of enabling or conflicting interactions within the VRK framework that merit close consideration for a meaningful participatory conservation strategy of both biodiversity and cultural diversity in a key hotspot.

ARTICLE TITLE	**Antibacterial and Antifungal Activities of Cimbopogon winterianus and Origanum syriacum Extracts and Essential Oils against Uropathogenic Bacteria and Foodborne Fungal Isolates**
AUTHORS	Rammal M., Khreiss S., Badran A., Mezher M., Bechelany M., Haidar C., **Khalil M.,** Baydoun, E., **El-Dakdouki M.**
JOURNAL	**Foods**
YEAR	2024
PUBLICATION INFO	13(11): 1684-1698
THEME / SUBTHEME	Health and Wellbeing/Bioactivities of Plant Extracts and Phytotherapy
ABSTRACT	This study focused on testing the antibacterial and antifungal activity of Origanum syriacum (O. syriacum) and Cimbopogon winterianus (C. winterianus) extracts and their essential oils (EOs). The bacteria were isolated from urine samples and identified by a VITEK assay, and the fungi were isolated from spoiled food samples and further identified by MALDI-TOF. The susceptibility of the microbial isolates was assessed by determining the bacteriostatic and bactericidal/fungicidal effects by the minimum inhibitory concentration (MIC) and minimum bactericidal/fungicidal concentration (MBC/MFC) broth microdilution assay and time-kill test. The antibiofilm activities were assessed by the antibiofilm screening assays. The bacterial isolates included three Gram-negative isolates (Escherichia coli, Klebsiella pneumonia, and Citrobacter freundii) and two Gram-positive isolates (Staphylococcus aureus and Streptococcus intermedius).

ABSTRACT

The fungal isolates included Candida albicans and Aspergillus niger. The O. syriacum and C. winterianus extracts exhibited bacteriostatic and fungistatic activities (MIC 1.25–2.5 mg/mL for the bacterial isolates and 2.5–5 mg/mL for the fungal isolates). However, their EOs exhibited bactericidal (MBC 5–20%) and fungicidal (MFC 1.25–10%) activities, meaning that the EOs had a better antimicrobial potential than the extracts. The antibiofilm activities of the mentioned extracts and their EOs were relatively weak. The O. syriacum extract inhibited S. aureus, S. intermedius, and K. pneumonia biofilms at a concentration of 0.3125 mg/mL and C. albicans and A. niger biofilms at 0.625 mg/mL. No antibiofilm activity was recorded for C. winterianus extract. In addition, the packaging of grapes with C. winterianus extract preserved them for about 40 days. The results reflect the significant antimicrobial activity of O. syriacum and C. winterianus extracts and their EOs, thus suggesting their potential in food packaging and preservation.

ARTICLE TITLE	**Asymptotic Behavior of the Porous Elastic System with Dual Phase Lag Model: Classical Versus Second Spectrum Perspectives**
AUTHORS	*Zougheib H.,* **El Arwadi T.,** Soufyane A.
JOURNAL	Studies in Applied Mathematics
YEAR	2023
PUBLICATION INFO	151(3): 1-30
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	This paper aims to analyze the energy decay of the thermoelastic porous system. The dual-phase lag theory is used to model heat transfer. We consider two perspectives: the classical approach and the second spectrum approach. For the classical approach, the well-posedness is obtained via the semigroup theory and the system is exponentially stable under equal wave speed conditions. On the opposite, we show a polynomial decay. On the other hand, the well-posedness of the truncated system is obtained via the Faedo Galerkin method, and the system is exponentially stable without any assumptions on the physical parameters.

ARTICLE TITLE	**Biosynthesis of silver nanoparticles as a reliable alternative for the catalytic degradation of organic dyes and antibacterial applications**
AUTHORS	*Hijazi B.,* Faraj M., Mhanna R., **El-Dakdouki M.**
JOURNAL	Current Research in Green and Sustainable Chemistry
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.crgsc.2024.100408
THEME / SUBTHEME	Science and Technology/ Green Science
ABSTRACT	Water bodies are being threatened continuously by various anthropogenic pollutants such as organic dyes and bacteria which led to scarcity of fresh water suitable for drinking and irrigation. Therefore, different water treatment methods have been implemented before the discharge of contaminated wastewater into water bodies. In this report, green-synthesized silver nanoparticles (AgNPs) were evaluated in the degradation of organic dyes and bacterial decontamination. The S. costus root aqueous extract was used as an environmentally benign reducing agent in the biosynthesis of AgNPs. The synthetic procedure was optimized in terms of different parameters, and several analytical techniques were used to thoroughly characterize the prepared nanocomposites including TEM, SEM, EDX, DLS, XRD, FTIR, UV/Vis, photoluminescence, and TGA. The nanoparticles were spherical, monodisperse, colloidally and thermally stable, and crystalline in nature. The efficiency of the biogenic AgNPs as catalysts for the degradation of organic dyes was evaluated against six structurally diverse dyes. These included methylene blue, phenol red, methyl orange, Congo red, orange G and safranin O. Moreover, the applicability of AgNPs as antibacterial agents was tested against K. pneumoniae, S. aureus, S. haemolyticus and E. faecalis where the zones of growth inhibition, MIC and MBC values were determined for each bacterium. Overall, the biosynthesized nanoparticles were remarkable catalysts in the discoloration of hazardous dyes and displayed notable antibacterial potency against Gram-positive and Gram-negative bacteria.

ARTICLE TITLE	**Biodiversity and Biological Applications of Marine Actinomycetes-Abu-Qir Bay, Mediterranean Sea, Egypt**
AUTHORS	Hegazy G., Olama Z., Abou-Elela G., Ramadan H., Ibrahim W., **El Badan D.**
JOURNAL	Journal of Genetic Engineering and Biotechnology
YEAR	2023
PUBLICATION INFO	21(1): 1-18
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	Background The ability of actinomycetes to produce bioactive secondary metabolites makes them one of the most important prokaryotes. Marine actinomycetes are one of the most important secondary metabolites producers used for pharmaceuticals and other diferent industries. Results In this study, the promising actinomycetes were isolated from Abu-Qir Bay. Four diferent media named as starch nitrate, starch casein, glycerol asparagine, and glycerol glycine were used as a preliminary experimental media to study the role of the medium components on the counts of actinomycetes in sediment samples. The results indicated that starch casein medium reported the highest counts (30–63 CFU/g) in all the tested sites. Lower counts were detected on starch nitrate and glycerol asparagine. On the other hand, glycerol glycine medium gave the low est counts (15–48 CFU/g). Abu-Qir8 harbored the highest average count of actinomycetes (63 CFU/g), followed by Abu-Qir1 (48 CFU/g). The lower counts were detected in Abu-Qir5 and Abu-Qir7 (26 and 29 CFU/g, respectively). A total of 12 pure obtained actinomycetes isolates were subjected to morphological, physiological, and biochemical characterization. The selected actinobacterial isolates were subjected to numerical analysis, and the majority of iso lates were grouped into four main clusters (A, B, C, & D), and each of them harbored two isolates; additionally, four isolates did not cluster at this similarity level. Isolate W4 was carefully chosen as the most promising pigment and anti microbial agent's producer; the produced pigment was extracted and optimized by statistical experiments (PBD & BBD) and was tested for its anti-infammatory activity. The results showed anti-infammatory efect and prevented the denaturation of BSA protein at a concentration much higher than the safe dose and increased with increasing the pigment concentration. Conclusion Marine actinomycetes play a vital role in the production of novel and important economic metabolites that have many industrial and pharmaceuticals applications. Streptomyces genera are the most important actinomy cetes that produce important metabolites as previously reported.

ARTICLE TITLE	**Calcination Temperature Dependence of Tri-Magnetic Nanoferrite Ni0. 33Cu0. 33Zn0. 33Fe2O4: Structural, Morphological, and Magnetic Properties**
AUTHORS	*Farhat M.,* Yassine R., Aridi A., **Bitar Z., Awad R.**
JOURNAL	Ceramics International
YEAR	2024
PUBLICATION INFO	50(11): 20582-20599
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	The calcination temperature plays a pivotal role in determining the physical and magnetic properties of ferrite nanoparticles, influencing their performance and applicability in various applications. In this study, $Ni_{0.33}Cu_{0.33}Zn_{0.33}Fe_2O_4$ nano ferrites were produced using the coprecipitation method and subsequently calcined at different temperatures, specifically 500 °C, 550 °C, 600 °C, 650 °C, and 700 °C. The X-ray diffraction analysis confirmed the presence of cubic spinel ferrite phase (Fd-3m) and revealed an increase in crystallite size from 12.84 to 20.19 nm as the calcination temperature increased from 500 °C to 700 °C. X-ray photoelectron spectroscopy analysis provided insights into chemical oxidation states. Scanning electron microscopy and transmission electron microscopy images revealed that at higher calcination temperatures, nanoparticles tend to aggregate. This aggregation is associated with an observable rise in particle size, increasing from 18.16 to 29.11 nm for nanoparticles calcined at 500 °C and 700 °C, respectively. Energy-dispersive X-ray confirmed pure elemental compositions. Fourier transform infrared spectroscopy identified red and blue shifts in wavenumbers corresponding to tetrahedral and octahedral group complexes, respectively. Nanoparticles calcined at 700 °C exhibited the highest saturation magnetization (62.642 emu/g) and coercivity (75.27 G), as revealed from the vibrating sample magnetometry analysis. Upon increasing the calcination temperature from 500 °C to 700 °C, the ferromagnetic contribution was improved from 24.26% to 98.64% along with a reduction in superparamagnetic contribution from 75.74% to 1.34%, respectively. The electron paramagnetic resonance (EPR) study showed an increase in the values of g and ΔHpp with the rise in calcination temperature. This observation suggests an enhancement in dipole–dipole interactions. Furthermore, a linear relationship was discovered between the g factor and crystallite size, inducting the formation of single domain. Finally, altering the calcination temperature adjusted the physical and magnetic properties of $Ni_{0.33}Cu_{0.33}Zn_{0.33}Fe_2O_4$nanoparticles. This adjustment indicates their potential for versatile applications, particularly in hyperthermia treatment and as T2 contrast agents in magnetic resonance imaging.

ARTICLE TITLE	**Cannabinoid Receptor 2 Gene Polymorphism and the Risk of Developing Rheumatoid Arthritis in Lebanese Patients**
AUTHORS	Ismail M., **Khawaja G.**
JOURNAL	Cannabis and Cannabinoid Research
YEAR	2024
PUBLICATION INFO	DOI: 10.1089/can.2023.0220
THEME / SUBTHEME	Health and Wellbeing/Human Diseases at the Molecular Level
ABSTRACT	Objective: Evidence supports a role of cannabinoid receptor 2 (CB2) in regulating the immune response. Some variations in the CB2 receptor gene (CB2) were linked to the susceptibility of developing rheumatoid arthritis (RA). The aim of this study is to assess the relationship between CNR2 rs2501431 and the risk of developing RA in Lebanese patients. Methods: A total of one hundred five Lebanese RA patients and one hundred five controls participated in the study. CNR2 was genotyped and analyzed. Results: Using $\chi 2$ test, our results show that the CC genotype was the most common (47.6%, $p<0.00001$) and that the C allele highly predominated (64%, $p<0.00001$) in the RA group compared to the control group. The relative odds ratio show that carriers of the CC genotype have more than 13-fold risk of developing RA as compared to TT. Conclusion: Our results suggest that the rs2501431 variant of CNR2 gene can be considered as a risk factor for RA development, and thus implicate the potential targeting of CB2 receptor for the treatment of RA.

ARTICLE TITLE	**Characterization, Antioxidant, Antibacterial, and Antibiofilm Properties of Biosynthesized Ag/AgCl Nanoparticles using Origanum Ehrenbergii Boiss**
AUTHORS	*Hachem.,* Z. Kashmar R., **Abdallah A.,** Awad R., **Khalil M.**
JOURNAL	Results in Materials
YEAR	2024
PUBLICATION INFO	21(1): 1-14
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology

ABSTRACT

In the current study, silver/silver chloride nanoparticles (Ag/AgCl-NPs) were synthesized using the leaf extract of the endemic Lebanese plant, Origanum ehrenbergii Boiss, as the reducing medium. The structure, morphology, and physiochemical characteristics of the synthesized AgNPs were determined by X-ray diffraction (XRD), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), ultraviolet–visible (UV) absorption spectroscopy, and Fourier transform infrared (FTIR) spectroscopy, and photoluminescence (PL). The antioxidant activity of the AgNPs was assessed according to the 2, 2-diphenyl−1-picrylhydrazyl (DPPH) assay. The antibacterial effect of the AgNPs was investigated using the broth microdilution method, agar well diffusion, Time-kill test, and biofilm inhibition and eradication assays. This is the first report dealing with the characterization, antioxidant, and antibacterial properties of biosynthesized Ag/AgCl-NPs using the plant Origanum ehrenbergii Boiss. The findings demonstrated the synthesis of face-centered cubic (fcc) Ag/AgCl-NPs with a mean particle size of 15 nm that displayed remarkable antioxidant capacity and inhibitory activities against eight bacteria; 3 g-positive (Enterococcus faecium, Staphylococcus aureus, and Staphylococcus haemolyticus) and 5 g-negative bacteria (Pseudomonas aeruginosa, Citrobacter braakii, Escherichia coli, Stenotrophomonas maltophilia, and Klebsiella pneumoniae). The synthesized AgNPs inhibited the growth of bacteria after 3 h. Ag/AgCl-NPs exhibited inhibitory effects on the bacterial biofilms' formation as well as on pre-formed biofilms. These results highlight the potential to use these biosynthesized Ag/AgCl-NPs as antibacterial, antibiofilm, and antioxidant agents.

ARTICLE TITLE	**ChatGPT: A Bibliometric Analysis and Visualization of Emerging Educational Trends, Challenges, and Applications**
AUTHORS	Dwinggo Samala A., Sokolova E. V., Grassini S., **Rawas S.**
JOURNAL	**International Journal of Evaluation and Research in Education**
YEAR	2024
PUBLICATION INFO	13(4): 2374-2387
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This study conducts a comprehensive bibliometric analysis and visual exploration of the chat generative pre-trained transformer (ChatGPT) literature in 2023, focusing on its trends, challenges, and applications in education. Using RStudio for bibliometric analysis and VOS viewer for data visualization, this study examines publications from the Scopus database. Following the preferred reporting items for systematic reviews and metaanalyses (PRISMA) guidelines, the systematic review process reinforces the robustness of the analysis. The finding reveals notable trends in the utilization of ChatGPT. Key insights underscore ChatGPT's increasing role in enhancing engagement, facilitating personalized learning, and fostering student creativity and critical thinking.

ABSTRACT

However, its integration into education encounters obstacles, including ethical considerations, issues of academic honesty, and the imperative for precise usage guidelines; notable applications of ChatGPT encompass language learning, tutoring, automated feedback provision, and functioning as a virtual assistant. These applications showcase ChatGPT's potential to reshape the educational landscape by introducing innovative pedagogical methods and enriching the student experience. This combined bibliometric and visual analysis provides a comprehensive view of the current status of ChatGPT within the educational domain. It provides a snapshot of the role of ChatGPT in education, offering valuable insights for future research endeavors.

ARTICLE TITLE	**ChatGPT-Powered Deep Learning: Elevating Brain Tumor Detection in MRI Scans**
AUTHORS	**Rawas S., Tafran C.,** AlSaeed D.
JOURNAL	**Applied Computing and Informatics**
YEAR	2024
PUBLICATION INFO	20(3/4): 1-13
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	**Purpose** Accurate diagnosis of brain tumors is crucial for effective treatment and improved patient outcomes. Magnetic resonance imaging (MRI) is a common method for detecting brain malignancies, but interpreting MRI data can be challenging and time-consuming for healthcare professionals. **Design/methodology/approach** An innovative method is presented that combines deep learning (DL) models with natural language processing (NLP) from ChatGPT to enhance the accuracy of brain tumor detection in MRI scans. The method generates textual descriptions of brain tumor regions, providing clinicians with valuable insights into tumor characteristics for informed decision-making and personalized treatment planning. **Findings** The evaluation of this approach demonstrates promising outcomes, achieving a notable Dice coefficient score of 0.93 for tumor segmentation, outperforming current state-of-the-art methods. Human validation of the generated descriptions confirms their precision and conciseness.

ABSTRACT

Research limitations/implications
While the method showcased advancements in accuracy and understandability, ongoing research is essential for refining the model and addressing limitations in segmenting smaller or atypical tumors.

Originality/value
These results emphasized the potential of this innovative method in advancing neuroimaging practices and contributing to the effective detection and management of brain tumors.

ARTICLE TITLE	**$CoFe_2O_4$/ $Mg_{0.9}Ni_{0.1}O$ Nanocomposites with Potential Application in Adsorption: Synthesis, Characterization and Malachite Green Removal**
AUTHORS	*Sharrouf M.,* Aridi A., **Habanjar K.,** Naoufal D., Awad R.
JOURNAL	**Water, Air, & Soil Pollution**
YEAR	2024
PUBLICATION INFO	235(411): 1-22
THEME / SUBTHEME	Science and Technology/Advanced Materials

ABSTRACT

$(CoFe_2O_4)_{1-x}/(Mg_{0.9}Ni_{0.1}O)x$ nanocomposites, with weight fraction x = 0, 0.1, 0.2, 0.4, 0.8 and 1, have been synthesized by co-precipitation method followed by high-speed ball milling technique. The structural and optical properties of the prepared samples have been studied. XRD analysis confirmed the formation of the two pure phases $CoFe_2O_4$ and $Mg_{0.9}Ni_{0.1}O$, without the formation of any impurities or minor phases in the nanocomposites. Transmission electron microscopy (TEM) followed by high-resolution TEM (HRTEM) and SAED were used to study the morphology, crystallinity and lattice spacing, respectively. TEM micrographs revealed the co-existence of spherical particles for both pure phases and their nanocomposites. The second-order kinetic model was employed to investigate the adsorption efficiency of the nanocomposites for removing malachite green (MG) dye from the solution. Among the prepared samples, superior adsorption performance was revealed by $(CoFe_2O_4)0.2/(Mg_{0.9}Ni_{0.1}O)0.8$ and $Mg_{0.9}Ni_{0.1}O$. $(CoFe_2O_4)0.2/(Mg_{0.9}Ni_{0.1}O)0.8$ nanocomposites were chosen as the best candidate among all samples as they possess magnetic properties which makes them easily removed from the solution after the adsorption process. Different adsorption isotherms (Langmuir, Freundlich, and Temkin isotherms) were used to determine the adsorption isotherm, and the results are consistent with the Langmuir theoretical model. The adsorption was further investigated by varying adsorbent concentration, pH of MG solution and reaction temperature.

ARTICLE TITLE	**Characterization of Actinobacteria strains in Lebanese soil with an emphasis on investigating their antibacterial activity**
AUTHORS	*Zahr R., Zahr S.,* **El Hajj R., Khalil M.**
JOURNAL	**Brazilian Journal of Microbiology**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s42770-023-01242-5
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology

ABSTRACT

With the alarming rise of drug resistant pathogens, the quest for new bioactive compounds from natural habitats has increased. Actinomycetes are fungus-like filamentous Gram-positive bacteria, considered as prominent natural antibiotic synthesizers. This study aimed at isolating actinomycetes from agricultural soil samples of Tamnine El Tahta and Haddatha, with an emphasis on the physicochemical soil characteristics. In addition, it aimed at screening and identifying the antibacterial-producing actinomycetes, with a determination of the chemical composition of the extract. Forty-six actinomycetes were isolated from six soil samples. Actinomycetes load exhibited a positive correlation with moisture content, and a negative correlation with pH, salinity, and organic matter content. Primary screening for antibacterial activity was performed against various Gram-positive and Gram-negative bacteria by cross-streak method. Fourteen actinomycetes isolates were potent against the test microorganisms, and the most effective isolate (T25) was selected for identification, and extract preparation. The antibacterial activity of the extract was tested using secondary screening, in addition to MIC, and MBC determination. T25 isolate exhibited a 92% similarity with Micrococcus luteus/lylae. MIC recorded was 12.5 mg/ml and the MBC was higher than 100 mg/ml against all test microorganisms. Total phenol content was estimated to be 18.5 ± 0.0015 mg GAE/g dry weight using Folin-Ciocalteu method, and total flavonoid content recorded 2.3 ± 0.02 mg RE/g dry weight using Aluminum Nitrate colorimetric method. This study revealed that the physicochemical parameters in soils impact the distribution of actinomycetes. Moreover, it shed the light on Micrococcus luteus/lylae strain, considered as a promising antibacterial resource for further potential clinical investigations.

ARTICLE TITLE	**Comparative Study between Oxide/Soft Ferrite, Oxide/ Hard Ferrite, and Soft/Hard Ferrite Nanocomposites: Structural, Electrical, And Magnetic Properties**
AUTHORS	Farhat S., Awad R., **Bitar Z.**
JOURNAL	**Physica Scripta**
YEAR	2024
PUBLICATION INFO	DOI: 10.1088/1402-4896/ad4837
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Three binary nanocomposites(NCs): ($_{0.5}$NiO/$_{0.5}$Ni$_{0.5}$Zn$_{0.5}$Fe$_2$O$_4$),($_{0.5}$NiO/$_{0.5}$BaFe$_{12}$O$_{19}$), and ($_{0.5}$NiO/$_{0.5}$Ni$_{0.5}$Zn$_{0.5}$Fe$_2$O$_4$),($_{0.5}$NiO/$_{0.5}$BaFe$_{12}$O$_{19}$)were prepared using the co-precipitation method followed by the wet ball-milling technique. X-ray diffraction analysis showed the production of NiO and $_{0.5}$NiO/$_{0.5}$Ni$_{0.5}$Zn$_{0.5}$Fe$_2$O$_4$ single phases, while the α-Fe2O3 secondary phase appeared in the BaFe$_{12}$O$_{19}$ and the $_{0.5}$NiO/$_{0.5}$Ni$_{0.5}$Zn$_{0.5}$Fe$_2$ O$_4$/$_{0.5}$BaFe$_{12}$O$_{19}$ nanocomposite. The transmission electron microscopy investigation and the selected area electron diffraction demonstrated the presence of the nanocomposites' constituent phases. x-ray photoelectron spectroscopy identified the oxidation states found in the prepared samples(Ba^{2+}, Ni^{2+}, Ni^{3+}, Zn^{2+}, Fe^{3+}, and O^{2-}). The bandgap values ( ) Eg of the nanocomposites are in the range between 2.79 and 3.66 eV, which indicates their semiconductor nature. The DC conductivity experiment confirmed the semiconducting nature of all samples, and the activation energies (EaH) and (EaL) at high and low-temperature regions, respectively, were calculated from the Arrhenius equation. According to the vibrating sample magnetometer, the NCs exhibited ferromagnetic (FM) as showed by the M-H loops. In the oxide/soft ferrite NC, the dM/dH curve indicated strong exchange coupling interactions, while the hard and the soft magnetic phases in the oxide/hard ferrite and the soft/hard ferrite NCs were weakly exchanged coupled. Significant uses had been found for each of the three nanocomposites according to their constituent phases and properties.

ARTICLE TITLE	**Comparative Study on the Chemical Composition and Biological Activities of the Essential Oils of Lavandula angustifolia and Lavandula x intermedia Cultivated in Lebanon**
AUTHORS	**Massoud R.,** Bouaziz M., Abdallah H., **Zeiz A.,** Flamini G., **El-Dakdouki M.**
JOURNAL	**ACS Omega**
YEAR	2024
PUBLICATION INFO	DOI: 10.1021/acsomega.4c00313
THEME / SUBTHEME	Health and Wellbeing/ Bioactivities of Plant Extracts and Phytotherapy
ABSTRACT	The phytochemical profile of essential oils is influenced by genetic and paragenetic factors. In this research, we studied the essential oils of Lavandula angustifolia and Lavandula x intermedia cultivated in Lebanon. The latter is a cross hybrid between Lavandula angustifolia and Lavandula latifolia and is also known as lavandin and Lavandula hybrida. Specifically, the chemical composition and biological activities (antibacterial, antioxidant, anticancer, and hemolytic) of the essential oils were assessed. GC-MS results showed marked differences in the chemical compositions of the oils. For example, linalool was more abundant in L. x intermedia (44.15%) than in L. angustifolia (32%), while an opposite trend was observed for the percentages of 1,8-cineole (8.6% in L. angustifolia and 4.0% in L. x intermedia). FTIR analysis confirmed the richness of both oils in monoterpenes and sesquiterpenes. In terms of antioxidant activity, L. angustifolia essential oil demonstrated significantly better activity (IC50= 5.24 ± 1.20 mg/mL) compared to L. x intermedia oil in the DPPH radical scavenging assay. MTT cell viability assays revealed that L. angustifolia essential oil was a slightly more potent antiproliferative agent than L. x intermedia oil on human colorectal (HCT-116) and human breast (MCF-7) cancer cells. The antibacterial activity of the essential oils was tested against Staphylococcus aureus, Staphylococcus epidermidis, Enterococcus faecalis, Escherichia coli, and Serratia marcescens. Both oils showed good antibacterial activities with MIC values of 0.174 and 0.169 mg/mL for L. angustifolia and L. x intermedia oils, respectively. MBC determinations revealed that the antibacterial activity was bactericidal against all bacteria, except Staphylococcus aureus. Furthermore, both essential oils did not exhibit notable hemolytic activity on red blood cells. Overall, Lebanese L. angustifolia and L. x intermedia essential oils have promising industrial and medicinal values.

ARTICLE TITLE	**Corrosion Inhibition Efficiency of Biosynthesized Silver Nanoparticles Using Citrus aurantium Peels Extract**
AUTHORS	Hamze Z., Faraj M., Mhanna R., Younes G., **El-Dakdouki M.**
JOURNAL	**Journal of Bio- and Tribo-Corrosion**
YEAR	2024
PUBLICATION INFO	10(3): 1-24
THEME / SUBTHEME	Science and Technology/ Corrosion Control
ABSTRACT	Corrosion is a detrimental persistent industrial conundrum that can cause the failure of operating equipment and weakening of construction assemblies, thus threatening the lives of humans, and accelerating the consumption of the natural metals reservoirs. In this study, we deployed green silver nanoparticles (AgNPs) as corrosion inhibitors for mild steel. Citrus aurantium peels aqueous extract (CAPE) mediated the bio-reduction of silver ions (Ag+) into silver nanoparticles (AgNPs) under optimized experimental conditions. The prepared nanoparticles were comprehensively characterized by various techniques for size, morphology, optical properties, crystallinity, and elemental composition. Phytochemical analysis showed that the plant extract is rich in phenolic compounds that facilitated the formation of metallic silver from Ag+ ions. The anticorrosion properties of CAPE and CAPE-AgNPs for mild steel in 0.5 M HCl were investigated by potentiodynamic polarization and electrochemical impedance spectroscopy techniques. The biosynthesized CAPE-AgNPs were more efficient than CAPE in slowing down corrosion with inhibition efficiency of 70% attained at 1000 ppm of the inhibitor. CAPE and CAPE-AgNPs acted as mixed-type corrosion inhibitors with dominance over the cathodic reaction. Fitting the experimental data into different isotherms demonstrated that the corrosion inhibition was an endothermic process that took place through physical adsorption. CAPE-AgNPs significantly reduced pitting and localized damage on the metal surface. These findings highlighted the utility of CAPE-AgNPs as efficient corrosion inhibitors in different industrial settings.

ARTICLE TITLE	**Correction: Structural, Cation Distribution, Mechanical, and Optical Properties of Rare-Earth Doped Cadmium Zinc Ferrites**
AUTHORS	*Korek H.*, **Habanjar K.,** Awad R.
JOURNAL	**Applied Physics A**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s00339-024-07410-0
THEME / SUBTHEME	Science and Technology/Advanced Materials
ABSTRACT	The structural, mechanical, optical, and magnetic properties of RE^{3+} ($Nd^{3+}$and Sm^{3+}) doped cadmium zinc ferrites were investigated. The purpose of the rare-earth dopants is to deduce the possible applications for the prepared samples. The $Cd_{0.5}Zn_{0.5}RExFe_{2-x}O_4$ ferrite (x = 0.00, 0.01, 0.08) was synthesized using the wet chemical co-precipitation method. The structural investigations were done using X-ray diffraction (XRD) fitted using Rietveld refinement. The analysis confirmed the spinel structure›s crystallinity belonging to the Fd3m space group. The cation distribution and many other structural parameters were estimated from the XRD data. Cation distribution calculations were done using a custom-built Python program that proved the normal structure of the prepared ferrites. The mechanical properties were calculated using the data extracted from Fourier transform infrared (FTIR) spectra, which showed an increase in porosity, weakening of elastic moduli, increase in ionic distances, and expansion of the unit cell. The optical properties were studied using Photoluminescence (PL) spectroscopy and Ultraviolet–Visible (UV–Vis) spectroscopy, which allowed the evaluation of the energy gaps that are found to range between 3.24 and 3.27 eV for the direct energy gap. The results confirmed the quantum confinement effect due to the decrease of crystallite size with the increase of the energy band gap. Optical analysis also showed that the prepared ferrites are good candidates for optoelectronics and nonlinear optical applications. Mössbauer spectroscopy and vibrating sample magnetometer (VSM) investigate the magnetic and structural properties that verified the superparamagnetic behavior in all samples.

ARTICLE TITLE	**Cymbopogon Winterianus (Java Citronella Plant): A Multi-Faceted Approach for Food Preservation, Insecticidal Effects, and Bread Application**
AUTHORS	Rammal M., Badran A., Haidar C., Sabbah A., Bechelany M., Awada M., Hassan K., **El-Dakdouki M.,** Raad M.
JOURNAL	**Foods**
YEAR	2024
PUBLICATION INFO	13(5): 803-823
THEME / SUBTHEME	Health and Wellbeing/Bioactivities of Plant Extracts and Phytotherapy
ABSTRACT	Certain plants like Rosemarinus officinalis, Lavandula angustifolia and Origanum vulgare have been used in the food industry for centuries. Cymbopogon winterianus (Java Citronella plant) is one of the most significant plants. The objective of this study is to screen for secondary metabolites by phytochemical screening, evaluate the antioxidant contents of extracts and investigate the use of the Java Citronella plant in food preservation and as an insecticide. Java Citronella powder was added to bread and evaluated for its moisture content, and a visual and sensory analysis was performed. Sitophilus granarius (L.) weevils were exposed to Java Citronella essential oil (JCEO). The phytochemical screening revealed that the extracts were abundant in secondary metabolites. The JCEO had a yield of 0.75%. The aqueous extract had a higher total phenolic content of 49.043 ± 0.217 mg GAE/g than the ethanolic extract, which was 24.478 ± 1.956 mg GAE/g. The aqueous extract had a total flavonoids content 27,725.25 ± 54.96 μg RE/g higher than the ethanolic extract, with 24,263 ± 74 μg RE/g. The ethanolic extract had stronger antioxidant activity, with anIC50 = 196.116 μg/mL higher than the aqueous extract at 420 μg/mL. The 2% Java Citronella powder in the bread was preferred by consumers, and had a shelf life of 6 days. JCEO killed all the weevils with a high dose of 10% after 48 h. The Java Citronella showed insecticidal and food preservative activity. The results should help in future research to enhance the applications of Java Citronella in various domains, from food technology to insecticides.

ARTICLE TITLE	**Discrete Observability of the Bresse System**
AUTHORS	**El Arwadi T.,** Youssef W., Wehbe A.
JOURNAL	**Mathematics and Mechanics of Solids**
YEAR	2022
PUBLICATION INFO	28(5): 1170-1189
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	In this work, a recent type of observability inequality for the Bresse system in one-dimensional–bounded domain is investigated. First, a finite element implicit Euler scheme is studied. More precisely, a priori error estimate is established which leads to the convergence of the proposed scheme. Then, based on this error estimate, a discrete observability inequality is obtained.

ARTICLE TITLE	**Digital Entrepreneurship Research for Learning and Teaching in Education:A Bibliometric Analysis**
AUTHORS	Fadillah R., Ganefri G., Yulastri A., Luthfi A., Hidayat H., Samala A., **Rawas S.**
JOURNAL	**TEM Journal**
YEAR	2024
PUBLICATION INFO	DOI: 10.18421/TEM133-28
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	Digital entrepreneurship has heralded a paradigm shift in the business and educational landscape, ushering in an era where creative thinking, problem-solving, and digital prowess are integral curriculum components. This study undertakes a comprehensive bibliometric analysis of digital entrepreneurship in education, delving into its profound influence on the learning and teaching process.

ABSTRACT

Leveraging the extensive Scopus database for data extraction, our research aims to offer a panoramic view of research trends, methodologies, and critical themes encapsulated within the academic literature from 2004 to 2023. Employing a meticulous bibliometric analysis methodology utilizing Bibilioshiny complemented by Microsoft Excel for metadata visualization, our study meticulously identified and analyzed 257 relevant documents. Through this analysis, we delineate the contributions of 743 authors and their affiliations while scrutinizing the geographical distribution of contributing countries. The findings of our study underscore a marked surge in interest surrounding digital entrepreneurship in education, with China emerging as the primary contributor, boasting 108 published articles in this domain.

ARTICLE TITLE	**Do Equal Speed Condition and Exponential Stability Relate for the Truncated Thermoelastic Timoshenko System under Green Naghdi Law?**
AUTHORS	*Zougheib H.,* **El Arwadi T.**, Madureira R., Rincon M.
JOURNAL	**Journal of Thermal Stresses**
YEAR	2023
PUBLICATION INFO	46(8): 673-70
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	Over the years, the stabilization Timoshenko systems with dissipative features have piqued the interest of researchers. The study of Timoshenko systems under various damping effects has resulted in a significant number of studies. When nonphysical assumptions of equal wave velocities are used in stabilization, the expected exponential decay of the energy solution is attained in all recent research. In this study, we analyze a onedimensional thermooelastic Timoshenko type system in the setting of the second frequency spectrum, where the assumption of equal wave speed is not required for exponential decay to occur. In fact, According to Elishakoff's studies [Elishakoff, Advances in Mathematical Modeling and Experimental Methods for Materials and Structures: The Jacob Aboudi Volume, Dordrecht, The Netherlands: Springer, pp. 249–254, 2009.], we consider the so-called truncated version of the Timoshenko system, and we added a thermoelastic damping according to Green Naghdi law of heat conduction. We first use Faedo–Galerkin approximation to verify the system's global well-posedness. Using a Lyapunov functional we establish an exponential stability without assuming the condition of equal wave speed. A numerical scheme is introduced and analyzed. Finally, assuming extra regularity on the solution, we get some a priori error estimates and we present some numerical results which demonstrate the exponential behavior of the solution. This result significantly improves the previous results in the literature in which equal wave velocities are used to obtain exponential stability.

ARTICLE TITLE	**Dual Convolutional Malware Network (DCMN): An Image-Based Malware Classification Using Dual Convolutional Neural Networks**
AUTHORS	*Al-Masri B., Bakir N.,* **El-Zaart A.,** Samrouth K.
JOURNAL	**Electronics**
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/electronics13183607
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	Malware attacks have a cascading effect, causing financial harm, compromising privacy, operations and interrupting. By preventing these attacks, individuals and organizations can safeguard the valuable assets of their operations, and gain more trust. In this paper, we propose a dual convolutional neural network (DCNN) based architecture for malware classification. It consists first of converting malware binary files into 2D grayscale images and then training a customized dual CNN for malware multi-classification. This paper proposes an efficient approach for malware classification using dual CNNs. The model leverages the complementary strengths of a custom structure extraction branch and a pre-trained ResNet-50 model for malware image classification. By combining features extracted from both branches, the model achieved superior performance compared to a single-branch approach.

ARTICLE TITLE	**Effect of G0 Minitubers Size and Planting Distance on G1 Solanum Tuberosum L. Tubers Production in Lebanon**
AUTHORS	*Dalleh M.,* **Borjac J.,** Younes G., Choueiri E., Chehade A., Elbitar A.
JOURNAL	**Asian Journal of Biotechnology and Genetic Engineering**
YEAR	2024
PUBLICATION INFO	7(1):8-15
THEME / SUBTHEME	Science and Technology/Environmental Studies

ABSTRACT

Plant spacing and seed tuber size are important agronomic management practices in the production of potato. Three weights of G0 potato tubers (W1 < 10g; 10g< W2< 20g; 20g< W3< 30g) and two planting distances (D1: 10 cm and D2: 20 cm) with a potato variety Spunta were taken in a study from March to June during the 2022 planting season at the Lebanese Agricultural Research Institute (LARI, Tal Amara), Bekaa, Lebanon. The objective was to observe the effect of G0 tuber weights and planting distance on average weight (AWe), average number (AN), average length (AL), average width (AW) and production/m2 of G1 potato tubers cultivar Spunta in Lebanon. The largest G0 tubers (20g< W3< 30g) planted at widest distance (D2: 20 cm) yielded the maximum significant weight, length, width and yield of 41.75 g 6.63, 3.57 cm and 11.52 Kg/m2 respectively of G1 tubers produced whereas the lowest average in these traits (4.19g, 2.89 cm, 1.49 cm and 3.49 Kg/m2) were obtained in smallest G0 tuber weight (W1 < 10g) and closest planting distance (D1: 10 cm). The highest number of G1 tubers (24) was obtained with smallest G0 tubers (W1< 10 g) planted at the closest plant spacing 10 cm, while the lowest number (12) was obtained in the largest size G0 tuber (20g< W3< 30g) with the closest distance 10cm. To conclude, we outline a protocol to produce potato seeds cultivar Spunta in Lebanon by evaluating the field performance of different size potato tuber and planting distances. Our findings suggest planting G0 tuber of W< 10 g at spacing distance of 10 cm. This will increase the number of G1 tubers obtained and provide access to broader international markets.

ARTICLE TITLE	**Electronic Structure with Spin-Orbit Coupling Effect of HfH Molecule for Laser Cooling Investigations**
AUTHORS	Abu El Kher N., **Korek M.,** Alharzali N., El-Kork N.
JOURNAL	**Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy**
YEAR	2024
PUBLICATION INFO	314(15):1-15
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	The electronic structure, including the spin-orbit coupling effect of the HfH molecule, has been studied to determine if it can be cooled through Doppler and Sysphus laser cooling techniques. The multi-reference configuration interaction plus Davidson correction (MRCI + Q) method has been used to calculate its potential energy curves (P.E.C.s) in the $\Omega^{(\pm)}$ and $^{2s+1}\Lambda^{(+/-)}$ representation. The spectroscopic constants Te, Re, ωe, Be, αe, the dipole moment μe, and the dissociation energies De agree very well with previously published work. In addition, we present in this work twenty new doublet and quartet states in the Ω(±) representation. The electronic transition dipole moment curves (TDMCs) between the lowest-lying electronic states have been investigated for the Δ - π, π + Σ^+ and Δ - Φ transitions among specific $\Omega^{(\pm)}$ states.

ABSTRACT

The Franck-Condon factors (FCFs), the Einstein coefficient of spontaneous emission [Formula: see text] , and the radiative lifetime τ have been computed for the investigated transitions. In addition, properties of the molecules› electronic and vibrational states, such as the static dipole moment curves (D.M.C.s), the ionic character fionic, and the rovibrational constants are calculated. We deduce from our results that the HfH molecule is indeed a laser-cooling candidate that can reach a temperature as low as the nK regime. We present a complementary scheme with suitable experimental parameters. These results can be of great interest to experimental spectroscopists interested in ultracold diatomic molecules and their applications.

ARTICLE TITLE	**Energy Decay Analysis for Porous Elastic System with Microtemperature: Classical Vs Second Spectrum Approach**
AUTHORS	*Zougheib H.,* **El Arwadi T.,** *El-Hindi M.,* Soufyane A.
JOURNAL	**Partial Differential Equations and Applications**
YEAR	2023
PUBLICATION INFO	5(6): 1-28
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	The stability features of the dissipative porous elastic systems have piqued the interest of several researchers. The desired exponential decay property of the energy is obtained unless the nonphysical equal speed condition is imposed. This work analyzes the porous elastic system with micro-temperature. First, the exponential stability is obtained in case where there is an assumption on physical constants. Then from a second-spectrum viewpoint, the system's global well-posedness is proved using the Faedo–Galerkin method. Later, we prove that the microtemperature effect is enough to get the exponential stability of the solution without any assumption on the physical constants. A numerical scheme is introduced. Finally, we present some numerical results which demonstrates the exponential behavior of the solution.

ARTICLE TITLE	**Establishing an OCD Model in BALB/c Mice Using RU24969: A Molecular and Behavioural Study of Optimal Dose Selection**
AUTHORS	*Salloum F.,* Farran M., Shaib H., Jurjus A., Sleiman R., **Khalil M.**
JOURNAL	Behavioural Neurology
YEAR	2024
PUBLICATION INFO	2024(1): 4858-66
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology
ABSTRACT	Obsessive-compulsive disorder (OCD) is a disabling disease characterized by distressing obsessions and repetitive compulsions. The etiology of OCD is poorly known, and mouse modeling allows to clarify the genetic and neurochemical basis of this disorder and to investigate potential treatments. This study evaluates the impact of the 5-HT1B agonist RU24969 on the induction of OCD-like behaviours in female BALB/c mice (n = 30), distributed across five groups receiving varying doses of RU24969. Behavioural assessments, including marble test, tail suspension test, sucrose preference test, forced swim test, and nestlet shredding test, were conducted. Gene expression and protein quantitation of Gabra1 and serotonin transporter in mouse brain were also performed. Marble-burying behaviour increased significantly at high doses of RU24969 (15-20 mg/kg). The forced swimming test consistently showed elevated values at the same high concentrations, compared to the control. Altered reward-seeking behaviour was indicated by the sucrose preference test, notably at 15 and 20 mg/kg doses of RU24969. Nestlet shredding results did not show statistical significance among the tested animal groups. Gene expression analysis revealed reduced Gabra1 expression with increasing doses of RU, while serotonin transporter was not related to varying doses of RU24969. Western blotting corroborated these trends. The results underscore complex interactions between the serotonin system, GABAergic signaling, and OCD-relevant behaviours and suggest the use of intraperitoneal injection of 15 mg/kg of RU24969 to induce OCD-like behaviour in BALB/c mouse models.

ARTICLE TITLE	**Enhancement of the Physico-Mechanical Properties of La-Doped Mg–Ni–Co Tri-Ferrite**
AUTHORS	*Abdallah A., Rabaa M.,* Basma H., **Bitar Z.,** Yaacoub N., Sayed Hassan R., Awad R.
JOURNAL	Journal of Materials Science: Materials in Electronics
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s10854-024-11999-6
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	This report investigates the effect of La doping on the structural, microstructural, magnetic, thermodynamic, and mechanical properties of $Mg_{1/3}Ni_{1/3}Co_{1/3}Fe_{2-x}La_xO_4$ (x = 0.00, 0.02, and 0.08) spinel ferrites prepared via the wet co-precipitation method. The prepared samples atained a single cubic ferrite phase; except for the pure sample, additional minor traces of hematite secondary phase were formed. The La^{3+} dopants infuenced the expansion of the latice from 8.351 to 8.372 Å and the reduction of the crystallite size from 30.21 to 14.02 nm, as the dopant concentration increased from zero to x = 0.08. The morphology of the samples depicted highly agglomerated spherical nanoparticles, in which the agglomeration increased with the doping concentration due to the magnetic interaction and size efects. The local physical properties were investigated using Mössbauer spectrometry analysis at 300 K and 77 K by measuring the isomer shift, the quadrupolar shift, and the hyperfne feld. The appearance of sextet peaks was registered for all the samples, accompanied by a paramagnetic doublet for x = 0.08 sample at 300 K. Moreover, the La^{3+} dopants enhance the latice distortion due to the mismatch of their ionic radii with Fe^{3+} ions, causing a decrease in the hyperfne feld from 46.9 to 26.0 T, at 300 K. The elemental composition, valence, and cationic distribution were investigated using X-ray photoelectric spectroscopy (XPS). The results showed a migration of Fe^{3+} ions from octahedral to tetrahedral sites upon La doping, which was matched by Mössbauer and XPS measurements. Additionally, Fourier transform infrared spectroscopy was employed to determine the force constants, elasticity, energy, thermodynamic, and mechanical parameters. The La dopants have enhanced the elastic moduli by 11% and the Debye temperature by 4% with x = 0.08 concentration. The Vickers microhardness measurements showed a reverse indentation Received: 23 September 2023 Accepted: 12 January 2024 © The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature, 2024 Address correspondence to E-mail: a.mabdallah@bau.edu.lb 245 Page 2 of 24 J Mater Sci: Mater Electron (2024) 35:245 size efect of the prepared samples, assured by Meyer's rule. Also, it is revealed that La^{3+} dopants have boosted the Vickers microhardness, as it increased from 6.951 to 7.520 GPa, as La^{3+} concentration increased from zero to x = 0.08. This enhancement was correlated to the grain size reduction, following the Hall–Petch relation. These fndings suggest the usage of the synthesized La-doped tri-ferrites for industrial applications.

ARTICLE TITLE	**Enhancing Occupational Health and Safety Education: A Mobile Gamification Approach in Machining Workshops**
AUTHORS	Fortuna A., Prasetya F., Samala A., Andriani W., **Rawas S.,** Ramadhan A., Chai H., Compagno M., Abbasinia S., Nabawi R.
JOURNAL	**International Journal of Information and Education Technology**
YEAR	2024
PUBLICATION INFO	14(9): 1227-1238
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This study explores the results of developing mobile gamification technology as a cutting-edge educational tool for occupational health and safety that aims to foster a safe and healthy work environment and increase student awareness of potential hazards in the machining workshop. This study engages 64 students from the Department of Mechanical Engineering at Universitas Negeri Padang. The research follows a comprehensive 4D development model encompassing the define, design, develop, and disseminate stages. The findings underscore the robustness of the developed technology, with media validation scoring (M = 4.40) and material validation (M = 4.39) both achieving "very valid" ratings. The practicality test yielded promising responses, with lecturers rating the application (M = 4.38) as "very practical" and students acknowledging its practicality (M = 4.18). Subsequently, effectiveness testing revealed a significant N-gain score of 0.65, categorizing it as moderate/effective in enhancing learning outcomes. In brief, this study demonstrates the successful development of mobile gamification in occupational health and safety education, specifically in terms of validity, practicality, and effectiveness criteria. The implications transcend academia, offering the prospect of a safer and more conducive community environment in the future.

ARTICLE TITLE	**Effect of Gadolinium and Manganese on the Physical Properties of Yttrium Iron Garnet**
AUTHORS	Noureddine S., ***Srour A.,*** Lakys Y., **Bitar Z.,** Awad R.
JOURNAL	**Physica B: Condensed Matter**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.physb.2023.415200
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	The $Y_{3-x}GdxFe_{5-y}Mn_yO_{12}$ (x = y = 0.0, 0.2, 0.4, 0.6, 1.0, and 1.5) powders were synthesized by a co-precipitation method. The structural analysis confirmed the presence of the cubic structure of YIG, the formation of the secondary phase $YFeO_3$ and the stoichiometry proposed for $Y_{3-x}GdxFe_{5-y}Mn_yO_{12}$. The results of the FTIR spectroscopy show three prominent absorption bands that shift to lower wavenumber values with the increase of co-dopant concentrations. Energy bandgap values are found to be 2.96 eV for pure YIG and 3.02 ± 0.1 eV for doped powders. Photoluminescence spectra show that all the samples exhibit intense peaks around 530 nm. Moreover, Gd^{3+} and Mn^{2+} partial alternatives strongly influence the magnetic behavior of YIG nanoparticles. It is observed that coercivity is affected by the crystallite size of $0.0 \leq x = y \leq 0.6$, confirming the multidomain nature of the powders, which could be acceptable in microwave applications and data storage uses.

ARTICLE TITLE	**Exploring Hydrogen Sources in Catalytic Transfer Hydrogenation: A Review of Unsaturated Compound Reduction**
AUTHORS	***Taleb B.,*** Jahjah R., Cornu D., Bechelany M., Al Ajami M., Kataya G., Hijazi A., **El-Dakdouki M.**
JOURNAL	**Physica B: Condensed Matter**
YEAR	2023
PUBLICATION INFO	28(22): 7541-7572
THEME / SUBTHEME	Science and Technology/Green Science

ABSTRACT

Catalytic transfer hydrogenation has emerged as a pivotal chemical process with transformative potential in various industries. This review highlights the significance of catalytic transfer hydrogenation, a reaction that facilitates the transfer of hydrogen from one molecule to another, using a distinct molecule as the hydrogen source in the presence of a catalyst. Unlike conventional direct hydrogenation, catalytic transfer hydrogenation offers numerous advantages, such as enhanced safety, cost-effective hydrogen donors, byproduct recyclability, catalyst accessibility, and the potential for catalytic asymmetric transfer hydrogenation, particularly with chiral ligands. Moreover, the diverse range of hydrogen donor molecules utilized in this reaction have been explored, shedding light on their unique properties and their impact on catalytic systems and the mechanism elucidation of some reactions. Alcohols such as methanol and isopropanol are prominent hydrogen donors, demonstrating remarkable efficacy in various reductions. Formic acid offers irreversible hydrogenation, preventing the occurrence of reverse reactions, and is extensively utilized in chiral compound synthesis. Unconventional donors such as 1,4-cyclohexadiene and glycerol have shown a good efficiency in reducing unsaturated compounds, with glycerol additionally serving as a green solvent in some transformations. The compatibility of these donors with various catalysts, substrates, and reaction conditions were all discussed. Furthermore, this paper outlines future trends which include the utilization of biomass-derived hydrogen donors, the exploration of hydrogen storage materials such as metal-organic frameworks (MOFs), catalyst development for enhanced activity and recyclability, and the utilization of eco-friendly solvents such as glycerol and ionic liquids. Innovative heating methods, diverse base materials, and continued research into catalyst-hydrogen donor interactions are aimed to shape the future of catalytic transfer hydrogenation, enhancing its selectivity and efficiency across various industries and applications.

ARTICLE TITLE	**Exploring the Antimicrobial, Antiviral, Antioxidant, And Antitumor Potentials of Marine Streptomyces Tunisiensis W4MT573222 Pigment Isolated from Abu-Qir Sediments, Egypt**
AUTHORS	Ibrahim W., Olama Z., Abou elela G., Ramadan H., Hegazy G., **El Badan D.**
JOURNAL	**Microbial Cell Factories**
YEAR	2023
PUBLICATION INFO	22(95): 2-17
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	Due to the therapeutic importance of microbial pigments, these pigments are receiving the attention of researchers. In this present study 60 isolates were isolated from sediments of Abu-Qir coast of the Mediterranean sea, Alexandria, Egypt, out of which 12 were considered as pigmented actinomycetes. Streptomyces sp.

ABSTRACT

W4 was characterized by small round green pigmented colonies when grown on starch-casein agar medium. The green pigment was extracted using a mixture of acetone-methanol (7:3 v/v). The antimicrobial, antioxidant, antiviral, and anticancer activities of the green pigment produced by Streptomyces sp.W4 were investigated. The pigment was characterized using FTIR, Raman spectroscopy, EDX, and GC–MS. The results revealed that the pigment has antibacterial and antifungal activity and also showed inhibition of HAV 78% but its antiviral activity against the Adenovirus was weak. The results proved the safety of the pigment toward normal cells and anticancer activity against three different cancer cell lines HepG-2 (liver cancer cell line), A549 (lung cancer cell line), and PAN1 (pancreas cancer cell line). The pigment was combined with 9 antibiotics and then tested against the Gram-negative bacterium Enterococcus faecalis using disc diffusion bioassay. LEV showed an antagonistic effect, while CXM and CIP showed a synergistic effect.

ARTICLE TITLE	**Extended Reality for Education: Mapping Current Trends, Challenges, and Applications**
AUTHORS	Samala A., Bojic L., **Rawas S.,** Howard N., Arif Y., Tsoy D., Coelho D.
JOURNAL	**Jurnal Pendidikan Teknologi Kejuruan**
YEAR	2023
PUBLICATION INFO	7(3): 140-169
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	The advancements in 5G technology and Artificial Intelligence (AI) have accelerated the integration of immersive technologies such as Extended Reality (XR) into educational practices. There is a notable scarcity of studies focusing specifically on the applications and impact of XR in academic settings. Most existing research has concentrated on AR and VR, leaving a gap in understanding the full potential of XR. Addressing these gaps and challenges is crucial for harnessing the full potential of XR in education. This research aims to map and analyze the applications, trends, and educational challenges of XR technology. This study conducts a bibliometric analysis covering XR's application in education from 2018 to 2023, analyzing 32 articles from Scopus sources. Key findings highlight XR's annual growth in research publications, with significant contributions from the United States, China, and Canada. XR enriches education by facilitating immersive simulations, real time interaction with virtual objects, and spatial manipulation in three dimensions. It fosters presence and embodiment in virtual environments, supports practical training through realistic simulations, enhances multi-sensory engagement, promotes collaborative learning environments, and improves accessibility for diverse learners.

ABSTRACT

The main challenges of XR technology include high costs, technical hurdles, regulatory issues, infrastructure limitations, and the need for digital literacy and skills. Addressing these challenges requires collaborative efforts among educators, researchers, and industry stakeholders. Such collaboration is crucial for harnessing the full potential of XR technology to revolutionize education and prepare learners for a dynamic future.

ARTICLE TITLE	**Fabrication, Characterization, and Antibacterial Activity of Ferrite, Chromite, and Aluminate Nanoparticles**
AUTHORS	***El Hajjar I., Al Bitar M.,*** Zahr R., Zahr S., **Khalil M.,** Awad R.
JOURNAL	**Materials Research Express**
YEAR	2023
PUBLICATION INFO	11(1): 5003-5028
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	$Zn_{0.33}Co_{0.33}Mg_{0.33}X_2O_4$ nanoparticles (NPs), where X = Fe, Cr, Al and denoted by F, C, and A, were prepared by the co-precipitation method. X-ray diffraction patterns validated the formation of NPs with cubic spinel structure with the detection of small amounts of impurities in samples C (Cr_2O_3) and A (MgO). Transmission electron micrographs showed a nearly spherical shape for samples F and A. However, sample C revealed cubic and nearly spherical shapes. Energy-dispersive x-ray analysis ensured the presence of chemical constituents in all samples. The vibrational modes of NPs were confirmed with Fourier transform infrared spectroscopy. The direct bandgap energy values, calculated using ultraviolet-visible spectroscopy, were in the range of 2.355 and 2.967 eV for F, C, and A samples. X-ray photoelectron spectroscopy analysis confirmed the compositions as well as the valence states of all elements. Magnetic hysteresis (M-H) loops revealed a soft ferromagnetic behavior. Sample F exhibited a higher saturation magnetization, remnant magnetization, magnetic moment, and magnetic anisotropy compared to those of samples C and A. The antibacterial activity of the tested samples against four bacteria (Staphylococcus aureus, Stenotrophomonas maltophilia, Escherichia coli, and Enterococcus faecium) was determined using the broth microdilution assay, minimum bactericidal concentration (MBC), and time-kill test. The prepared NPs exhibited varying antibacterial activity due to multiple factors. These results highlighted the potential utility of the ternary ferrite, chromite, and aluminate NPs in the treatment of microbial infections, particularly multidrug-resistant bacteria.

ARTICLE TITLE	**From Likes to Buys: Unveiling the Impact of Social Media Influencers on Consumer Behavior and Market Dynamics**
AUTHORS	Samala A., **Rawas S.**
JOURNAL	**TEM Journal**
YEAR	2024
PUBLICATION INFO	DOI: 10.18421/TEM133-4334TU
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	This study investigates the significant impact of social media influencers on consumer purchasing behavior, focusing on the role of credibility and trustworthiness. A robust quantitative research approach was used to collect data from an online survey of 500 consumers who actively follow social media influencers. The results show a significant and positive relationship between social media influencers and consumer purchasing behavior. Notably, the credibility of these influencers and the nature of the products or services they promote emerge as important factors influencing consumer decisions. This study offers useful insights for marketers, emphasizing the importance of strategically selecting influencers and cultivating long-term relationships to increase credibility and trustworthiness. These findings provide practical advice for improving influencer marketing strategies and engaging with target audiences.

ARTICLE TITLE	**Fungal Isolation, Detection, and Quantification of Aflatoxins in Nuts Sold in the Lebanese Market**
AUTHORS	**Hellany H.,** Assaf J., Matta J., **Khalil M.**
JOURNAL	**Processes**
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/pr12051018
THEME / SUBTHEME	Health and Wellbeing/ Toxicology

ABSTRACT

This study examines the prevalence of aflatoxin contamination in 160 nut samples, both shelled and unshelled (including pistachios, peanuts, and walnuts), from the Lebanese market, focusing on their fungal contamination and specific toxigenic strains. Aflatoxin B1 (AFB1), known for its potent carcinogenic and immunosuppressive properties, was detected in various samples. Moisture content analysis showed that unshelled nuts often exceeded maximum moisture limits more frequently than shelled nuts, with levels ranging from 1.9 to 9.5%. The predominant fungal genus identified through cultivation on potato dextrose agar (PDA) plates was Aspergillus. In total, 55% of samples were contaminated with A. flavus and 45% with A. niger. All toxigenic strains isolated were identified as Aspergillus flavus. The aflatoxins, particularly AFB1, were quantified using the enzyme-linked immunosorbent assay (ELISA) and reversed-phase high-performance liquid chromatography (HPLC), revealing contamination in 43.8% of the samples, with concentrations ranging from 0.4 to 25 μg/kg. Some samples notably exceeded the established maximum tolerable limits (MTLs) for AFB1, set between 2 and 8 μg/kg. Shelled pistachios showed the highest contamination rate at 52% and were the most frequent to surpass the MTL of 8 μg/kg for pistachios, whereas walnuts displayed the lowest contamination levels, with only 15.4% exceeding the MTL for aflatoxins.

ARTICLE TITLE	**Galangin: A Promising Flavonoid for the Treatment of Rheumatoid Arthritis-Mechanisms, Evidence, and Therapeutic Potential**
AUTHORS	*Khawaja G., El-Orfali Y.,* **Shoujaa A.,** Abou Najem S.
JOURNAL	**Pharmaceuticals**
YEAR	2024
PUBLICATION INFO	17(7): 963-989
THEME / SUBTHEME	Health and Wellbeing/Bioactivities of Plant Extracts and Phytotherapy
ABSTRACT	Rheumatoid Arthritis (RA) is a chronic autoimmune disease characterized by progressive joint inflammation and damage. Oxidative stress plays a critical role in the onset and progression of RA, significantly contributing to the disease's symptoms. The complex nature of RA and the role of oxidative stress make it particularly challenging to treat effectively. This article presents a comprehensive review of RA's development, progression, and the emergence of novel treatments, introducing Galangin (GAL), a natural flavonoid compound sourced from various plants, as a promising candidate. The bioactive properties of GAL, including its anti-inflammatory, antioxidant, and immunomodulatory effects, are discussed in detail. The review elucidates GAL's mechanisms of action, focusing on its interactions with key targets such as inflammatory cytokines (e.g., TNF-α, IL-6), enzymes (e.g., SOD, MMPs), and signaling pathways (e.g., NF-κB, MAPK), which impact inflammatory responses, immune cell activation, and joint damage.

ABSTRACT

The review also addresses the lack of comprehensive understanding of potential treatment options for RA, particularly in relation to the role of GAL as a therapeutic candidate. It highlights the need for further research and clinical studies to ascertain the effectiveness of GAL in RA treatment and to elucidate its mechanisms of action. Overall, this review provides valuable insights into the potential of GAL as a therapeutic option for RA, shedding light on its multifaceted pharmacological properties and mechanisms of action, while suggesting avenues for future research and clinical applications.

ARTICLE TITLE	**Generative AI as Virtual Healthcare Assistant for Enhancing Patient Care Quality**
AUTHORS	Samala A., **Rawas S.**
JOURNAL	**International Journal of Online and Biomedical Engineering**
YEAR	2024
PUBLICATION INFO	DOI: 10.3991/ijoe.v20i05.45937
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	This study investigates the potential of Chat Generative Pre-Trained Transformer (ChatGPT) as a virtual healthcare assistant to enhance the quality of patient care. Inadequate patient care within healthcare systems is a key issue that has resulted in lower satisfaction and medical errors. Virtual healthcare assistants, exemplified by ChatGPT, have emerged as a promising solution to mitigate these challenges. A comprehensive literature review compares the benefits and drawbacks of using virtual healthcare assistants with those of human healthcare providers to assess their effectiveness in enhancing patient care. The article discusses the ChatGPT development process, including the data sources used, training and validation, and the integration of this technology into healthcare systems. The results of testing ChatGPT in patient care, including patient feedback, are provided. The study interprets these findings and indicates that ChatGPT can significantly enhance patient care. The implications of implementing virtual healthcare assistants in the healthcare sector are also explored, along with potential future research areas for enhancing ChatGPT. This study provides important new insights into how virtual healthcare assistants might enhance patient care and offers recommendations for healthcare organizations and legislators on leveraging ChatGPT. It shows that the astonishing development in patient care, known as ChatGPT, has the potential to revolutionize the healthcare industry.

ARTICLE TITLE	**Green Synthesis of Yttrium Derivatives Nanoparticles Using Pine Needle Leaf Extract: Characterization, Docking, Antibacterial, and Antioxidant Potencies**
AUTHORS	*Darwich N., Mezher M., Abdallah A.,* El-Sayed A., *El Hajj R.,* Hamdalla T., **Khalil M.**
JOURNAL	**Processes**
YEAR	2024
PUBLICATION INFO	12(1): 1713-24
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	Green nanoparticles are synthesized using environmentally friendly methods, and natural materials hold significant importance. This makes the process environmentally sustainable and reduces the production of harmful waste by-products. Green nanoparticles exhibit reduced toxicity which is crucial for biomedical applications. The current study suggested that yttrium nanoparticles (YNPs) should be synthesized, characterized, and evaluated for their diverse biological applications due to the rise in antibacterial resistance. The YNPs were prepared using a pine needle leaf extract (PNLE). The structural and morphological features have been investigated using X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), photoluminescence (PL), Fourier transform infrared spectroscopy (FTIR), ultraviolet–visible spectroscopy (UV–vis), and vibrating sample magnetometry (VSM). The XRD pattern demonstrated the presence of yttrium oxide and yttrium nitrate phases. The crystallite size and particle size of the synthesized YNPs measured 1.696 nm and 24.55 nm, respectively. The XPS peaks showed two components with binding energies at 530.940 eV and 532.18 eV due to the bond between O–Y and OH–Y, respectively. Additionally, the ferromagnetic nature of the YNPs was confirmed by VSM analysis. The YNPs were tested for antibacterial activity on six uropathogenic bacteria (S. aureus, S. haemolyticus, E. faecalis, E. coli, K. pneumonia, and P. aeruginosa) using the microdilution assays, to find the minimum inhibitory concentration (MIC) as well as the minimum bactericidal concentration (MBC), the agar well diffusion assay, and antibiofilm screening assays, where they showed bacteriostatic action against all isolates (0.5–1 mg/mL MIC) and significant inhibition of biofilm formation (80% inhibition rate). The antioxidant capacity assessed by 1,1, diphenyl-2-picrylhydrazyl (DPPH) radical scavenging revealed 50% DPPH scavenging. Moreover, docking studies exhibited that YNPs inhibit crucial bacterial enzymes, including DNA gyrase, penicillin-binding proteins, carbapenemase, LasR-binding protein, and dihydropteroate synthase. These findings may explain the mechanisms responsible for the observed antibacterial effects of YNPs. Overall, these findings underscore YNPs as promising candidates for antioxidant and antibacterial applications.

ARTICLE TITLE	**Gumbel (EVI)-Based Minimum Cross-Entropy Thresholding for the Segmentation of Images with Skewed Histograms**
AUTHORS	Jumiawi W., **El-Zaart A.**
JOURNAL	**Applied System Innovation**
YEAR	2023
PUBLICATION INFO	6(87): 1-13
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	In this study, we delve into the realm of image segmentation, a field characterized by a multitude of approaches; one frequently used technique is thresholding-based image segmentation. This process divides intensity levels into different regions based on a specified threshold value. Minimum Cross-Entropy Thresholding (MCET) stands out as an independent objective function that can be applied with any distribution and is regarded as a mean-based thresholding method. In certain cases, images exhibit diverse structures that result in different histogram distributions. Some images possess symmetric histograms, while others feature asymmetric ones. Traditional mean-based thresholding methods are well-suited for symmetric image histograms, relying on Gaussian distribution definitions for mean estimations. However, in situations involving asymmetric distributions, such as left and right-skewed histograms, a different approach is required. In this paper, we propose the utilization of a Maximum Likelihood Estimation (MLE) of Gumbel's distribution or Extreme Value Type I (EVI) distribution for the objective function of an MCET. Our goal is to introduce a dedicated image-thresholding model designed to enhance the accuracy and efficiency of image-segmentation tasks. This model determines optimal thresholds for image segmentation, facilitating precise data analysis for specific image types and yielding improved segmentation results by considering the impact of mean values on thresholding objective functions. We compare our proposed model with original methods and related studies in the literature. Our model demonstrates better performance in terms of segmentation accuracy, as assessed through both unsupervised and supervised evaluations for image segmentation.

ARTICLE TITLE	**Gundelia tournefortii L. (Akkoub): a Review of a Valuable Wild Vegetable from Eastern Mediterranean**
AUTHORS	Hani N., Abulaila K., Howes R., Mattana E., Bacci S., Sleem K., Sarkis L., Saed Eddine N., **Baydoun S.,** Arnold Apostolides N., Ulian T.
JOURNAL	**Genetic Resources and Crop Evolution**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s10722-024-01927-2
THEME / SUBTHEME	Creative Sustainable Development/ Human Development
ABSTRACT	Gundelia tournefortii L. (Asteraceae) is an artichoke-like wild edible vegetable that grows in the semi-arid climate of the East Mediterranean. Due to its high cultural and economic values for culinary and therapeutic uses, this plant is exposed to overharvesting driven by household consumption and trade, threatening the survival of natural populations. Some limited data on the nutrient composition of G. tournefortii exists indicating presence of folic acid and several essential amino acids. Research on seed germination reports that mechanical scarification, gibberellic acid, and cold stratification are all effective treatments for seed dormancy breaking and therefore to propagate plants from seed. Successful vegetative propagation from the plant meristems is also available. However, despite some exceptions, the species is still not widely cultivated due to its thorny habit and complex seed germination requirements, and the ability to ensure seed germination under natural field conditions remains to be addressed.

ARTICLE TITLE	**Harmony in Education: An In-Depth Exploration of Indonesian Academic Landscape, Challenges, and Prospects Towards the Golden Generation 2045 Vision**
AUTHORS	Samala A., **Rawas S.,** Criollo S., Bondarenko O., Samala A., Novaliendry D.
JOURNAL	**TEM Journal**
YEAR	2024
PUBLICATION INFO	DOI: 10.18421/TEM133-71
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	Education stands as the bedrock of individual growth and a defining force in shaping a nation's identity. Serving as a fundamental pillar for societal advancement, it emerges as a paramount investment for cultivating a golden generation marked by prosperity, health, and equitable communities. In the expansive landscape of global education, Indonesia boasts one of the largest systems, with a resolute commitment from the government evident in high budget allocations. However, despite these endeavors, Indonesia grapples with challenges, reflected in its low international education ranking, currently standing at 6th from the bottom. This study meticulously explores the core challenges embedded in the Indonesian educational system. Using bibliometric analysis following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, the authors scrutinized 367 high-quality articles from the Scopus database spanning from August 2000 to 2023.

ARTICLE TITLE	**Impact of GSM-EMW Exposure on The Markers of Oxidative Stress in Fetal Rat Liver**
AUTHORS	***Salameh M.,*** Ghandour S., Sabra L., Daher A., **Khalil M.,** Joumaa W.
JOURNAL	**Scientific Report**
YEAR	2023
PUBLICATION INFO	DOI: 10.1038/s41598-023-44814-z
THEME / SUBTHEME	Health and Wellbeing / Human Diseases at the Molecular Level
ABSTRACT	The current study investigated the effects of 24 h/day prenatal exposure to global system for mobile communication electromagnetic fields (GSM-EMFs), 900 MHZ-induced electromagnetic radiation (EMR), on oxidative stress (OS) status, apoptotic, and inflammatory changes in liver of rats during their fetal development period. Fifty-two Sprague–Dawley pregnant rats were equally divided into control and exposed groups. Whole embryos were removed at 7.5 dpc (days post coitus), while liver tissues were extracted from embryos at 11.5, 15.5, and 19.5 dpc. For exposed animals, results showed an increased OS reflected by high levels of malondialdehyde (MDA), a decrease in cytosolic superoxide dismutase (cytoSOD) activity, in mitochondrial superoxide dismutase (mitoSOD) levels and catalase (CAT) mRNA expression but also in hepatic nuclear factor erythroïd 2-related Factor 2 (Nrf-2), protein kinase B (Akt1), and intercellular adhesion molecule-1 (ICAM-1) mRNA expression at 15.5 dpc. Moreover, GSM-EMR exposure was shown to significantly decrease mitoSOD and CAT activities at almost all studied ages. Thus, rat embryos may be protected by their mothers from OS, apoptotic, and pro-inflammatory responses till a sensitive developmental stage, during a continuous prenatal EMR exposure. This protection could be then created from the embryos themselves.

ARTICLE TITLE	**Impact of Gundelia Tournefortti Extract on the Polycystic Ovarian Syndrome** ***(Joint Publication with Faculty of Medicine)***
AUTHORS	**Hachem S., Al Battal M., Borjac J.**
JOURNAL	Journal of the Social Sciences
YEAR	2024
PUBLICATION INFO	4(3): 1-9
THEME / SUBTHEME	Health and Wellbeing/Human Diseases at the Molecular Level

ABSTRACT

Background
Polycystic Ovarian Syndrome (PCOS) is a common endocrine disorder that affects females ranging from age 16 to 45 years. PCOS significantly increases the risk of infertility, cardiovascular diseases, and hypertension in women. Gundelia tournefortti has been shown to have various metabolic effects and has been utilized in Greco-Arab medicine for different pathological conditions.

Purpose
This study aims to evaluate the effect of Gundelia tournefortii on the ovaries of PCOS in mice. Study Design: Female Balb/c Mice (n = 63) were randomly divided into seven groups. PCOS was induced using dehydroepiandrosterone (DHEA). Post-disease induction, the mice were orally treated with 5 % Gundelia tournefortii aqueous extract. A group was pre-co treated with DHEA and the extract. Negative control included sham and sesame oil. Metformin was used as a positive control.

Methods
Histological analysis of the ovaries was performed. The levels of Testosterone and Estradiol in the serum were determined. The indicators of oxidative stress Glutathione (GSH), Malondialdehyde (MDA), Superoxide Dismutase (SOD), Catalase (CAT) were quantified along with the proinflammatory marker IL-1B using colorimetric analysis and ELISA. The effect of the extract on steroidogenic enzymes CYP11A1 and Aromatase was assessed using Western blot analysis.

Results
A decrease of apparent follicular cysts in the ovaries was observed after treatment with Gundelia tournefortii extract. The levels of serum Testosterone and Estradiol decreased post treatment of PCOS mice with the extract. The markers of oxidative stress were all normalized in the treatment group compared to the control group. The extract caused a decrease in IL-1β decreased in the treatment group. Finally, post-treatment with Gundelia tournefortii was able to restore Aromatase expression and repress expression of CYP11A1.

Conclusion
Our study showed that Gundelia tournefortii was able to restore all negative parameters induced by DHEA making the extract a plausible therapeutic agent for PCOS.

ARTICLE TITLE	**Investigation of Structural and Magnetic Properties of NiO/ $BaFe_{12}O_{19}$/ $Ni_{0.5}Zn_{0.5}Fe_2O_4$ Nanocomposites**
AUTHORS	*Farhat S.*, Awad R., **Bitar Z.**
JOURNAL	Applied Physics A
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s00339-024-07585-6
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

Pure NiO, $BaFe_{12}O_{19}$, and $Ni_{0.5}Zn_{0.5}Fe_2O_4$ nanoparticles were synthesized by the co-precipitation method. Four ternary $_{(1-x-y)}NiO/_xNi_{0.5}Zn_{0.5}Fe_2O_4/_yBaFe_{12}O_{19}$ (x and y between 0 and 1) nanocomposites (NCs) were prepared by the wet ball milling technique, then calcined at 950 °C for 4 h. The X-ray powder difraction (XRD) validated the production of pure NiO and $Ni_{0.5}Zn_{0.5}Fe_2O_4$ without impurities, while $BaFe_{12}O_{19}$ was produced with the α-Fe_2O_3 additional phase. When compared to the initial weight percentages, the Rietveld refnement technique revealed diferent weight percentages for the three phases. The transmission electron microscope (TEM) and the selected area electron difraction (SAED) investigated the morphology and the microstructure of the samples, respectively. X-ray photoelectron spectroscopy (XPS) showed that nanocomposites were successfully formed from the examination of the elements constituting the nanocomposites (Ba^{2+}, Ni^{2+}, Ni^{3+}, Zn^{2+}, $Fe^{3+}$and O^{2-}). The vibrating sample magnetometer (VSM) measurements identifed the efect of the weight percentage of each phase in the nanocomposite on the magnetic parameters. The switching feld distribution (SFD) curves indicated signifcant exchange coupling interactions in the samples that include a small weight percentage of $BaFe_{12}O_{19}$. Exchange and dipolar interactions were both recognized in Henkel plots of all samples, although exchange coupling predominated. Four laws of approach to saturation (LAS) were applied to the samples and showed magnetization dependency on H−1 and H−1/2 rather than the summation of H−1, H−2, and H for almost all samples.

ARTICLE TITLE	**In Vitro Propagation and Microtuberization of Potato Solanum Tuberosum L.) Spunta Variety in Lebanon**
AUTHORS	*Dalleh M.,* **Borjac J.,** Younes G., Choueiri E., Chehade A., Elbitar A.
JOURNAL	**Advances in Horticultural Science**
YEAR	2024
PUBLICATION INFO	37(3): 243-253
THEME / SUBTHEME	Science and Technology/Environmental Studies
ABSTRACT	One of the factors that causes low productivity of potatoes in Lebanon is the limited availability of certified seeds. The aim of this study was to establish a rapid protocol for in vitro propagation and microtuberization of potato (Solanum tuberosum L.) of Spunta variety. Meristems culture associated to thermotherapy (one month/37°C) constituted the first step. The highest percentage of reactive meristem (92%) was observed on MS medium devoid of growth regulators while MS medium containing Kin 0.4 mg.l-1, GA3 0.5 mg.l-1 and IBA 0.5 mg.l-1 yielded the highest average number of shootlets (7.8) in the seventh subculture. The lowest number of days obtained for microtuber formation was 10 and the highest average number of microtuber (1.49) was obtained with shootlets incubated under C2 culture conditions (16-h day/8-h night for initial 7 days at 25±2°C; for remaining period: continuous dark at 17±2°C). Contrary the highest microtubers average length (10.75 mm), average width (7.41 mm) and average weight (646.26 mg) were produced under C1 culture conditions (16-h day/8-h night at 25±2°C). Medium supplemented with 5 mg.l-1 BAP and 6% sucrose presented the highest average number of microtubers of 2.36 and 1.94 respectively. Type and concentration of cytokines and sucrose concentration did not have significant effect on the average length, width and weight of microtubers produced.

ARTICLE TITLE	**Influence Of Samarium on the Structural, Magnetic, and Gas Sensing Performance of Cadmium Zinc Ferrites)**
AUTHORS	*Korek H.,* **Habanjar K.,** Awad R.
JOURNAL	**Physica Scripta**
YEAR	2024
PUBLICATION INFO	99(3):1-24

THEME / SUBTHEME	Science and Technology /Advanced Materials
ABSTRACT	Cadmium zinc ferrites $Cd_{0.5}Zn_{0.5}SmxFe_{2-x}O_4$ nanoparticles were synthesized with different concentrations x = 0.00, 0.01, 0.02, 0.04, 0.06, and 0.08, via the wet chemical co-precipitation method. The effects of the Sm^{3+} doping on the structural, morphological, compositional, and magnetic properties have been investigated. The structural analysis is performed using x-ray diffraction (XRD) with Rietveld refinement. The results indicate great crystallinity in the FCC Fd3m spinel structure of $Cd_{0.5}Zn_{0.5}SmxFe_{2-x}O_4$ nanoparticles. The crystallite size was estimated using Debye–Scherrer, Williamson–Hall, Size-strain plot (SSP), and Halder-Wagner (H-W) methods. It revealed a decreasing trend with the increase of Sm-doping concentrations until the solubility limit at around x = 0.04. The spherical morphology of the samples was investigated using transmission electron microscopy (TEM) with minor agglomeration as a benefit of using the capping agent polyvinylpyrrolidone (PVP). Raman spectroscopy validates the incorporation of trivalent Sm^{3+} in the octahedral sites. X-ray photoelectron spectroscopy (XPS) verified the elemental compositions as well as the purity of the samples and the incorporation of the dopants. A vibrating sample magnetometer (VSM) was used to study the magnetic properties, and which indicates the superparamagnetic behavior of the prepared samples. The prepared samples were tested as liquefied petroleum gas (LPG) sensors by studying their sensitivity, optimum working temperature, response time, and recovery time. The doping of samarium ions reveals a great increase in LPG sensing sensitivity and optimum temperature with decreasing response and recovery times.

ARTICLE TITLE	**Inhibition of Pseudomonas Aeruginosa Quorum Sensing by Methyl Gallate from Mangifera Indica**
AUTHORS	Naga N., Zaki A., **El-Badan D.,** Rateb H., Ghanem K., Shaaban M.
JOURNAL	**Scientific Reports**
YEAR	2023
PUBLICATION INFO	13(1): 1-12
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	Antipathogenic drugs are a potential source of therapeutics, particularly following the emergence of multiple drug-resistant pathogenic microorganisms in the last decade. The inhibition of quorum sensing (QS) is an advanced antipathogenic approach for suppression of bacterial virulence and dissemination. This study aimed to investigate the inhibitory efect of some Egyptian medicinal plants on the QS signaling system of Pseudomonas aeruginosa. Among the tested plants, Mangifera indica exhibited the highest quorum sensing inhibition (QSI) activity against Chromobacterium violaceum ATCC 12472. Four pure compounds were extracted and identifed; of these, methyl gallate (MG) showed the most potent QSI.

ABSTRACT

MG had a minimum inhibitory concentration (MIC) of 512 g/mL against P. aeruginosa strains PAO1, PA14, Pa21, Pa22, Pa23, Pa24, and PAO-JP2. The virulence factors of PAO1, PA14, Pa21, Pa22, Pa23, and Pa24 were signifcantly inhibited by MG at 1/4 and 1/2 sub-MICs without afecting bacterial viability. Computational insights were performed by docking the MG compound on the LasR receptor, and the QSI behavior of MG was found to be mediated by three hydrogen bonds: Trp60, Arg61, and Thr75. This study indicates the importance of M. indica and MG in the inhibition and modulation of QS and QS-related virulence factors in P. aeruginosa.

ARTICLE TITLE	**In-Silico Study of Lebanese Herbal Compounds Against Carbapenem-Resistant Acinetobacter Baumannii Proteins**
AUTHORS	*Assaf I.,* **Al Hakawati N., Borjac J.**
JOURNAL	**Informatics in Medicine Unlocked**
YEAR	2023
PUBLICATION INFO	43(1):1-10
THEME / SUBTHEME	Science and Technology /Advanced Materials

ABSTRACT

Acinetobacter baumannii is one of the main contributors to nosocomial infections. Recently, the prevalence of A. baumannii resistant to carbapenem (CRAB) has grown, further limiting available treatments. Purpose: Given that the antimicrobial effect of medicinal plants has been proven on different pathogenic bacteria, the purpose of this study is to find efficient herbal compounds capable of inhibiting CRAB important proteins, by computational screening. Phytochemicals compounds of seven Lebanese herbs were collected from related articles. CRAB protein structures were obtained from RCSB PDB database. The 3-D structures of phytochemicals were obtained from PubChem and SpiderChem databases. Molecular docking analysis of phytochemicals was performed using ArgusLab 4.0.1 against oxacillinases Ambler Class D proteins including blaoxa-23, blaoxa-24, blaoxa-58, and blaoxa-143, and the Metallo-lactamases Ambler Class B blaNDM-1. Our study showed that the phytochemicals Ursolic and Oleanolic acid, Vebonol, γ & β Tocopherol, Lyoniside, Rosmarinic acid, and 3,4-Dicaffeoylquinic acid had the highest binding energy to the five CRAB proteins (− 14.33 to − 10.7645 kcal/mol score range), with Ursolic acid and Vebonol having the highest binding affinity to all proteins. Ursolic acid was shown to have no or minimum side effects while Vebonol is known to having carcinogenic effect in rats. Based on our study, Origanum syriacum and Rhus coriaria L. showed to possess the best compounds against CRAB important proteins. These medicinal compounds may be effective as antibiotics against CRAB. Furthermore, computationally based techniques can be reliable for estimating the bioavailability of the phytochemicals that can be used to create innovative medications.

ARTICLE TITLE	**Investigation of Structural, Optical, Electrical, Magnetic And Antibacterial Properties Of (Mn and Sm) Co-doped CdO Nanostructures**
AUTHORS	Halabi R., Abdallah A., **Khalil M.,** Awad R., Mattar M.
JOURNAL	**Applied Physics A: Materials Science and Processing**
YEAR	2023
PUBLICATION INFO	129(1): 307-10
THEME / SUBTHEME	Health and Wellbeing /Industrial and Medical Microbiology

ABSTRACT

This investigation studies the effect of Mn and Sm co-dopants on the properties of CdO nanostructures. With the aid of co-precipitation technique, $Cd_{1-2x}Mn_xSm_xO$ (x = 0.00, 0.005, 0.01, 0.02, 0.03, and 0.04) nanostructures, denoted by CdO, co-0.5, co-1, co-2, co-3 and co-4, respectively were synthesized. The crystallinity and phase formation of the prepared samples were confirmed by X-ray powder diffraction. The doped samples exhibited larger lattice parameters and strain as compared to the pure sample. Transmission electron micrographs revealed the formation of nanowires for pure and low co-doped concentrations and nanowires with nanoclusters for higher co-doped concentrations. The Raman spectra disclosed the major phonon modes of CdO without any indicator from the co-dopants, proving that they were well integrated into the CdO lattice. The UV–Vis spectra revealed the tunable energy gap with the co-dopants' concentration. The photoluminescence spectroscopy indicated the abundance of Cd interstitials and O/Cd vacancies. The DC conductivity indicated the metallic behavior of the prepared samples, triggered by Cd^{2+} vacancies, and the semiconducting behavior at high temperatures for co-1 and co-2. CdO and co-0.5 showed a weak ferromagnetic behavior combined with diamagnetic behavior; however, superparamagnetic along with an antiferromagnetic behavior was detected for higher doping concentrations. The origin of ferromagnetism may be related to O/Cd vacancies. Remarkably, all the samples prevented the growth of bacteria and formed well-defined zones around the samples with a stronger antibacterial activity on gram-negative (Escherichia coli, Citrobacter Braakii, and Klebsiella pneumoniae) than that on gram-positive bacteria (Staphylococcus aureus, Staphylococcus epidermidis, and Streptococcus intermedius).

ARTICLE TITLE	**International Price Earnings and Country Risk Model in an Asian Context**
AUTHORS	Arayssi M., **Yassine N.**
JOURNAL	Journal of Asia Business Studies
YEAR	2023
PUBLICATION INFO	DOI: 10.1108/JABS-04-2023-0133
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	This paper aims to estimate a statistical model of the country risk determination as represented by the country price earnings ratio (PE) to identify potentially mispriced countries. It uses the gross domestic product (GDP) growth rate and a dummy indicator for market-related events (i.e. financial crises), both approximating the business cycle. The model is used to compare a major Asian country's (i.e. Japan) risk with Western countries' risk. Design/methodology/approach – The model used finance variables such as the systemic, nondiversifiable, risk and foreign direct investments to characterize any country risk. A random effects model with panel data estimated the effects of macroeconomic and financial variables on PE. The simultaneity problem was checked using two stage least squares and some lagged independent variables. Findings – The results explained to investors the country risk contributing factors: PE was positively correlated with variables that may increase dividends and market risk premia similar to GDP growth rates and total risk and negatively correlated with variables that increase market risk, namely, nominal risk-free interest rates and financial crises. Japan's PE seemed to exceed most of the Western countries considered here, implying lower risks, lower interest rates and higher growth in the major Asian country Japan. Originality/value – This paper focuses on the effectiveness of country risk measures in predicting periods of intense instability, similar to financial crises. This study contributes a model to measure market risk premium, using PE (or inversely, the earnings yield) as a proxy variable. Investors can use this risk measure in picking less risky stocks to include in their portfolio, calling for liberalizing Asian countries' financial markets to improve their stock market capitalization.

ARTICLE TITLE	**Investigation of the Physical Properties and Antibacterial Activity of Various Ferrite, Chromite, and Aluminate Nanocomposites**
AUTHORS	***El Hajjar I.,*** Al Bitar M., ***Zahr S., Zahr R.,*** **Khalil M.,** Awad R.
JOURNAL	Journal of Alloys and Compounds
YEAR	2023
PUBLICATION INFO	968(1): 953-959
THEME / SUBTHEME	Health and Wellbeing /Industrial and Medical Microbiology
ABSTRACT	In the current study, nanoparticles (NPs) with $Zn_{0.33}Co_{0.33}Mg_{0.33}Fe_2O_4$ (F), $Zn_{0.33}Co_{0.33}Mg_{0.33}Cr_2O_4$ (C), and $Zn_{0.33}Co_{0.33}Mg_{0.33}Al_2O_4$ (A) were used to prepare various nanocomposites (NCs). Different NCs 0.5 F / 0.5 C (FC), 0.5 F / 0.5 A (FA), 0.5 A / 0.5 C (AC), and 0.33 F / 0.33 A / 0.33 C (FAC) were prepared via the co-precipitation method followed by the ball milling technique, starting from F, A, C (NPs). X-ray diffraction confirms the formation of NCs with minor impurities with cubic spinel structures. The transmission electron micrographs display the nearly spherical and cubic shapes of FC, AC, and FAC NCs. However, the FA nanocomposite (NC) has a nearly spherical shape. The elemental contents for NCs are confirmed using energy-dispersive X-ray spectroscopy. The existence of the vibrational modes of NPs, constituting each NCs, is verified by Fourier transform infrared spectroscopy. The bandgaps for various NCs, determined from ultraviolet-visible spectroscopy, are related to the crystallite size variations X-ray photoelectron spectroscopy results confirm the elemental composition as well as the oxidation states of the elements present in the NCs. M-H loops, measured by the vibrating sample magnetometer demonstrate a soft ferromagnetic behavior. The saturation magnetization Ms for FA is higher than that of FC, AC, and FAC. The antibacterial activity of the synthesized NCs against four bacterial strains (Staphylococcus aureus, Stenotrophomonas maltophilia, Escherichia coli, and Enterococcus faecium) was evaluated by means of broth microdilution assay, minimum bactericidal concentration (MBC), and time-kill test. The synthesized NCs displayed different impacts against the targeted bacteria due to several factors, including size, shape, doping, secondary phase, optical, and magnetic parameters. These findings emphasize the potential application of these NCs in treating bacterial infections, including multidrug-resistant bacterial infections.

ARTICLE TITLE	**Irreducible Representations of the Braid Group B_3 in Dimension 6**
AUTHORS	*Mayassi T.*, **Abdulrahim M.**
JOURNAL	Journal of the Indian Math. Soc.
YEAR	2024
PUBLICATION INFO	DOI: 10.18311/jims/20xx/xxx
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	Braid groups have an important role in many branches of mathematics like Knot Theory and Cryptography. In this work, we study the irreducibility of representations of the Braid group B3 of dimension 6. In [1], a family of representations of B3 of dimension n + 1 is constructed using q-deformed Pascal's triangle. This family of representations of B3 is a generalization of the representations given by Humphries [4] as well as the representations given by I. Tuba and H. Wenzl [7]. For more details, see [1, Theorem 3], and [2]. Kosyak mentioned in [5] that the irreducibility of the representations constructed by q-Pascal's triangle is still an open problem for dimensions ≥ 6, although some sufficient conditions are given in [1]. In our work, we consider these representations and we determine a necessary and sufficient condition for the irreducibility in the case the dimension is precisely 6.

ARTICLE TITLE	**Irreducible Representations of the Group of Conjugating Automorphisms of a Free Group**
AUTHORS	*Nasser M., Al Yafi R.*, **Abdulrahim M.**
JOURNAL	International Journal of Applied Mathematics
YEAR	2024
PUBLICATION INFO	DOI: 10.12732/ijam.v37i4.1
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science

ABSTRACT

As E. Formanek has characterized low dimensional representations of the braid group Bn, we extend these representations to the group of conjugating automorphisms Cn, when n ≥ 5. We then give a classification for irreducible representations of Cn in dimensions of at most n − 3. Next, we determine representations of Cn in dimension n−1 when each of the restrictions to the symmetric group Sn and the braid group Bn are irreducible.

ARTICLE TITLE	**Isolation and Characterization of Bacillus Subtilis BSP1 from Soil: Antimicrobial Activity and Optimization of Fermentation Conditions**
AUTHORS	**Hellany H.,** Assaf J., Barada S., ***El-Badan D., El Hajj R.,*** Abou Najem S., Abou Fayad A., **Khalil M.**
JOURNAL	Processes
YEAR	2024
PUBLICATION INFO	12(1): 1621-37
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	This study focused on the isolation, characterization, and evaluation of the antimicrobial and antioxidant activities of a crude extract from Bacillus subtilis isolated from rhizosphere soil. Through biochemical and physiological assessments, followed by whole genome sequencing, the isolate was confirmed as Bacillus subtilis BSP1. We examined the antimicrobial activity of B. subtilis BSP1 metabolites against various pathogenic bacteria and fungi. To enhance its antibacterial efficacy, we optimized the fermentation medium to maximize the secretion of antibacterial agents. Our findings demonstrated that the crude extract exhibited notable antimicrobial properties against various pathogenic bacterial and fungal isolates. The antioxidant test revealed a dose-dependent increase in the extract's DPPH scavenging activity and reducing power, with an impressive 98.9% DPPH scavenging activity at 30 mg/mL. Importantly, safety assessments indicated a lack of hemolytic activity on human red blood cells, with only 1.3% hemolysis at 100 mg/mL, suggesting its potential suitability for practical applications. In summary, Bacillus subtilis BSP1, isolated from soil, appears to be a promising candidate for antibiotic production. Its significant antimicrobial and antioxidant properties, combined with its safety profile, highlight its potential applications in medicine, agriculture, and biotechnology.

ARTICLE TITLE	**It is the Time for Quorum Sensing Inhibition as Alternative Strategy of Antimicrobial Therapy**
AUTHORS	Naga N., **El-Badan D.,** Ghanem K., Shaaban M.
JOURNAL	**Cell Communication and Signaling**
YEAR	2023
PUBLICATION INFO	21(1): 2-14
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology
ABSTRACT	Multiple drug resistance poses a signifcant threat to public health worldwide, with a substantial increase in morbidity and mortality rates. Consequently, searching for novel strategies to control microbial pathogenicity is necessary. With the aid of auto-inducers (AIs), quorum sensing (QS) regulates bacterial virulence factors through cell-to-cell signaling networks. AIs are small signaling molecules produced during the stationary phase. When bacterial cultures reach a certain level of growth, these molecules regulate the expression of the bound genes by acting as mirrors that refect the inoculum density. Gram-positive bacteria use the peptide derivatives of these signaling molecules, whereas Gram-negative bacteria use the fatty acid derivatives, and the majority of bacteria can use both types to modulate the expression of the target gene. Numerous natural and synthetic QS inhibitors (QSIs) have been developed to reduce microbial pathogenesis. Applications of QSI are vital to human health, as well as fsheries and aquaculture, agriculture, and water treatment.

ARTICLE TITLE	**Local Time Fractional Reduced Differential Transform Method for Solving**
AUTHORS	Chu Y., **Jneid M.,** Chaouk A., Inc M., Rezazadeh H., Houwe A.
JOURNAL	**Fractals**
YEAR	2023
PUBLICATION INFO	DOI: 10.1142/S0218348X2340128X
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	In this paper we seek to find solutions of the local time fractional Telegraph equation (LTFTE) by employing the local time fractional reduced differential transform method (LTFRDTM). This method produces a numerical approximate solution having the form of an infinite series that converges to a closed form solution in many cases. We apply LTFRDTM on four different LTFTEs to examine the efficiency of the proposed method. The yielded results established the effectiveness of LTFRDTM as a reliable and solid approach for obtaining solutions of LTFTEs. The solutions coincided with the exact solution in the ordinary case when $\mu = 1$. It also required minimal amount of computational work and saved a lot of time.

ARTICLE TITLE	**Magnetic Separation, Sunlight-Driven Photocatalytic Activity, and Antibacterial Studies of Sm-Doped $Co_{0.33}$ $Mg_{0.33}$ $Ni_{0.33}$ Fe_2 O_4 Nanoparticles**
AUTHORS	*Aridi A., Rabaa M., Mezher* M., Naoufal D., **Khalil M.,** Awad R.
JOURNAL	Environmental Science and Pollution Research
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s11356-024-33641-y
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology

ABSTRACT

Magnetic nanoparticles have emerged as a promising tool for wastewater treatment due to their unique properties. In this regard, $Co_{0.33}Mg_{0.33}Ni_{0.33}SmxFe_{2-x}O_4$ (0.00x 0.08) nanoparticles were prepared to examine their magnetic separation efficiency (MSE), photocatalytic, antibacterial, and antibiofilm performances. Pure nanoparticles, having the highest saturation magnetization (Ms = 31.87 emu/g), exhibit the highest MSE, where 95.6% of nanoparticles were separated after 20 min of applying a magnetic field of 150 mT. The catalytic performance of the prepared samples is examined by the photodegradation of rhodamine B (RhB) dye exposed to direct sunlight radiation. Improved photocatalytic activity is exhibited by $Co_{0.33}Mg_{0.33}Ni_{0.33}Sm_{0.04}Fe_{1.96}O_4$ nanoparticles, labeled as Sm0.04, where the rate of the degradation reaction is enhanced by 4.1 times compared to pure nanoparticles. Rising the pH and reaction temperature improves the rate of the photodegradation reaction of RhB. The incorporation of 15 wt% reduced graphene oxide (rGO) with Sm0.04 enhanced the rate of the reaction by 1.7 and 2.4 times compared with pure Sm0.04 sample and rGO, respectively. The antibacterial and antibiofilm activities against Escherichia coli, Leclercia adecarboxylata, Staphylococcus aureus, and Enterococcus faecium are assessed by the minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) broth microdilution, the agar well diffusion, the time-kill assays, the biofilm formation, and destruction assays. The bacteria used in these assessments are isolated from wastewater. The nanoparticles exhibit a bacteriostatic activity, with a better effect against the Gram-positive isolates. $Co_{0.33}Mg_{0.33}Ni_{0.33}SmxFe_2O_4$ (x = 0.00) nanoparticles have the best effect. The effect is exerted after 2–3 h of incubation. Gram-positive biofilms are more sensitive to nanoparticles.

ARTICLE TITLE	**Molecular Properties Prediction, Anticancer and Anti-Inflammatory Activities of Some Pyrimido[1,2-B]Pyridazin-2-One Derivatives**
AUTHORS	**Zeiz A.,** Kawtharani R., Elmasri M., Khawaja G., Hamade E., Habib A., Ayoub A., Abarbri M., **El-Dakdouki M.**
JOURNAL	BioImpacts
YEAR	2024
PUBLICATION INFO	14(2): 27688-27700
THEME / SUBTHEME	Health and Wellbeing/ Toxicology

ABSTRACT

Introduction
The anticancer and anti-inflammatory activities of a novel series of eleven pyrimido[1,2-b] pyridazin-2-one analogues substituted at position 7 were assessed in the current study.

Methods
The physicochemical characteristics were studied using MolSoft software. The antiproliferative activity was investigated by MTT cell viability assay, and cell cycle analysis elucidated the antiproliferative mechanism of action. Western blot analysis examined the expression levels of key pro-apoptotic (Bax, p53) and pro-survival (Bcl-2) proteins. The anti-inflammatory activity was assessed by measuring the production levels of nitric oxide in RAW264.7 cells, and the expression levels of COX-2 enzyme in LPS-activated THP-1 cells. In addition, the gene expression of various pro-inflammatory cytokines (IL-6, IL-8, IL-1β, TNF-α) and chemokines (CCL2, CXCL1, CXCL2, CXCL3) was assessed by RT-qPCR.

Results
Compound 1 bearing a chlorine substituent displayed the highest cytotoxic activity against HCT-116 and MCF-7 cancer cells where IC50 values of 49.35 ± 2.685 and 69.32 ± 3.186 μM, respectively, were achieved. Compound 1 increased the expression of pro-apoptotic proteins p53 and Bax while reducing the expression of pro-survival protein Bcl-2. Cell cycle analysis revealed that compound 1 arrested cell cycle at the G0/G1 phase. Anti-inflammatory assessments revealed that compound 1 displayed the strongest inhibitory activity on NO production with IC50 of 29.94 ± 2.24 μM, and down-regulated the expression of COX-2. Compound 1 also induced a statistically significant decrease in the gene expression of various cytokines and chemokines.

Conclusion
These findings showed that the pyrimidine derivative 1 displayed potent anti-inflammatory and anticancer properties in vitro, and can be selected as a lead compound for further investigation.

ARTICLE TITLE	**New Stability Result for Bresse System with Dual Phase-Lag Thermoelasticity**
AUTHORS	Bouraoui H., Djebabla A., **El Arwadi T.**
JOURNAL	**Applicable Analysis**
YEAR	2024
PUBLICATION INFO	103(13): 1-18
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	This work is devoted to the study of the time decay of the one-dimensional thermoelastic Bresse system where the dual-phase-lag heat conduction theory is used to model the heat transfer. In this theory, two relaxation parameters τq and $\tau\theta$ are proposed. By using the multplier method, we prove that the system is dissipative if $2\tau\theta > \tau q$ and exponentially stable by introducing a new stability number $\chi 1$. This result substantially improves earlier results in the literature.

ARTICLE TITLE	**Neuroprotective Effects of Zinc Oxide Nanoparticles in a Rotenone-Induced Mouse Model of Parkinson's Disease**
AUTHORS	**Khafajah Y., Shaheen M., El Natour D.,** Merheb M., Matar R., **Borjac J.**
JOURNAL	**Nanotheranostics**
YEAR	2024
PUBLICATION INFO	8(4): 497-505
THEME / SUBTHEME	Health and Wellbeing/ Human Diseases at the Molecular Level

ABSTRACT

Goals of the investigation
This work aimed to evaluate the neuroprotective effects of zinc oxide (ZnO) nanoparticles in an experimental mouse model of rotenone-induced PD and investigate the therapeutic effects of ZnO, cobalt ferrite nanoparticles, and their combination.

Methods
The levels of dopamine, norepinephrine, epinephrine, and serotonin were assessed using ELISA in the control and experimental model of PD mice. The dopa-decarboxylase expression level was assayed by real-time PCR. The expression level of tyrosine hydroxylase (TH) was assessed by western blot analysis.

Results
Our data showed that levels of dopamine decreased in PD mice compared to normal. ZnO NP increased dopamine levels in normal and PD mice (37.5% and 29.5%; respectively, compared to untreated mice). However, ZnO NP did not cause any change in norepinephrine and epinephrine levels either in normal or in PD mice. Levels of serotonin decreased by 64.0%, and 51.1% in PD mice treated with cobalt ferrite and dual ZnO- cobalt ferrite NPs; respectively, when compared to PD untreated mice. The mRNA levels of dopa-decarboxylase increased in both normal and PD mice treated with ZnO NP. Its level decreased when using cobalt ferrite NP and the dual ZnO-cobalt ferrite NP when compared to untreated PD mice. A significant decrease in TH expression by 0.25, 0.68, and 0.62 folds was observed in normal mice treated with ZnO, cobalt ferrite, and the dual ZnO-cobalt ferrite NP as compared to normal untreated mice. In PD mice, ZnO administration caused a non-significant 0.15-fold decrease in TH levels while both cobalt ferrite and the dual ZnO-cobalt ferrite NP administration caused a significant 0.3 and 0.4-fold decrease respectively when compared to untreated PD mice.

ARTICLE TITLE	**Pterostilbene Induces Apoptosis in Hepatocellular Carcinoma Cells: Biochemical, Pathological, and Molecular Markers**
AUTHORS	**Khalil M.,** Agamy A., Elshewemi S., Sultan A., Abdelmeguid N.
JOURNAL	**Saudi Journal of Biological Sciences**
YEAR	2023
PUBLICATION INFO	30(1):17-26
THEME / SUBTHEME	Health and Wellbeing/ Human Diseases at the Molecular Level

ABSTRACT

Worldwide, hepatocellular carcinoma (HCC) is considered the sixth most prevalent cancer and ranked third in causes leading to death. Pterostilbene (PTE), a dimethylated analog of resveratrol, is a phytochemical found in fruits such as blueberries and grapes, and is known for its anticancer effect. The current study intended to investigate the effect of PTE on HepG2 cells. Cell viability, colony-forming potential, lipid peroxidation, catalase enzyme (CAT), superoxide dismutase (SOD), and caspase 3 activities, histone release, and expression levels of mTOR, S6K1, p53, and STAT3 proteins were assessed in PTE-treated HepG2 cells. In addition, the cellular and ultrastructural alterations were evaluated by light and transmission electron microscopy. PTE induced a significant reduction in HepG2 viability in a dose-dependent manner (IC50 of PTE = 74 ± 6 μM), accompanied by a decrease in colony formation potential. PTE-treated cancer cells exhibited a decrease in lipid peroxidation and CAT activity, and an increase in histone release, caspase-3, and SOD activities. Ultrastructurally, PTE-treated cells exhibited notable cell shrinkage, reduced number of filopodia, increased vacuolization, apoptotic bodies, accumulation of lipid droplets, enlarged mitochondria, dilated endoplasmic reticulum, pyknotic nuclei, and cellular fragmentation. mTOR, S6K1, and STAT3 levels were downregulated, however p53 level was modulated in PTE-treated cells. The anticancer potential of PTE might be related to its ability to alter the ultrastructure morphology, reduce mitotic activity, and modulate some key protein required for cell proliferation, suggesting its potential to trigger cancer cells towards apoptosis.

ARTICLE TITLE	**Occurrence Of Antibiotics and Antibiotic Resistant Bacteria in the Lebanese Polluted Litani River**
AUTHORS	*Mounzer C.*, Baydoun S., Amer R., **Borjac J.**
JOURNAL	**Environmental Monitoring and Assessment**
YEAR	2023
PUBLICATION INFO	DOI: 10.1007/s10661-023-12267-6
THEME / SUBTHEME	Science and Technology/Environmental Studies
ABSTRACT	Antibiotic contamination in polluted rivers is well recognized as an environmental and public health challenge. In this study, the occurrence, distribution, and ecological risk assessment of three commonly used antibiotics (amoxicillin, ciprofloxacin, and azithromycin) were assessed in the Litani River, the most important and highly polluted river in Lebanon. Physicochemical and microbiological water quality parameters including the antibiotic-resistant ones were in parallel determined in the same sites. Water samples from five sites stretching across the river upper basin were analyzed for the antibiotics under study using high-performance liquid chromatography, with both fluorometric and UV detectors post-extraction using a solid-phase method with a hydrophilic-lipophilic balance cartridges.

ABSTRACT

The disc diffusion method and standardized water quality methods were used for antibiotic-resistant bacteria and water quality assessment, respectively. Amoxicillin and ciprofloxacin were found at concentrations of 250 ng/L and 107.2 ng/L, while azithromycin was not detected in any of the sites under study. Varying levels of antibiotic resistance were detected with the isolated Escherichia coli (E. coli) and Pseudomonas aeruginosa (P. aeruginosa) while the total coliforms showed resistance to multiple antibiotics. COD, TP, PO_4^{3-}, TN, NO^{3-}, NH^{4+}, E. coli, total coliform, P. aeruginosa, and Cd levels surpassed permissible levels. Correlation analysis with water quality parameters (COD, total phosphate, phosphate, total nitrogen, and cadmium) showed a significant positive correlation with ciprofloxacin ($r > 0.5$, p value < 0.05). Also, the resistant P. aeruginosa showed a significant positive correlation with cadmium ($r > 0.5$, p value < 0.05) while the resistant E. coli was positively correlated with total nitrogen, nitrate, and lead levels ($r > 0.5$, p value < 0.05). The ecological risk assessment revealed that all the tested antibiotics pose low risks (ecological risk quotient $RQ < 0.1$) except ciprofloxacin, which could pose a medium risk ($0.1 < RQ < 1$). Future research concerning the long-term assessment of antibiotics' residues and the identification of resistance genes in the river is recommended.

ARTICLE TITLE	**On Partial Exact Controllability of Fractional Control Systems in Conformable Sense**
AUTHORS	**Jneid M.**
JOURNAL	**Journal of Mathematics**
YEAR	2024
PUBLICATION INFO	DOI: 10.1155/2024/9531298
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	In this work, we investigate the partial exact controllability of fractional semilinear control systems in the sense of conformable derivatives. Initially, we establish the existence and uniqueness of the mild solution for this type of fractional control systems. Then, by employing a contraction mapping principle, we obtain sufficient conditions for the conformable fractional semilinear system to be partially exactly controllable, assuming that its associated linear part is partially exactly controllable. To demonstrate the efficacy of the theoretical findings, a typical example is provided at the end.

ARTICLE TITLE	**Processing the Controllability of Control Systems with Distinct Fractional Derivatives via Kalman Filter and Gramian Matrix**
AUTHORS	Awadalla M., ***Chaouk A.,*** **Jneid M.,** Abuasbeh K., Alahmadi J.
JOURNAL	**Fractal and Fractional**
YEAR	2024
PUBLICATION INFO	8(1): 0-21
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	In this paper, we investigate the controllability conditions of linear control systems involving distinct local fractional derivatives. Sufficient conditions for controllability using Kalman rank conditions and the Gramian matrix are presented. We show that the controllability of the local fractional system can be determined by the invertibility of the Gramian matrix and the full rank of the Kalman matrix. We also show that the local fractional system involving distinct orders is controllable if and only if the Gramian matrix is invertible. Illustrative examples and an application are provided to demonstrate the validity of the theoretical findings.

ARTICLE TITLE	**Physical Properties and Dielectric Response of (Gd, Pr)-Dual Doped Samarium Iron Garnet**
AUTHORS	*Srour A.,* **Bitar Z.,** Badreddine K., Awad R.
JOURNAL	**Ceramics International**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.ceramint.2023.03.255
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Samarium iron garnet, $Sm_3Fe_5O_{12}$, co-doped with Gd^{3+} and Pr^{3+} ions, having the chemical formula $Sm_{3-2x}Gd_xPr_xFe_5O_{12}$ ($0.0 \leq x \leq 0.8$), were synthesized by the co-precipitation method. The structural study confirmed the cubic crystallization of the $Sm_3Fe_5O_{12}$ phase in the addition of two secondary phases, α-Fe_2O_3 and $SmFeO_3$. The variation of the lattice parameters and crystalline size indicated that both Gd^{3+} and Pr^{3+} ions were incorporated into the lattice. The elemental analysis confirmed the stoichiometry proposed for $Sm_{3-2x}Gd_xPr_xFe_5O_{12}$. The co-doping process of SmIG affected the absorbance of photo-radiations, making them possible candidates for transparent electrodes and optoelectronic devices. Energy band gap values were in the range of 2.921–3.004eV. DC electrical conductivity measurements studied the transport properties through which two activation energies were determined. The co-doping process affected the dielectric constants (ε', ε'', tan δ), which reached a maximum value for $x = 0.2$. Dielectric relaxation was observed in the measurements, which could be due to the presence of oxygen vacancies as detected in XPS results. The Nyquist plots revealed that all the samples exhibited a negative temperature coefficient of impedance, where the arc of the semicircles decreased as the temperature increased from 413 to 743K. Also, the contribution of the resistance at high-frequency was related to the grains and grain boundaries. The ac conductivity mechanism followed the small polaron and the correlated barrier hopping models. In the temperature range between 333 and 583K, the prepared samples are promising for ion-conducting glasses and ionic crystals.

ARTICLE TITLE	**Prospecting the Structural and Magnetic Features of (x) $CuO/_{(1-x)}$ $CdFe_2O_4$ Nanocomposite System (0.0≤ x≤ 1.0)**
AUTHORS	***Yassine R., Abdallah A.,*** Sayed Hassan R., Yaacoub N., Awad R., Bitar Z.
JOURNAL	**Journal of Nanoparticle Research**
YEAR	2023
PUBLICATION INFO	DOI: 10.1007/s11051-023-05749-8
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	The structural properties of $_{(x)}CuO/_{(1-x)}CdFe_2O_4$ nanocomposites for x = 0.0, 0.1, 0.2, 0.3, 0.4, 0.5 and 1.0 were studied. The X-ray diffraction (XRD) patterns confirmed the existence of both phases with a secondary phase of α-Fe_2O_3. The Fourier-transform infrared spectroscopy (FTIR) characterization showed the vibrational bands of the synthesized samples. The high resolution transmission electron microscopy (HRTEM) micrographs revealed the presence of CuO, $CdFe_2O_4$, and α-Fe_2O_3 phases and showed the polycrystalline nature of the prepared nanocomposites. The scanning electron microscope (SEM) study exhibited the morphology of the prepared nanostructures and indicated the agglomeration between them. The energy-dispersive X-ray spectroscopy (EDX) results revealed the presence of all chemical elements within the synthesized nanocomposites. Emission peaks of the samples were analyzed via Photoluminescence (PL) deconvolutions which approved the interface defects. The Mössbauer study showed the presence of hematite impurity and the results were coherent with XRD findings. The obtained M-H loops from the vibrating-sample magnetometer (VSM) analysis depicted a paramagnetic nature of CuO and showed the ferromagnetic behavior of the nanocomposites.

ARTICLE TITLE	**Quantification, Prevalence, and Pretreatment Methods of Mycotoxins in Groundnuts and Tree Nuts: An Update**
AUTHORS	***Hellany H.,*** Assaf J., **El-Badan D., Khalil M.**
JOURNAL	**Processes**
YEAR	2023
PUBLICATION INFO	11(1): 3428-3459
THEME / SUBTHEME	Health and Wellbeing/ Toxicology
ABSTRACT	Mycotoxins are toxic compounds produced as secondary metabolites by certain types of filamentous fungi under specific conditions. The contamination of nuts and nut-related products with mycotoxins is a significant global concern due to their severe consequences on human health, including carcinogenicity and immunosuppression. Aflatoxins, with a particular emphasis on aflatoxin B1, are the most common and toxic mycotoxins found in human food. Aflatoxin B1 (AFB1) is known to be highly toxic and carcinogenic. Consequently, global food regulatory organizations have established permissible levels for mycotoxins in nuts. Numerous methodologies have been developed for the detection of mycotoxins in nuts. However, high-performance liquid chromatography (HPLC) and ultra-high-performance liquid chromatography coupled with triple quadrupole mass spectrometry (UHPLC-QqQ-MS/MS) have shown clear benefits in terms of effectiveness and sensitivity. This review aims to provide a comprehensive overview of the major mycotoxins found in nuts, their physiological effects, and their worldwide prevalence. Additionally, the review will focus on nut sample pretreatment methods, analytical techniques employed for mycotoxin detection in nuts, and recent advancements in materials and solvents used for this purpose. Significant gaps exist in mycotoxin detection in nuts, including methodological variability and insufficient data from certain nut-producing countries that need further exploration in the future.

ARTICLE TITLE	**Quercus Cerris L.: Antibacterial and Antibiofilm Potential**
AUTHORS	Najib R., Mezher M., Houri T., Kairallah Y., **Khalil M.**
JOURNAL	**Journal of Microbiology, Biotechnology and Food Sciences**
YEAR	2023
PUBLICATION INFO	DOI: 10.55251/jmbfs.9843
THEME / SUBTHEME	Science and Technology/ Environmental Studies
ABSTRACT	Invasion of pathogenic infections, antibiotic resistance, and formation of biofilms represent serious contemporary issues that threaten human health. Quercus cerris L. is a deciduous Mediterranean tree that has been used in folk medicine since the ancient times but without knowing its phytochemical profile. The aim of this study was to evaluate the antibacterial potential of aqueous and ethanolic leaf extracts against two Gram-positive bacteria (Streptococcus intermedius and Enterococcus faecium) and two Gram-negative bacteria (Escherichia coli and Stenotrophomonas maltophilia) using agar well diffusion and broth microdilution methods. The antibiofilm properties of Quercus cerris L. extracts were also tested against the listed bacteria. The results of this study showed that both extracts displayed antibacterial capacity. However, the test cultures were found to be more susceptible to the ethanolic extract than the aqueous one.

ABSTRACT

The lowest minimum inhibitory concentration (MIC) (12 mg/ml) and minimum bactericidal concentration (MBC) (25 mg/ml) values of the ethanolic extract were registered against Escherichia coli, while the highest values were noted against Streptococcus intermedius. As for the aqueous extract, it showed only a bacteriostatic activity against all the tested bacteria with a MIC of 100 mg/ml. The results of the antibiofilm assays also showed that the ethanolic extract exhibited significant antibiofilm effects against the investigated microorganisms. In the light of the findings of this research study, the aqueous and ethanolic extracts of Quercus cerris L. may be very useful in the development of new plant-based antimicrobial agents.

ARTICLE TITLE	**Redefining the Battle Against Colorectal Cancer: A Comprehensive Review of Emerging Immunotherapies and their Clinical Efficacy**
AUTHORS	**Shebbo S.,** Binothman N., Darwaish M., Niaz H., Abdulal R., **Borjac J.,** Hashem A., Mahmoud A.
JOURNAL	**Frontiers in Immunology**
YEAR	2024
PUBLICATION INFO	DOI: 10.3389/fimmu.2024.1350208
THEME / SUBTHEME	Health and Wellbeing / Human Diseases at the Molecular Level
ABSTRACT	Colorectal cancer (CRC) is the third most common cancer globally and presents a significant challenge owing to its high mortality rate and the limitations of traditional treatment options such as surgery, radiotherapy, and chemotherapy. While these treatments are foundational, they are often poorly effective owing to tumor resistance. Immunotherapy is a groundbreaking alternative that has recently emerged and offers new hope for success by exploiting the body's own immune system. This article aims to provide an extensive review of clinical trials evaluating the efficacy of various immunotherapies, including CRC vaccines, chimeric antigen receptor T-cell therapies, and immune checkpoint inhibitors. We also discuss combining CRC vaccines with monoclonal antibodies, delve into preclinical studies of novel cancer vaccines, and assess the impact of these treatment methods on patient outcomes. This review seeks to provide a deeper understanding of the current state of CRC treatment by evaluating innovative treatments and their potential to redefine the prognosis of patients with CRC.

ARTICLE TITLE	**Results on Partial Approximate Controllability of Fractional Control Systems in Hilbert Spaces with Conformable Derivatives**
AUTHORS	**Jneid M.**
JOURNAL	**AIP Advances**
YEAR	2023
PUBLICATION INFO	14(2024): 1-7
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This paper investigates partial approximate controllability of fractional linear and semi-linear control systems involving the conformable derivative. First, we derive sufficient and necessary conditions for partial approximate controllability of fractional linear systems over a small interval. Then, we apply a new approach, different from typical methods involving complexity inequalities and fixed-point theorems, to obtain sufficient conditions for partial approximate controllability of semi-linear fractional control systems, assuming that the linear part is partially approximately controllable. The effectiveness of these results is demonstrated through an illustrative example.

ARTICLE TITLE	**Revolutionizing Brain Tumor Analysis: A Fusion of ChatGPT and Multi-Modal CNN for Unprecedented Precision**
AUTHORS	**Rawas S., Samala A.**
JOURNAL	**International Journal of Online and Biomedical Engineering**
YEAR	2024
PUBLICATION INFO	20(8): 37-48
THEME / SUBTHEME	Science and Technology/ Software and Computing

ABSTRACT

In this study, we introduce an innovative approach to significantly enhance the precision and interpretability of brain tumor detection and segmentation. Our method ingeniously integrates the cutting-edge capabilities of the ChatGPT chatbot interface with a state-of-the-art multi-modal convolutional neural network (CNN). Tested rigorously on the BraTS dataset, our method showcases unprecedented performance, outperforming existing techniques in terms of both accuracy and efficiency, with an impressive Dice score of 0.89 for tumor segmentation. By seamlessly integrating ChatGPT, our model unveils deep-seated insights into the intricate decision-making processes, providing researchers and physicians with invaluable understanding and confidence in the results. This groundbreaking fusion holds immense promise, poised to revolutionize the landscape of medical imaging, with far-reaching implications for clinical practice and research. Our study exemplifies the transformative potential achieved through the synergistic combination of multi-modal CNNs and natural language processing, paving the way for remarkable advancements in brain tumor detection and segmentation.

ARTICLE TITLE	**Rosemary Essential Oil Potentiates the Antitumor Activity of 5-Fuorouracil in Human Colorectal Carcinoma cells**
AUTHORS	**El Sala A., Khawaja G., Khalil M.**
JOURNAL	**Journal of Pharmacy and Pharmacology**
YEAR	2023
PUBLICATION INFO	76(4): 10-100
THEME / SUBTHEME	Health and Wellbeing/ Bioactivities of Plant Extracts and Phytotherapy

ABSTRACT

Objectives
Improving response rates in colorectal cancer (CRC) is an urgent clinical need. This study aimed to explore the synergistic action of Lebanese rosemary essential oil (REO) and 5-fluorouracil (5-FU) in HCT116 CRC cells.

Methods
We tested the cell viability of monotherapy and combination therapy. The combination index was calculated using CompuSyn software to evaluate drug-drug interactions and the level of synergistic cytotoxicity. We also evaluated cell migration and cytopathology. Furthermore, cell apoptosis-related proteins (i.e. Bax and Bcl-2) were measured by Western blot analysis.

Key findings
The REO/5-FU combination synergistically reduced cell viability, effectively decreased cell migration, and increased the Bax/Bcl-2 ratio in HCT116 cells. This triggered a proapoptotic morphology and initiated an apoptotic cascade in HCT116 cells, as indicated by a higher Bax/Bcl-2 ratio.

Conclusions
Our results provide evidence of the REO/5-FU combination as a better approach to improve 5-FU anticancer efficacy and allow the use of lower 5-FU doses due to the adjuvant effect of REO.

ARTICLE TITLE	**Safeguarding Vascular Health: Unleashing the Potential of Smartphone Early Warning Systems to Elevate Phlebitis Prevention in IV Infusion Therapy**
AUTHORS	Asman A., Yulkifli, Yohandri, Nazhifah N., **Rawas S.,** Samala A.
JOURNAL	**International Journal of Online and Biomedical Engineering**
YEAR	2024
PUBLICATION INFO	20(8): 139-148
THEME / SUBTHEME	Science and Technology/ Software and Computing

ABSTRACT

Intravenous (IV) infusion is a pervasive medical intervention, administered to approximately 90% of hospitalized patients. Phlebitis, characterized by inflammation of the veins resulting from infusion, stands as a prevalent complication, ranking fourth among hospitalacquired infections globally. This research investigates the efficacy of a Smartphone Early Warning System (EWS) display in mitigating the incidence of phlebitis within the Safa treatment room at Aisyiyah Hospital. Employing a pre-experimental research design with a Static-group Comparison approach, 16 respondents were allocated to treatment and control groups. The Mann-Whitney Test, a statistical analysis, unveiled a significant difference (P Value = 0.001 < 0.05) in phlebitis incidence between the treatment group, utilizing the Smartphone EWS display, and the control group, which relied on conventional monitoring methods. Notably, the average rank of phlebitis incidence in the control group (21.12) exceeded that in the treatment group (9.78). This study sheds light on the potential of the Smartphone EWS display to curtail phlebitis during infusion, emphasizing its role in advancing nursing care quality through real-time monitoring and early prevention strategies.

ARTICLE TITLE	**Silibinin's Effects against Methotrexate-Induced Hepatotoxicity in Adjuvant-Induced Arthritis Rat Model**
AUTHORS	**Khawaja G., El-Orfali Y.**
JOURNAL	**Pharmaceuticals**
YEAR	2024
PUBLICATION INFO	17(4): 431-447
THEME / SUBTHEME	Health and Wellbeing/Bioactivities of Plant Extracts and Phytotherapy
ABSTRACT	Methotrexate (MTX) is the first drug of choice to treat several diseases, including rheumatoid arthritis. However, its administration is accompanied by severe side effects, most commonly hepatotoxicity. Hence, alternative therapies with a lower toxicity and fewer side effects are needed. This study aimed to investigate the antioxidant and hepatoprotective effects of silibinin (SIL, natural agent) against MTX-induced hepatotoxicity in an adjuvant-induced arthritis (AIA) rat model. Arthritic rats were treated with SIL (100 mg/kg) and/or methotrexate (2 mg/kg). Non-arthritic rats, arthritic untreated rats, and arthritic rats who received the vehicle were followed in parallel. SIL alleviated the systemic consequences of arthritis by restoring lost weight, decreasing the erythrocyte sedimentation rate, and ameliorating joint damage, which was evident both micro- and macroscopically. Additionally, SIL prevented the histopathological alterations in the liver and significantly reduced the liver damage caused by MTX and AIA, as shown by a decrease in the markers of liver damage (ALT and AST). Furthermore, SIL relieved the oxidative stress induced by AIA and MTX in liver tissue by decreasing the lipid peroxidation (MDA) levels and enhancing the antioxidant defense system (GSH levels; catalase and superoxide dismutase (SOD) activities). In conclusion, our results suggest that SIL is a potent antioxidant and hepatoprotective agent in arthritic rats. It markedly attenuated the progression and severity of the arthritic disease and eased the oxidative stress in liver tissue by improving the pro-oxidant/antioxidant balance.

ARTICLE TITLE	**Structural, Optical, and Dielectric Properties of CuO/$CdFe_2O_4$ Nanocomposites Synthesized by the Co-precipitation Method**
AUTHORS	**Yassine R., Abdallah A., Awad R., Bitar Z.**
JOURNAL	**Materials Performance and Characterization**
YEAR	2023
PUBLICATION INFO	DOI: 10.1520/MPC20220104
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	In this study, $_xCuO/_{[1-x]}CdFe_2O_4$ nanocomposites (NCs) were prepared with different weight percentages (x = 0.0, 0.1, 0.3, 0.5, and 1.0) using the co-precipitation method. X-ray powder diffraction patterns revealed the formation of copper oxide (CuO) and cadmium ferrite ($CdFe_2O_4$) phases in each NC with hematite as a secondary phase. Transmission electron microscope study confirmed the existence of CuO and $CdFe_2O_4$ crystal grains with sizes of 17.86 and 18.45 nm, respectively. Optical analysis indicated that the addition of CuO caused variations in bandgap energy and shifts in the emission wavelength of the NCs. Dielectric measurements were carried out in the frequency range of 1 kHz–5 MHz, and dielectric study was performed by analyzing the frequency, temperature, and composition dependence of the dielectric parameters for the samples. Dielectric results showed the dispersion behavior of the NCs with increasing frequency and composition concentration corresponding to low dielectric losses, which makes them suitable for optoelectronics and high-frequency devices.

ARTICLE TITLE	**Superconductivity Investigation of (Bi, Pb)-2223 Added with Different Nanoferrites and their Composites**
AUTHORS	*Najem A.,* **Habanjar K.,** Awad R., Anas M., Matar M.
JOURNAL	**Physica Scripta**
YEAR	2024
PUBLICATION INFO	99(1): 1-28
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

In this study, the impact of different types of nanoferrites additions of $Zn_{0.5}Ni_{0.5}Fe_2O_4$ and $Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19}$ nanoparticles and their nanocomposite of $(Zn_{0.5}Ni_{0.5}Fe_2O_4)_{0.5}$ $(Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19})_{0.5}$ on the structural and normal state resistivity of $Bi_{1.6}Pb_{0.4}Sr_2Ca_2Cu_3O_{10}$, ((Bi,Pb)-2223) superconducting phase were systematically investigated. The samples were synthesised using high purity oxide powders via a solid-state reaction approach. Based on the Rietveld analysis of x-ray diffraction (XRD) data, the tetragonal structure of (Bi,Pb)-2223 was established to be the predominant phase for all composite samples of the three nano-additions› contents. However, a little change to the lattice parameters (and) was obtained. Furthermore, the small amounts (0.04 wt%) of $Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19}$ and $(Zn_{0.5}Ni_{0.5}Fe_2O_4)_{0.5}$ $(Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19})_{0.5}$ improved the development of the (Bi,Pb)-2223 phase. The volume fraction of the (Bi,Pb)-2223 phase increased from 86.47% to 88.73% and 88.69%, respectively. Then, it declined to 74.25% and 71.48% upon rising x to 0.40 wt%, respectively, as well as for $Zn_{0.5}Ni_{0.5}Fe_2O_4$ nanoparticles up to 0.40 wt%. SEM images verify the host superconducting matrix›s granular structure for all three nanoadditions up to 0.40 wt%. The existence of three nano additions in the host superconductor matrix is verified by employing energy dispersive x-ray (EDX) and x-ray photoelectron spectroscopy (XPS) analysis. The measurements for the resistivity dependency of temperature presented that, as compared to the pure sample (Tc = 108.67 K), the nano-$(Zn_{0.5}Ni_{0.5}Fe_2O_4)_x$ added in the (Bi,Pb)-2223 phase exhibits more negative impact than it is with the other two additions. In contrast, the nano-$(Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19})_x$ has the highest value of Tc with a value of 110.95 K at x = 0.04 wt%. Furthermore, the superconducting transition width (ΔTc) improved for all composite samples except for the sample at x = 0.04 wt%, for $Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19}$ and $(Zn_{0.5}Ni_{0.5}Fe_2O_4)_{0.5}$ $(Ba_{0.4}Sr_{0.4}Ca_{0.2}Fe_{12}O_{19})_{0.5}$ which showed the sharpest transition width. This suggests that their addition is anticipated to act as artificial pinning centers and strengthen the coupling between the grains in the (Bi,Pb)-2223 ceramic.

ARTICLE TITLE	**Steel Anti-Corrosion Behavior for Pure and Mg-doped CuO Nanoparticles in Different Media: Raman, Potentiodynamic Polarization and Electrochemical Impedance Analysis**
AUTHORS	**El Sayed A., Abdallah A., Adnan R.,** Noun M., **El Ghouch N.,** Awad R.
JOURNAL	**Journal of Bio- and Tribo-Corrosion**
YEAR	2024
PUBLICATION INFO	10(1): 1-13
THEME / SUBTHEME	Science and Technology/Corrosion Control

ABSTRACT

Mg-doped CuO nanoparticles ($Cu_{1-x}Mg_xO$) capped with ethylenediamine tetraacetic acid (EDTA), $0.000 \leq x \leq 0.020$, have been synthesized by the co-precipitation route. The anti-corrosion behavior of 10 ppm of pure and Mg-doped CuO nanoparticles was studied on mild steel in 0.5 M hydrochloric (HCl) and sulfuric (H_2SO_4) acids, containing 1% of sodium dodecyl sulfate (SDS) as surfactant. Potentiodynamic polarization and electrochemical impedance spectroscopy were employed to study their anti-corrosion behavior. Based on the results provided, the successful corrosion inhibition of mild steel in 0.5 M HCl and H_2SO_4 solutions has been established and confirmed by Raman measurements at 50 min in the presence of pure and Mg-doped CuO nanoparticles. Mg-doped CuO nanoparticles enhanced the corrosion protection of mild steel in 0.5 M HCl and H_2SO_4 solutions. This might be attributed to the adsorption reaction of Mg^{2+} ions that form a protective film on the mild steel surface. This was confirmed by Raman spectra in both media, where the corrosion products formed such as hematite, goethite, maghemite, and green rust were detected and analyzed.

ARTICLE TITLE	**Stabilization of Bresse System with Thermodiffusion Effect**
AUTHORS	*Youssef W.,* **Arwadi T.**
JOURNAL	**Mathematics of Control, Signals, and Systems**
YEAR	2023
PUBLICATION INFO	35(1): 1-20
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science

ABSTRACT

We consider the Bresse beam with thermodiffusion effects act on the bending moment and axial force together. An exponential stability is obtained in the case of equal speeds of propagation. Otherwise, a polynomial stability is proved. Using the frequency domain method together with some multiplier techniques, we prove these results.

ARTICLE TITLE	**Synthesis of Ruthenium Complexes And Assessing Their Anticancer And Antibacterial Effects**
AUTHORS	Zeiz A., ***Chayya S.,*** Kassem Z., Hijazi A., Khawaja G., **El-Dakdouki M.**
JOURNAL	**Farmacia**
YEAR	2023
PUBLICATION INFO	71(6): 1129-1142
THEME / SUBTHEME	Health and Wellbeing/ Toxicology
ABSTRACT	Ruthenium (Ru) complexes exhibit intriguing biological effects, including potent antibacterial and anticancer activities. The aim of this study was to prepare $Ru_{(dppz)}(DMSO)_2Cl_2$ complex from cis-fac-dichlorotetrakis(dimethylsulfoxide)ruthenium(II) precursor (cis-$Ru(DMSO)_4Cl_2$), and assess its anticancer and antibacterial activities. The complex was characterized by NMR and FTIR spectroscopies. The physiochemical properties of the prepared complexes were predicted by employing MolSoft software and its DNA binding potential was assessed using molecular docking. The complex displayed an intercalative mode of DNA binding with a binding affinity of -15.93 kcal/mol and a hydrogen bonding of 2.5 Å. Additionally, Ru complex exhibited a promising antibacterial effect against E. coli, E. faecalis, P. aeruginosa and S. aureus at a minimum inhibitory concentration (MIC) of ~ 30 μg/mL. The cytotoxic activity of cis-$Ru(DMSO)_4Cl_2$ and $Ru_{(dppz)}(DMSO)_2Cl_2$ complexes against colorectal (HCT-116) and breast cancer (MCF-7) cell lines was elucidated by using the MTT cell viability assay, and the latter complex displayed an intriguing low IC50 value (12.6 μM) in HCT-116 cells. The precise molecular mechanism of action of $Ru_{(dppz)}(DMSO)_2Cl_2$ complex was deciphered by tracking the expression levels of key apoptotic proteins, namely p53, Bax and Bcl-2. Western blotting analysis showed that the anticancer activity is mediated by the complex's ability to activate the mitochondrial apoptotic pathway, as evident by modulating the expression level of p53, Bax and Bcl-2 proteins.

ARTICLE TITLE	**Surveying and Mapping Cereals and Legumes Wild Relatives in Mount Hermon (Bekaa, Lebanon)**
AUTHORS	Sayde E., Chalak L., **Baydoun S.,** Shehadeh A., El Zein H., Al Beyrouthy J., Yazbek M.
JOURNAL	**Ecology and Evolution**
YEAR	2024
PUBLICATION INFO	DOI: 10.1002/ece3.10943
THEME / SUBTHEME	Creative Sustainable Development/ Human Development
ABSTRACT	Crop Wild Relatives (CWR) should be highly prioritized, monitored, and conserved as they have an immense effect on sustainability and livelihood. In this study we aim to survey and map cereal and legume wild relatives of Fabaceae and Poaceae families. Mount Hermon, Bekaa side, Lebanon. A set of 46 CWR species were targeted based on desk selection analysis and prioritization by the International Center for Agricultural Research in Dry Areas genebank for their potential importance in breeding programs. A botanical survey of 17 sites of the various habitats of Mount Hermon was performed during April–June 2021 using a systematic transect/quadrate sampling method. Recorded genera and species were accurately georeferenced and then mapped with the DIVA-GIS program. In total, 854 occurrences were observed belonging to 34 species of Fabaceae and 12 species of Poaceae. High H' Shannon diversity values were recorded in three sites (Al Fakiaa, Sham El Hafour and Ain Ata- al Berke) of the Mount with values ranking between 2.45 and 2.83. This was confirmed by the richness distribution maps of genera and species. Richness distribution maps provide relevant clues on candidate sites for high concentrations of each of the species under study. At least the three sites, hosting 87% of the surveyed CWR›s species, can be considered for further in situ conservation actions.

ARTICLE TITLE	**Synthesis, Characterization, and Gas-Sensing Application of Cd0.5Zn0.5ndxfe2–Xo4 Nanoparticles**
AUTHORS	*Korek H.*, **Habanjar K.,** Elsharkawy G., Awad R.
JOURNAL	**Materials Research Express**
YEAR	2024
PUBLICATION INFO	DOI: 10.1088/2053-1591/ad6ef0
THEME / SUBTHEME	Science and Technology/Advanced Materials
ABSTRACT	Fabrication of $Cd_{0.5}Zn_{0.5}NdxFe_{2-x}O_4$ nanoparticles, with x = 0.00, 0.01, 0.02, 0.04, 0.06, and 0.08, has been carried out using a wet chemical co-precipitation method. The effect of the rare earth Nd^{3+} doping on the prepared ferrites was structurally investigated using x-ray diffraction (XRD) along with Rietveld refinement. The results indicate great crystallinity in the FCC Fd3m spinel structure of $Cd_{0.5}Zn_{0.5}NdxFe_{2-x}O_4$ nanoparticles. The lattice parameter increases with the increase of doping concentration from 8.5378 until 8.5432 Å and the crystallite size obtained using Debye-Sherrer, Williamson–Hall, Size-strain plot (SSP), and Halder-Wagner(H-W) methods, decreases until the solubility limit of the materials is at x = 0.04. By using transmission electron microscopy (TEM), the morphological analysis reveals the spherical shape of the samples with minor agglomeration with the aid of using a Polyvinylpyrrolidone (PVP) capping agent. The grain size ranges from 14.37 to 15.24 nm. Raman spectroscopy verifies the incorporation of N^{3+} in the octahedral sites and the decrease in particle size. The elemental composition was verified using x-ray photoelectron spectroscopy (XPS). The magnetic properties were studied using a vibrating sample magnetometer(VSM) and it shows superparamagnetic behavior with a decrease in the saturation magnetization from 2.207 to 1.918 emu g−1 and an increase in coercivity from 7.194 to 14.397 G. The prepared materials were tested as liquefied petroleum gas(LPG) sensors by studying their sensitivity, selectivity, optimum working temperature, response, and recovery times. Nd^{3+} doping shows a great increase in LPG sensing sensitivity 4 to 20 times than the pure samples. The doping concentration also decreases the response and recovery times.

ARTICLE TITLE	**Tailoring the Structural, Optical and Anti-corrosion Effect of Synthesized Sn-Doped CuO Nanoparticles on Mild Steel in 0.5 M HCl Solution**
AUTHORS	*El Sayed M.*, **El Ghouch N.,** Younes G., Noun M.
JOURNAL	**Material Engineering and Performance**
YEAR	2024
PUBLICATION INFO	1(1): 1-16
THEME / SUBTHEME	Science and Technology/Advanced Materials
ABSTRACT	This study dealt with the synthesis of pure and Sn-doped CuO with different concentrations (x = 0.000, 0.005, and 0.010) capped with ethylenediaminetetraacetic acid (EDTA) through the simple and low-cost co-precipitation method. The synthesized nanoparticles are further characterized by x-ray diffraction to determine their structural properties. The crystalline size is decreased to 37.06 nm upon increasing the concentration of Sn dopant. Also, Sn doping has a remarkable effect on CuO, where it was observed with smaller and spherical particles that are confirmed from the SEM results. Also, EDX confirmed the excellent compositional homogeneity that verified that Sn is a real dopant in CuO. Ultraviolet-visible spectroscopy is used to determine the optical properties of the Sn-doped CuO nanoparticles in propanol solvent. The Tauc plots are used to estimate the band gap energies. These nanoparticles are found to be excitation-dependent which is proved by using photoluminescence spectroscopy. Also, they can be used as a potential candidate for blue-chip and are applicable in near-UV white light emitting devices. Consequently, these nanoparticles have been used as corrosion inhibitors with 77% efficiency on mild steel in 0.5 M HCl which is confirmed by electrochemical impedance spectroscopy measurements. The potentiodynamic polarization studies classified these nanoparticles as mixed-type inhibitors that form a protective film on the mild steel surface. This was confirmed by Raman spectra in 0.5 M HCl where the corrosion products formed were detected and analyzed.

ARTICLE TITLE	**T. Boudieri Extract Potentiates the Effects of Capecitabine Treatment in Human Colon Cancer Cells**
AUTHORS	Sawaya K., **Khalil M., Khawaja G.**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2024
PUBLICATION INFO	5(2): 1-10
THEME / SUBTHEME	Health and Wellbeing/ Human Diseases at the Molecular Level
ABSTRACT	Colorectal cancer is one of the most frequently occurring types of cancer worldwide, ranking as high as second in certain regions in terms of incidence, with a projected increase in mortality rate of 66% by the year 2035 (Sawicki et al., 2021). This predicted rise in colorectal cancer cases can be attributed to a wider spread in multiple factors implicated in the development of this type of cancer, such as increased sedentary life-styles and unhealthy diets, what is more concerning however is the increase in incidence of early-onset colorectal cancer in individuals below the age of 50 (Akimoto et al., 2021). In addition to its high incidence, colorectal cancer also has a high mortality rate, constituting in some countries the third or even second cause of cancer related deaths (Siegel et al., 2020). Another reason that highlights the urgency for continuing to explore anti-cancer chemotherapeutic alternatives that can act as stand-alone treatments or adjunct therapies as well as synergistic tools to boost the efficacy of chemotherapeutic agents already being utilized is that cancer cells generally employ several mechanisms to develop drug resistance to known treatments and evade them such as mutations in various proteins involved in cell signaling pathways that are targeted by chemotherapeutic agents (Nussinov, Tsai, & Jang, 2021).

ARTICLE TITLE	**The Impact of Augmented Reality Learning Experiences Based on the Motivational Design Model: A Meta-Analysis**
AUTHORS	Prasetya F., Fortuna A., Samala A., **Rawas S.,** Mystakidis S., Waskito S., Primawati E., Wulansari E., Kassymova K.
JOURNAL	**Social Sciences & Humanities**
YEAR	2024
PUBLICATION INFO	10(2024): 0-13
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	This meta-analysis examined the impact of augmented reality learning experiences on the motivational design model to obtain findings related to student attention, material relevance, increased confidence, and student satisfaction; however, heterogeneity in the sample population of this study was ignored. The analysis utilized Preferred Reporting Items for Systematic Reviews and meta-analysis guidelines to logically define and communicate outcomes, employing JASP software for quantitative study and VOSviewer to visualize tendencies and connections amid bibliometric examination to recognize gaps in sources. The exploration incorporated twenty-five comparative analyses evaluating how interventions affected student enthusiasm. Encouraging effects were noticed, specifically in concentration attention (dRe = 0.816), relevance (dRe = 0.787), confidence (dRe = 0.773), and satisfaction (dRe = 0.787). Furthermore, subsequent identification of possible publication bias through Egger's test and funnel plot revealed no issues of publication bias in this meta-analysis study. The study concluded that learners showed that the four design models had more positive motivation towards augmented reality learning than those who did not engage in augmented reality-based learning. Nevertheless, some studies included in this meta-analysis had minuscule sample sizes and short intervention durations. Future research efforts should encompass extended interventions and implementations, delving into augmented reality learning through empirical studies to achieve a more expansive influence and diverse representation of student groups.

ARTICLE TITLE	**Theoretical Electronic Structure with Spin–Orbit Coupling Effect of the Molecules SrAt and BaAt for Laser Cooling Studies**
AUTHORS	*Madi A.,* El-Kork N., Zeid I., **Korek M.**
JOURNAL	**Scientific Reports**
YEAR	2024
PUBLICATION INFO	DOI: 10.1038/s41598-024-53564-5
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Ab initio CASSCF/MRCI + Q calculations have been used to investigate the electronic structure and transition properties of the alkaline earth astatine molecules SrAt and BaAt. The adiabatic potential energy curves have been computed and plotted for the low-lying electronic states in the representations $^{2S+1}\Lambda^{+/-}$ and $\Omega^{(\pm)}$ (with and without spin-orbit coupling effect). The spectroscopic and vibrational constants have been deduced for the corresponding bound states. An analysis of the Franck-Condon factors, the Einstein Coefficients, and the branching ratios among different vibrational levels has shown that both SrAt and BaAt molecules are suitable candidates for Doppler and Sysphus laser cooling. Experimental laser cooling schemes and conditions for these two molecules have been proposed. These results may pave the way for new spectroscopic and laser cooling experiments of alkaline earth astatine molecules.

ARTICLE TITLE	**Theoretical and Numerical Study of the Decay in a Viscoelastic Bresse System**
AUTHORS	**El Arwadi T.,** ***El Hindi M.,*** Hassan J., Messaoudi S.
JOURNAL	**Discrete and Continuous Dynamical Systems - Series B**
YEAR	2024
PUBLICATION INFO	29(12): 1-30
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science

ABSTRACT

In this paper, we consider a one-dimensional finite-memory Bresse system with homogeneous Dirichlet-Neumann-Neumann boundary conditions. We prove some general decay results for the energy associated with the system in the case of equal and non-equal speeds of wave propagation under appropriate conditions on the relaxation function. In addition, we show by giving an example that in the case of equal speeds of wave propagation and for certain polynomially decaying relaxation functions, our result gives an optimal decay rate in the sense that the decay rate of the system is exactly the same as that of the relaxation function considered. We also include some numerical illustrations in order to validate our theoretical findings.

ARTICLE TITLE	**The Modulatory Effect of Al-Assi River Trout Fish Meal on OCD Manifestations and Molecular Mechanisms In BALB/C Mice**
AUTHORS	***Salloum F.,*** Farran M., Shaib H., Jurjus A., Sleiman R., **Khalil M.**
JOURNAL	**Functional Foods in Health and Disease**
YEAR	2024
PUBLICATION INFO	14(5): 299-310
THEME / SUBTHEME	Health and Wellbeing/ Human Diseases at the Molecular Level
ABSTRACT	Background: Obsessive-Compulsive Disorder (OCD) is a type of anxiety disorder that is marked by intrusive and distressing thoughts, as well as repetitive behaviors. Trout fish (Oncorhynchus mykiss) is a functional food that might have potential therapeutic effects on many neurological disorders including OCD. Objective: This study aims to explore the effects of Al-Assi River trout fish meal, a dietary source of tryptophan, on obsessive-compulsive disorder (OCD) symptoms and related molecular pathways in BALB/c mice. Methods: OCD mice were divided into five groups: one control group without any treatment, one group treated with fluoxetine (a selective serotonin reuptake inhibitor), and three groups fed with different doses of trout fish meal (0, 7.5, and 15 g/kg body weight). The mice were subjected to various behavioral tests, such as the marble test, tail suspension test, sucrose preference test, and forced swim test, to evaluate OCD and depressive-like behaviors. Moreover, the expression and protein levels of genes involved in the serotonergic and GABAergic systems were measured. Results: The results indicated that trout fish meal had dose-dependent effects on OCD-like behaviors, revealing exacerbation at lower doses and improvement at higher doses. For instance, in the marble test, OCD mice fed with 7.5 g of trout fish/kg body weight buried more marbles than those fed with 15 g/kg of trout fish (4.5 vs 3.33 out of 6, $p>0.05$). In the tail suspension test, the immobility time of OCD mice treated with fluoxetine was numerically lower than that of the untreated OCD mice (63.6 vs 87.3 seconds, $p>0.05$). Furthermore, normal mice had different baseline gene Functional Foods in Health and Disease 2024; 14(4): 299-310 FFHD Page 300 of 310 expression profiles than OCD mice.

ABSTRACT	Normal mice had the highest fold increase of Gabra gene expression (3.75) compared to the untreated OCD group, followed by groups treated with 7.5 and 15 g of trout fish/ kg body weight (2.02 and 1.44, respectively). Conclusions: This study suggests that dietary interventions rich in tryptophan, such as trout fish meal, may have modulatory effects on OCD symptoms and molecular mechanisms in mice. However, the optimal dosing and individual variability need to be considered. More research is required to clarify the underlying mechanisms and to evaluate the potential efficacy of trout fish meal in treating OCD in humans.

ARTICLE TITLE	**The Role of Artificial Intelligence in Eliminating Accounting Errors** ***(Joint Publication with Faculty of Business Administration)***
AUTHORS	**Al Najjar M., Ghanem M., Mahboub R., Nakhal B.**
JOURNAL	**Journal of Risk and Financial Management**
YEAR	2024
PUBLICATION INFO	17(353): 1-15
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	This study investigates the impact of artificial intelligence (AI) on reducing accounting errors from two distinct angles: that of accounting software developers and of certified public accountants. We employ a questionnaire-based approach informed by prior research and validated through pilot testing. Our findings reveal significant benefits for software developers. AI effectively addresses various accounting errors, including tax rate discrepancies, cutoff period inaccuracies, principal violations, concealed transactions, mathematical mistakes, and manipulation errors. However, when considering users, AI's effectiveness varies. While it successfully mitigates certain errors, such as those related to principles, it falls short in eliminating mathematical errors. This research contributes fresh insights into the role of AI in accounting within emerging markets, enhancing our understanding of its potential and limitations.

ARTICLE TITLE	**Towards Digital Twins for Optimizing Metrics in Distributed Storage Systems - A Review**
AUTHORS	**Itani M., Abu Daher L.,** *Hammoud A.*
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2023
PUBLICATION INFO	5(1): 1-11
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	With the exponential data growth, there is a crucial need for highly available, scalable, reliable, and cost-effective Distributed Storage Systems (DSSs). To ensure such efficient and fault tolerant systems, replication and erasure coding techniques are typically used in traditional DSSs. However, these systems are prone to failure and require different failure prevention and recovery algorithms. Failure recovery of DSS and data reconstruction techniques take into consideration different performance metrics optimization in the recovery process. In this paper, DSS performance metrics are introduced. Several recent papers related to adopting erasure coding in DSSs are surveyed together with highlighting related performance metrics introduced in the context of these papers. Next, we present recent literature where Digital Twins (DTs) are involved in monitoring DSSs and assisting the data center managers in intelligent decision-making. Finally, important open issues are identified to inspire future studies for fully efficient DSSs.

ARTICLE TITLE	**Towards Industrial Metaverse: A High-Fidelity Digital Twin for IIoT with Optimized Age-Accuracy Tradeoff**
AUTHORS	**Itani M.,** Sharafeddine S.
JOURNAL	**IEEE Access**
YEAR	2024
PUBLICATION INFO	DOI: 10.1109/ACCESS.2024.3434630
THEME / SUBTHEME	Science and Technology/Network Optimization

ABSTRACT

Digital twins technology is a key pillar to realizing the vision of Industrial Metaverse and enabling Industry 5.0 where industries become more sustainable, resilient, and smart, while being humancentric. In this paper we aim at developing a high fidelity digital twin model consistent with its physical system for better informed decisions in terms of failure avoidance or performance enhancements. To enable this, we harness the capabilities of an unmanned aerial vehicle (UAV) to collect measurement data from Industrial Internet of Things devices that monitor various independent physical entities in a given industrial plant. Each device sends its readings to the UAV that in turn performs computations to determine the status of the physical entities. The UAV relays the resulting status details to the digital twin running at the edge of the network in a timely manner. For a high fidelity digital twin, the processed status has to be kept as close as possible to the actual status of the physical entities through ensuring high accuracy and synchronization. To do so, we introduce the age of digital twin metric based on the age of information concept to represent the degree of synchronization between the digital and physical twins then formulate the problem as a mixed integer non-convex program. Due to its complexity, we decompose the problem into two subproblems, convexify their constraints and optimize the UAV trajectory, device scheduling, wireless and computing resource allocation, and data collection. We run extensive simulations for various system parameters and demonstrate the resulting accuracy of the digital twin model while ensuring high synchronization. Simulation results corroborate the superiority of our proposed solution as compared to different baseline approaches.

ARTICLE TITLE	**Transforming Healthcare Data Management: A Blockchain-Based Cloud EHR System for Enhanced Security and Interoperability**
AUTHORS	Dwinggo A., **Rawas S.**
JOURNAL	**International Journal of Online and Biomedical Engineering**
YEAR	2024
PUBLICATION INFO	5(1): 1-11
THEME / SUBTHEME	Science and Technology/Cryptography and Blockchain
ABSTRACT	The adoption of cloud-based electronic health record (EHR) systems and blockchain technology in healthcare is gaining attention for enhancing data security and interoperability. This research focuses on designing and implementing a blockchain-based cloud EHR system. It explores selecting suitable blockchain technology, cloud infrastructure, and data management methods to ensure patient data confidentiality, integrity, and availability. The architecture and components of the system, including the blockchain network, cloud storage layer, and user interface, are thoroughly discussed. A pilot study evaluates the system's feasibility and performance, showcasing improved data protection, sharing, and management compared to traditional EHR systems.

ABSTRACT

The potential benefits, drawbacks, and barriers to adoption of a blockchain-based cloud EHR system are examined. This research provides valuable insights and recommendations for healthcare institutions considering the implementation of such systems, addressing the challenges, and offering guidance for successful adoption.

ARTICLE TITLE	**Transforming Healthcare Delivery: Next-Generation Medication Management in Smart Hospitals Through IOMT And ML**
AUTHORS	**Rawas S.**
JOURNAL	**Discover Artificial Intelligence**
YEAR	2024
PUBLICATION INFO	DOI:10.1007/s44163-024-00128-1
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	The management of medications is a crucial component of healthcare, and pharmaceutical errors can have detrimental effects on patients, healthcare professionals, and healthcare systems. By utilizing patient-specific data and cutting-edge technology like the Internet of Medical Things (IoMT) and machine learning, customized drug management systems have the potential to increase patient safety and healthcare effectiveness. In this study, we reviewed a large body of literature on the subject of medication management in healthcare and the potential advantages of personalized medication management. We then assessed how IoMT and machine learning might be used to enhance medication management in smart hospitals. Then, we created a framework for assessing how personalized medication management utilizing IoMT and machine learning affects patient safety and healthcare effectiveness. Our study›s findings demonstrate that in smart hospitals, tailored medication management with IoMT and machine learning can drastically lower medication errors while also enhancing patient safety and healthcare effectiveness. Our findings have important ramifications for the future of medication administration in smart hospitals, and we advise healthcare professionals and policymakers to give priority to integrating cutting-edge technology like IoMT and machine learning for customized medication management.

ARTICLE TITLE	**Use of Virtual Reality as an Educational Tool: A Comparison Between Engineering Students and Teachers**
AUTHORS	Criollo C., Cerezo Uzcátegui J., Guerrero A., Yánez T., Samala A., **Rawas S.,** Luján S.
JOURNAL	**IEEE Access**
YEAR	2024
PUBLICATION INFO	13(4): 2374-2387
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Today, teaching faces several challenges, including students' difficulty in understanding abstract concepts and lack of motivation. To address these problems, the use of virtual reality (VR) has been explored as an innovative and potentially effective educational tool. However, so far, the effectiveness of VR applications and the perception of their use lack a clear and effective approach to be used to support education. The importance of addressing this problem lies in the need to improve the quality of teaching using emerging technologies. It is for this reason that it is important to find new strategies to improve the effectiveness of teaching using VR. In this context, this research presents the results of the FreeDev application, previously validated with 20 teachers and with 80 engineering students from a private university. FreeDev is a VR application designed to support the teaching of basic programming, it is aimed as an educational tool to provide an immersive experience to students on how to get started in programming and computational thinking. FreeDev has been well accepted, and both teachers and engineering students see it as a tool that can be used to support education. It is hoped that this research will contribute to the advancement of knowledge in the field of education.

ARTICLE TITLE	**Laser Cooling and Electronic Structure of Be Halide Anions Bex− (X = Cl, Br, F, And I)**
AUTHORS	*Madi A.,* El-Kork N., **Zeid I., Korek M.**
JOURNAL	**Journal of Chemical Physics**
YEAR	2024
PUBLICATION INFO	DOI: 10.1063/5.0091872

THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	The adiabatic potential energy curves of the low lying electronic states of the Be halide anions BeX− (Cl, Br, F, and I) have been investigated in the representation 2s+1Λ(+/−) by using the complete active space self-consistent field with a multireference configuration interaction method. The spectroscopic parameters Te, Re, ωe, and Be and the static and transition dipole moment μe were studied, and a rovibrational study of the investigated electronic states was performed. New electronic states were investigated here for the first time. The calculated highly diagonal Franck–Condon factor and the short radiative lifetime among the lowest vibrational levels of the X1Σ0+ − (1)3∏1 transitions of the molecular anion BeF− prove its candidacy for Doppler laser cooling. The experimental proof of the stability and the calculated experimental parameters, such as the vibrational branching ratio, the slowing distance, the recoil, and Doppler temperatures with the experimental conditions of the buffer gas cell of this anion, open the route for experimental work on the BeF− molecular ion.

ARTICLE TITLE	**Uncovering the Therapeutic Potential of Lithium Chloride in Type 2 Diabetic Cardiomyopathy: Targeting Tau Hyperphosphorylation and TGF-β Signaling via GSK-3β Inhibition**
AUTHORS	***Abou Assi L.,*** Alkhansa S., Njeim R., Ismail J., Madi M., Ghadieh H., Al Moussawi S., Azar T. S., Ayoub M., Azar W. S., Hamade S., Nawfal R., Haddad N.-R., Harb F., Faour W., **Khalil M.,** Eid A.
JOURNAL	**Pharmaceutics**
YEAR	2024
PUBLICATION INFO	16(1): 955-76
THEME / SUBTHEME	Health and Wellbeing/ Human Diseases at the Molecular Level
ABSTRACT	Diabetic cardiomyopathy (DCM) is a major complication of type 2 diabetes mellitus (T2DM) that leads to significant morbidity and mortality. The alteration in the signaling mechanism in diabetes leading to cardiomyopathy remains unclear. The purpose of this study is to investigate the role of tauopathy in myocardial dysfunction observed in T2DM. In that regard, diabetic Sprague Dawley rats were treated with intraperitoneal injections of lithium chloride (LiCl), inhibiting tau phosphorylation. Cardiac function was evaluated, and molecular markers of myocardial fibrosis and the TGF-β signaling were analyzed. T2DM rats exhibited a decline in ejection fraction and fractional shortening that revealed cardiac function abnormalities and increased myocardial fibrosis. These changes were associated with tau hyperphosphorylation.

ABSTRACT	Treating diabetic rats with LiCl attenuated cardiac fibrosis and improved myocardial function. Inhibition of GSK-3β leads to the suppression of tau phosphorylation, which is associated with a decrease in TGF-β expression and regulation of the pro-inflammatory markers, suggesting that tau hyperphosphorylation is parallelly associated with fibrosis and inflammation in the diabetic heart. Our findings provide evidence of a possible role of tau hyperphosphorylation in the pathogenesis of DCM through the activation of TGF-β and by inducing inflammation. Targeting the inhibition of tau phosphorylation may offer novel therapeutic approaches to reduce DCM burden in T2DM patients.

ARTICLE TITLE	**Unveiling the Landscape of Generative Artificial Intelligence in Education: A Comprehensive Taxonomy of Applications, Challenges, and Future Prospects**
AUTHORS	Samala A., **Rawas S.,** Wang T., Reed J., Kim J., Howard N., Ert M.
JOURNAL	**Education and Information Technologies**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s10639-024-12936-0
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	The rapid advancement of Generative Artifcial Intelligence (GenAI) models, particularly ChatGPT, has sparked widespread discussion among educators and researchers regarding their potential implications for education. This study presents a comprehensive taxonomy of GenAI in academia and education, encompassing a wide range of applications, challenges, ethical considerations, and future prospects. Drawing on a scoping review of 453 articles, including the 50 most cited works throughout 2023, the taxonomy provides a state-of-the-art analysis of the current landscape of GenAI in education. The taxonomy ofers a theoretical framework that aligns with the current discourse in GenAI and education, providing a critical evaluation of the existing literature and proposing innovative perspectives and solutions. The practical implications of the taxonomy for educators, researchers, and policymakers are highlighted, emphasizing the need for ethical considerations and informed policies to maximize the benefts of GenAI while minimizing its risks and negative impacts.

ARTICLE TITLE	**Water Body Satellite Images Segmentation using Maxwell Boltzmann Distribution**
AUTHORS	**Affara L., El Zaart A., Damaj R.**
JOURNAL	**BAU Journal - Science and Technology**
YEAR	2024
PUBLICATION INFO	5(2): 9-9
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	Images can exhibit diverse attributes and characteristics, because of variations in both the quantity of each intensity level and their respective positions, histograms display varying distributions. Some images feature symmetric histograms, while others exhibit asymmetry. In image segmentation tasks, traditional mean-based thresholding methods work well with symmetric histograms, relying on Gaussian distribution definitions. However, situations arise where asymmetric distributions must be considered. Threshold-based segmentation entails the partitioning of intensity levels into separate regions determined by the threshold value. Within this category of thresholding methods, Minimum Cross Entropy Thresholding (MCET) stands out as a mean-based thresholding technique with a unique self-contained objective function adaptable to various distributions. In our study, we propose incorporating the Maxwell-Boltzmann Distribution into MCET›s objective function. We introduce a specialized model aimed at enhancing efficiency in image segmentation tasks, enabling precise data analysis customized to specific images with histograms skewed to the right. This approach yields improved segmentation results by considering the impact of utilizing the Maxwell-Boltzmann distribution with the right-skewed distribution within MCET›s objective function. We have validated our approach, and we conducted a comparative analysis, assessing the performance of our proposed model against relevant studies in the literature. We applied this approach to Sentinel-2 satellite imagery for water body segmentation. The outcomes showcase the effectiveness of our model in segmenting images with right-skewed histograms, substantiated by a variety of performance evaluations.

ARTICLE TITLE	**Well-Posedness of the Green–Naghdi Model for an Uneven Bottom in Presence of the Coriolis Effect and Surface Tension**
AUTHORS	*Berjawi M.,* **El Arwadi T.,** Israwi S., Talhouk R.
JOURNAL	Studies in Applied Mathematics
YEAR	2024
PUBLICATION INFO	153(1): 1-42
THEME / SUBTHEME	Science and Technology/Mathematical and Computational Science
ABSTRACT	The objective of this work is to derive and analyze a Green–Naghdi model with Coriolis effect and surface tension in nonflat bottom geometry. Gui et al. derive a Green–Naghdi-type model in flat bottom geometry under the gravity and Coriolis effect. Chen et al. proved the existence and uniqueness of solution in Sobolev space under a condition depending on the initial velocity and the Coriolis effect. In this paper, we provide a rigorous derivation of Green–Naghdi model under the influence of the two mentioned effects, with nonflat bottom. After that, the existence and construction of solutions for the derived model will be proved under two alternative conditions: the first one is the same condition as in Chen et al. and Berjawi et al. and the second one concerns only the Coriolis coefficient Ω that supposed to be only of order $O(\sqrt{\mu})$. This existence and uniqueness result ameliorate the result of Chen et al. and Berjawi et al. in the sense that no condition on the velocity is needed. We also prove the continuity of the associated flow map.

2. PROCEEDINGS

PROCEEDING TITLE	**A Novel Blockchain-Based Approach for Secure and Efficient Electronic Medical Record Sharing**
AUTHORS	**EL Ghor H., Daher M., Nakhal B.**
CONFERENCE TITLE	Algorithms in Advanced Artificial Intelligence ICAAAI2023
DATE	22/12/2023
PLACE	Bhimavaram,India
THEME / SUBTHEME	Science and Technology/Cryptography and Blockchain
ABSTRACT	Sharing of Electronic Medical Records (EMRs) between doctors and medical institutions can now be done using Blockchain - a disruptive approach to the exchange of EMRs. Blockchain can enhance the accuracy of medical decisions and improve public health significantly. However, there is a need to ensure that sensitive information is retrieved from the correct encrypted EMRs, and it is even more difficult to dynamically update the user attributes of authorized users. To this end, we propose a secure data sharing approach that uses blockchain and encryption techniques to ensure secure, efficient, and patient centric data sharing. We came up with a never-beforeseen approach to integrate attribute-based encryption, searchable encryption, and robust access control mechanisms to update user attributes with top-notch security measures in place. Additionally, we delve into the hurdles encountered and ways to make amends to the strengths and potential areas for improvement. Our proof of consistency demonstrates the impact of adding a consortium blockchain on securing the shared electronic medical records and the consequential improvements it yields for the healthcare industry.

PROCEEDING TITLE	**An Intelligent and Green E-healthcare Model for an Early Diagnosis of Medical Images as an IoMT Application**
AUTHORS	**Dhaini I., Rawas S., El-Zaart A.**
CONFERENCE TITLE	19th International Conference on Distributed Computing and Artificial Intelligence
DATE	01/07/2022
PLACE	University of L'Aquila, Italy

THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The Internet of Things (IoT) is a fast-evolving technology that utilizes software, hardware, and computer devices to form a network of interconnected gadgets. IoMT integrates medical equipment and applications linked to healthcare IT systems in an IoT-based ecosystem. Moreover, IoMT for health care is a massive data generator produced by sensors or any medical device attached to the Internet. As a result, transferring IoMT data to remote cloud databases is a popular procedure. This research proposes an intelligent and green healthcare model for an early diagnosis of medical images. Moreover, the research focuses on image segmentation, an essential phase in image analysis, and presents a precise and robust segmentation model. Furthermore, the research considers the high energy consumption of transferring massive data through the cloud. It suggests a new energy-aware VM placement model in a fog-based environment.

PROCEEDING TITLE	**Attack Detection in IoT-Based Healthcare Networks Using Hybrid Federated Learning**
AUTHORS	**Itani M.,** Basheer H., AbdulKhaleq F.
CONFERENCE TITLE	**2023 International Conference on Smart Applications, Communications and Networking (SmartNets)**
DATE	27/07/2023
PLACE	Istanbul, Turkey
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Cybercrimes are increasing rapidly throughout the world, leading to financial losses and compromising the integrity and confidentiality of private data. Statistics showed that cybercrimes led to losses of around $6 trillion in 2021 based on a survey by Cybersecurity Ventures. Knowing that IoT networks are considered a source of identifiable data for vicious attackers to carry out criminal actions using automated processes, machine learning (ML)-assisted methods for IoT security have gained much attention in recent years. While conventional ML relies on a single server to store all of its data, which makes it a less desirable option for domains concerned about user privacy, the Federated Learning (FL)-based anomaly detection technique, which utilizes decentralized on-device data to identify IoT network intrusions, represents the proposed solution to the aforementioned problem. We propose a framework to train and test IoT data from health network using different classical machine learning algorithms and an enhanced federated learning model.

ABSTRACT	FL is a framework that learns continuously in an iterative manner by training locally at the client side with the client's individual data, and then ´ updating the central server by forwarding the required data. We evaluated the performance of different algorithms based on accuracy, precision, recall and F1-score via different iterations. To develop a strong detection system, we used multiple datasets and generated different results. These results show decent and promising accuracy hence a promising solution towards telehealth application using machine learning techniques in detecting threats on IoT networks.

PROCEEDING TITLE	**Ensemble Learning Model for Face Swap Detection**
AUTHORS	Samrouth K., Beuve N., Deforges O., **Bakir N.,** Hamidouche W.
CONFERENCE TITLE	12th International Symposium on Digital Forensics and Security
DATE	30/04/2024
PLACE	San Antonio, TX, USA
THEME / SUBTHEME	Science and Technology/Software and Computing
ABSTRACT	Deepfake videos become now one of the top research topics because of their high spreading rate on social media. Faceswap, a particular type of Deepfake, consists in swapping faces of two persons in a video. Hence, face swapping can have malicious uses, such as falsifying privacy, interfering with political campaigns, terrorism, and threatening the social stability of the countries. Thus, early detection of this fake content is a primary task to limit their spread. Multiple approaches for DeepFake detection exist in the literature. The most recent and best ones are Identity-Aware and Mesoscopic features-based approaches. However, each of these approaches presents particular limitations. Therefore, in this paper, we propose to take the best out of these two recent approaches and to optimize the performance and robustness of Deepfake content detection. In particular, we propose an Ensemble Learning model based on combining the best two methods from the two aforementioned most recent approaches of detection. Our experiments show that our proposed ensemble model improved the performance and robustness of Deepfake detection to reach an accuracy of 95%.

PROCEEDING TITLE	**Specific Absorption Rate Reduction Method for Brain Safety in 5G Application**
AUTHORS	Moghnieh H., Barake R., **Daher M.**
CONFERENCE TITLE	**2023 Seventh International Conference on Advances in Biomedical Engineering**
DATE	12/10/2023
PLACE	La Sagesse University ,Beirut, Lebanon
THEME / SUBTHEME	Science and Technology /Mathematical and Computational Science
ABSTRACT	This paper presents a new Specific Absorption Rate (SAR) reduction method for Planar Inverted F Antenna (PIFA) for mobile devices in 5G. The approach is to perform periodic corrugations on the ground plane. This in turn adjust the current density induced by the antenna on the ground plane and eventually reduce SAR. Analysis of corrugation at different positions in the ground plane is presented. The design parameters of corrugations are optimized to maintain impedance matching and SAR reduction over 3.4 GHz to 3.8 GHz. Compared to the reference antenna, the peak value of 10 g average SAR of corrugated antennas are reduced by 57%. In addition, the efficiency of low SAR antennas is investigated. The validity of the proposed approach is proved by the simulation results of the antenna.

PROCEEDING TITLE	**Towards Reliable V2X Service Using UAV-Aided Coded Content Caching**
AUTHORS	**Itani M., Abu Daher L.**
CONFERENCE TITLE	**The 16th International Conference on the Developments in eSystems Engineering**
DATE	18/12/2023
PLACE	Atlas Universitesi,Istanbul,Turkey
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

With the advent of intelligent transportation systems and the increase in global mobile data traffic, the need for spaceair networks to provide extra resources, service, and coverage is becoming crucial. Recent technological advances in UAVs show that information processing equipment and data computation capabilities have been widely enhanced. UAVs play an important role in aiding terrestrial networks and proving cellular services. In this work, we harness the capabilities of UAVs and present a model where multiple UAVs cooperate together with the roadside units to serve vehicular nodes in rush hours and optimize content placement using file encoding technology to enhance the reliability of the whole system given the probability of a UAV failure. We present a system model, formulate the problem as a mixed integer linear programming problem and solve it using stochastic search algorithms. We run extensive simulations and show the effectiveness of our approach compared to several baseline approaches.

PROCEEDING TITLE	**Towards Secure IoMT: Attack Detection Using Deep Q-Learning in Healthcare Networks**
AUTHORS	**Abu Daher L.**
CONFERENCE TITLE	**The 16th International Conference on the Developments in eSystems Engineering (DeSE2023)**
DATE	18/12/2023
PLACE	Atlas Universitesi,Istanbul,Turkey
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	With the wide advent of IoT systems in the healthcare industry, not to mention that medical data is confidential and critical, any alteration in the data could affect the patients' treatment. Statistics show that cyber-attacks are rapidly increasing, thus an efficient intrusion detection technique is needed for integration in the healthcare sector. In this work, we explore the most frequent threats that target sensitive health data collected by IoMT devices. We introduce reinforcement learning in the context of medical IoT systems, and after presenting relevant literature, we conduct a study on a healthcare dataset and build models that constitute different intrusion detection systems using classical machine learning techniques together with deep reinforcement learning models using Q-learning. We performed extensive simulations based on the constructed models and compared the results using different performance metrics with a level of accuracy exceeding 92%.

PROCEEDING TITLE	**Towards Secure Federated Learning: Enhancing Privacy and Robustness in Decentralized AI Systems**
AUTHORS	Louis R., **Bakir N.,** Samrouth K.
CONFERENCE TITLE	**International Conference on Computer & Applications**
DATE	19/08/2024
PLACE	Cairo,Egypt
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	The traditional centralized training of artificial intelligence (AI) models faces growing privacy concerns as data increasingly resides in isolated silos and societal awareness of data privacy rises. Besides developing accurate global models, ensuring privacy in Machine Learning (ML) systems is now essential. Federated Learning (FL) has emerged as a powerful paradigm, enabling collaborative model training across decentralized devices, crucial in scenarios where sharing personal user data is risky. However, this decentralized approach introduces new privacy risks, particularly through inference attacks where adversaries can intercept and analyze models to extract sensitive information. Hence, there is still a need to protect FL systems. In this paper, we propose to encrypt the model parameters (weights and biais) updates exchanged between the FL server and clients. By implementing cryptographic protocols, we demonstrate how encryption can secure model parameters and predictions, preventing unauthorized access while maintaining model integrity. Our results indicate that incorporating encryption into FL offers a reasonable trade-off between security and performance, enhancing data privacy and overall security.

PROCEEDING TITLE	**PSO-GA-based Federated Learning for Predicting Energy Consumption in Smart Buildings**
AUTHORS	**Bakir N.,** Samrouth A., Samrouth K.
CONFERENCE TITLE	**The International Conference on Microelectronics -2023 Abu Dhabi**
DATE	17/12/2023
PLACE	Abu Dhabi

THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	Smart buildings are increasingly equipped with a multitude of sensors and IoT devices, generating vast amounts of data. Generating a common global efficient model for predicting energy consumption accurately in these environments is crucial for optimizing energy usage, reducing costs, and achieving sustainability goals. However, there are limitations in terms of communication resources and data privacy. Hence, Federated Learning (FL) has emerged as a promising solution to address the challenges of privacy, data decentralization, and scalability in such complex systems. However, FL can be challenging to optimize, as the parameters of the global model need to be tuned to achieve the best performance on a diverse set of devices (called clients). In this paper, we propose to combine the Genetic Algorithm (GA) with the Particle Swarm Optimization (PSO) algorithm to optimize FL for smart building energy consumption prediction. Experiments show that our proposed method increases the energy consumption prediction performance and reduce the Root Mean Square Error RMSE by 7.7% in comparison with the local models.

PROCEEDING TITLE	**Unlocking the Potential of Naïve Bayes for Network Intrusion Detection: A RandomForest-Driven Feature Selection Strategy**
AUTHORS	**El Rabaa R., Rawas S., El-Zaart A.**
CONFERENCE TITLE	**2023 International Conference on Computer and Applications**
DATE	01/11/2023
PLACE	Egypt
THEME / SUBTHEME	Science and Technology/ Digital Technology in Healthcare
ABSTRACT	Network intrusion detection systems play an essential role for ensuring an organization›s security success. This study focuses on the most recent intrusion detection systems built using the efficient and straightforward Naïve Bayes machine learning technique. However, in high dimensional, imbalanced data spaces, such Machine Learning based systems often underperform. To address this, feature selection approach is implemented using Select Best with Statistical Tests, a Random Forest-based filter, and Permutation Importance on the CSE CIC IDS 2018 dataset. The workflow begins with data transformation using Select Best with a chi-square test then applies the suggested method. Subsequently, feature relevance with Permutation Importance is assessed, eliminating low-impact features. Experiments include evaluation analysis using multiple evaluation metrics on Naïve Bayes classifier, showing that the Random Forest-based feature selection method significantly boosts Naïve Bayes› overall performance.

ABSTRACT	This leads to enhanced existing anomaly detection algorithms, and improved utilization of resources, underscoring the research›s introduction of an innovative feature selection method with a groundbreaking impact on the effectiveness and precision of intrusion detection systems, strengthening overall Security.

PROCEEDING TITLE	**Using Blockchain and Vazka Authentication for the Security of Smart Home Devices**
AUTHORS	Rayes W., Samrouth K., **Bakir N.**
CONFERENCE TITLE	**7th Arab ICT Conference 2024**
DATE	27/2/ 2024
PLACE	Bahrain
THEME / SUBTHEME	Science and Technology/ Cryptography and Blockchain
ABSTRACT	Smart home devices are increasingly used to automate daily tasks and provide enhanced comfort and convenience. However, as these devices become universal, their security risks also increase. These risks are caused by a lack of implementation of secure safety methods embedded within these devices and the nature of the data generated by these devices that could be used for malicious activities. In this paper, we propose an innovative robust approach to improve the security of data generated or collected by smart home devices. Our proposed method combines Blockchain with Vazka Authentication. First, our solution involves creating a decentralized system for storing devices collected or generated data using blockchain. Then, we introduce our new authentication mechanism, called Vazka, to limit unauthorized access to smart home devices data. It consists of dynamically generating a password based on the collected data signature. We analyze a particular case study that consists in applying our proposed solution to a smart home security camera's system. Our proposed solution has the potential to significantly enhance the security of video footage generated and collected by the smart home security camera. Overall, our proposed solution makes it more difficult for malicious actors to gain unauthorized access and/or tamper smart home devices collected data.

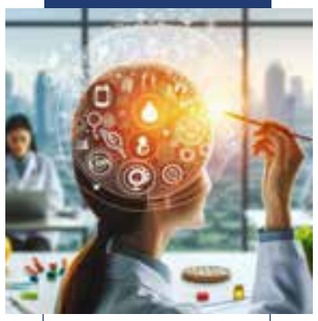
3. BOOK CHAPTER

BOOK CHAPTER TITLE	**A Blockchain-Enabled Approach for Secure Data Sharing in 6G-Based Internet of Things Networks**
AUTHORS	**Nakhal B.**
BOOK TITLE	Wireless Networks
YEAR	2023
PUBLISHER	Springer International Publishing
ISBN	978-3-031-33630-0
THEME / SUBTHEME	Science and Technology/Cryptography and Blockchain
ABSTRACT	The 6th generation of wireless networks (6G) promises to provide ultra-reliable, high-speed, and lowlatency communication for Internet of Things (IoT) devices. However, securing data transmission and storage in these networks is a critical challenge due to potential security threats. Blockchain technology provides a solution to enhance security in IoT networks by enabling secure, decentralized, and tamperproof data sharing. In this paper, we proposed a novel solution for securing data sharing and storage in 6Gbased IoT networks using blockchain technology, hybrid encryption, and IPFS. The proposed approach consists of four algorithms that enhance the security of the system: a user authentication algorithm, a data access algorithm, a data storage algorithm, and a secure data sharing algorithm. The secure data sharing algorithm enables secure, tamper-proof data sharing among authorized devices using a permissioned blockchain. These algorithms are implemented using hybrid encryption, which ensures data confidentiality, and have been evaluated for their effectiveness in enhancing security in 6G-based IoT networks. Our work contributes to the growing body of research on blockchain-enabled solutions for securing data in IoT networks and provides insights into the potential of blockchain technology, hybrid encryption, and IPFS to enhance security in 6G-based IoT networks. The proposed approach using these algorithms provides secure and tamper-proof data sharing, making the system more secure and reliable. We presented the technical details of our approach and evaluate its effectiveness in terms of security, with a particular focus on the role of hybrid encryption and IPFS in enhancing the security and reliability of the system. Our results demonstrate that the proposed approach enhances data security in 6G-based IoT networks by providing secure and tamper-proof data sharing. The use of hybrid encryption and IPFS makes the system more secure and reliable, with hybrid encryption ensuring data confidentiality and IPFS providing decentralized and fault-tolerant storage.

Prevalent SDG

SDG 3
85%

Prevalent Theme



Health and Wellbeing
95%

Prevalent Subtheme

Clinical Pharmacy and Practice
48%

% of Highly Indexed Journals

62%

Faculty of **PHARMACY**

23-24 RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**Acinetobacter Baumannii: Assessing Susceptibility Patterns, Management Practices, and Mortality Predictors in a Tertiary Teaching Hospital in Lebanon**
AUTHORS	**Itani R.,** Khojah J., Karout S., **Rahme D.,** Hammoud L., Awad R., Abu Farha R., Mukattash T. L., Raychouni H., **El Lakany A.**
JOURNAL	Antimicrobial Resistance and Infection Control
YEAR	2023
PUBLICATION INFO	12(1): 136-153
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	**Background** Acinetobacter baumannii is a major nosocomial pathogen capable of causing life-threatening infections. This bacterium is highly resistant to antibiotics and associated with high mortality rates. Therefore, this study aimed to evaluate A.baumannii's susceptibility patterns to antimicrobials, assess the appropriateness of the initiated antimicrobial therapy, determine the mortality rate, and identify predictors associated with mortality. **Methods** A retrospective observational study was conducted among patients infected with A. baumannii at a university hospital in Lebanon through the revision of medical records. Kaplan–Meier survival analysis and log-rank tests were used to analyze time-to-mortality. Binary logistic regression was performed to identify predictors of mortality. **Results** The records of 188 patients were screened, and 111 patients with A. baumannii infection were enrolled. Almost all isolates were resistant to carbapenem, and 43% of the isolates were extensively-drug resistant. Almost half of the patients received initial inappropriate antimicrobial therapy (n=50, 45.1%). The 30-day mortality rate associated with A. baumannii infection was 71.2% (79/111). The time to mortality in patients who received inappropriate antimicrobial therapy (5.70±1.07 days) was significantly shorter than in those who received appropriate antimicrobial therapy (12.43±1.01 days, P<0.01).Binary logistic regression revealed that inappropriate antimicrobial therapy (adjusted odds ratio [AOR]=16.22, 95% CI 2.68–9.97, P=0.002), mechanical ventilation (AOR=14.72, 95% CI 3.27–6.61, P<0.001), and thrombocytopenia (AOR=8.82, 95% CI 1.12–9.75, P=0.003) were more likely associated with mortality.

* Names in Bold Indicate BAU Academic Faculty
* Names in Italic Indicate BAU Students

ABSTRACT

Conclusions
A. baumannii exhibits an alarming mortality rate among infected patients. Thrombocytopenia, mechanical ventilation, and inappropriate antibiotic administration are associated with mortality in patients infected with A. baumannii. The prompt initiation of appropriate antimicrobial therapy, infection control measures, and effective stewardship program are crucial to reduce the incidence of A. baumannii and improve the treatment outcomes.

ARTICLE TITLE	**Antiviral Potential of Herbal Medicine in Fighting Covid-19 Pandemic, Re-Investigation of Herbal Monographs**
AUTHORS	*Kanso M.,* Omeiche Z., **Hijazi M.,** El-Lakany A., Aboul Ela M.
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2024
PUBLICATION INFO	DOI: 10.22159/ijpps.2024v16i9.51681
THEME / SUBTHEME	Health and Wellbeing/Drug Discovery
ABSTRACT	Medicinal herbs have been widely used in traditional medicine for their immune-boosting potential to humans in fighting various ailments, especially viral infections causing severe respiratory diseases such as influenza virus, H5N1, coronaviruses of different types, mainly MERS (Middle East Respiratory Syndrome), SARS (Severe Acute Respiratory Syndrome) and SARS-CoV-2 (Covid-19) that was declared by the World Health Organization (WHO), as a global pandemic. Various efforts are focusing despite the discovery of the vaccine, on finding treatments that can combat the serious complications of COVID-19, but in the absence of confirmed effective drugs, it is crucial to explore various possibilities including herbal medicines approved as antiviral agents. This study aims to identify key medicinal plants rich in bioactive compounds with antiviral activity against SARS-CoV-2., with the correlation regarding the collected information on their efficacy and safety with existing data in published official monographs presented to ensure the proper use of these natural constituents. Accordingly, a comprehensive review of the published literature was conducted using various scientific databases, including Scopus, PubMed, Google Scholar, and Web of Science. The analysis revealed the need to update herbal monographs and establish a globally harmonized approach to health claims associated with herbal medicines.

ARTICLE TITLE	**A Prognostic Model for Use before Elective Surgery to Estimate the Risk of Postoperative Pulmonary Complications (GSU-Pulmonary Score): A Development and Validation Study in Three International Cohorts**
AUTHORS	NIHR Global Health Research Unit on Global Surgery; STARSurg Collaborative, **Itani R., Tannir H.**
JOURNAL	**Lancet Digital Health**
YEAR	2024
PUBLICATION INFO	6(7): 507-519
THEME / SUBTHEME	Health and Wellbeing/Clinical Pharmacy and Practice
ABSTRACT	Background: Pulmonary complications are the most common cause of death after surgery. This study aimed to derive and externally validate a novel prognostic model that can be used before elective surgery to estimate the risk of postoperative pulmonary complications and to support resource allocation and prioritisation during pandemic recovery. Methods: Data from an international, prospective cohort study were used to develop a novel prognostic risk model for pulmonary complications after elective surgery in adult patients (aged ≥18 years) across all operation and disease types. The primary outcome measure was postoperative pulmonary complications at 30 days after surgery, which was a composite of pneumonia, acute respiratory distress syndrome, and unexpected mechanical ventilation. Model development with candidate predictor variables was done in the GlobalSurg-CovidSurg Week dataset (global; October, 2020). Two structured machine learning techniques were explored (XGBoost and the least absolute shrinkage and selection operator [LASSO]), and the model with the best performance (GSU-Pulmonary Score) underwent internal validation using bootstrap resampling. The discrimination and calibration of the score were externally validated in two further prospective cohorts: CovidSurg-Cancer (worldwide; February to August, 2020, during the COVID-19 pandemic) and RECON (UK and Australasia; January to October, 2019, before the COVID-19 pandemic). The model was deployed as an online web application. The GlobalSurg-CovidSurg Week and CovidSurg-Cancer studies were registered with ClinicalTrials.gov, NCT04509986 and NCT04384926. Findings: Prognostic models were developed from 13 candidate predictor variables in data from 86 231 patients (1158 hospitals in 114 countries). External validation included 30 492 patients from CovidSurg-Cancer (726 hospitals in 75 countries) and 6789 from RECON (150 hospitals in three countries). The overall rates of pulmonary complications were 2·0% in derivation data, and 3·9% (CovidSurg-Cancer) and 4·7% (RECON) in the validation datasets. Penalised regression using LASSO had similar discrimination to XGBoost (area under the receiver operating curve [AUROC] 0·786, 95% CI 0·774-0·798 vs 0·785, 0·772-0·797), was more explainable, and required fewer covariables.

ABSTRACT

The final GSU-Pulmonary Score included ten predictor variables and showed good discrimination and calibration upon internal validation (AUROC 0·773, 95% CI 0·751-0·795; Brier score 0·020, calibration in the large [CITL] 0·034, slope 0·954). The model performance was acceptable on external validation in CovidSurg-Cancer (AUROC 0·746, 95% CI 0·733-0·760; Brier score 0·036, CITL 0·109, slope 1·056), but with some miscalibration in RECON data (AUROC 0·716, 95% CI 0·689-0·744; Brier score 0·045, CITL 1·040, slope 1·009).
Interpretation: This novel prognostic risk score uses simple predictor variables available at the time of a decision for elective surgery that can accurately stratify patients› risk of postoperative pulmonary complications, including during SARS-CoV-2 outbreaks. It could inform surgical consent, resource allocation, and hospital-level prioritisation as elective surgery is upscaled to address global backlogs.

ARTICLE TITLE	**BAU Pharmacy Students' Perception on their Online Learning**
AUTHORS	**Rahme D., Jazi H., Issa M., Aboul-Ela M., Nakkash H., Ellakany A., Ghazy A.**
JOURNAL	**Migration Letters**
YEAR	2023
PUBLICATION INFO	DOI: 10.59670/ml.v20iS9.4954
THEME / SUBTHEME	Health and Wellbeing/ Pharmaceutical Education and Training

ABSTRACT

Background: The COVID-19 pandemic imposed dramatic changes on educational practices worldwide. Many universities and schools have moved into the delivery of their courses and educational programs utilizing fully electronic online modes. This study aims to evaluate the pharmacy students› online learning experience during the COVID-19 pandemic in the faculty of pharmacy at Beirut Arab University (BAU) to guide the pharmacy curriculum development. Methods: A cross-sectional survey was developed and distributed to students at the end of the spring semester of 2022. The survey was anonymous and participation was voluntary. The survey consists of 31 questions and each is a 5-point Likert scale. The answers made up a score that reflects the student's online learning experience in 5 main domains. The data were collected and recorded via google forms. Then the retrieved data was analyzed using SPSS version 25. Results: The response rate was 80% (n = 375). About two third of the respondents were female students (n=262). The majority of pharmacy students preferred on-campus learning (72.53%) whilst online learning negatively affected their interaction with instructors and colleagues (64.80%). Moreover, most of the students reported that online exams were more stressful and less fair than on-campus exams (60.27% and 56.26% respectively). The majority of students reported the effectiveness and the high quality of the online learning system in BAU (64% and 65.86% respectively).

ABSTRACT

Online learning was positively reported by students for improving their research application skills (72.80%), and accessibility for those residing in rural areas (50.14%). ANOVA test followed by post hoc analysis showed a significant difference in Moodle and Microsoft Teams use as educational platforms as well as online exam fairness among the various levels of pharmacy students. Conclusion: The online learning experience presented opportunities and posed challenges during the COVID pandemic. Carefully desinged curriculum adopting blended learning can better respond to students' needs and concerns while ensuring their full engagement.

ARTICLE TITLE	**Chondroitin Sulphate: An emerging Therapeutic Multidimensional Proteoglycan in Colon Cancer**
AUTHORS	**Mneimneh A.,** Mehanna M.
JOURNAL	**International Journal of Biological Macromolecules**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.ijbiomac.2023.127672
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery

ABSTRACT

Chondroitin sulfate (CS) is a sulfated glycosaminoglycan (GAG) that has captured massive attention in the field of drug delivery. As the colon is considered the preferred site for local and systemic delivery of bioactive agents for the treatment of various diseases, colon-targeted drug delivery rose to the surface of research. Amid several tactics to attain colon-targeted drug release, the exploitation of polymers degraded by colonic bacteria holds great promise. Chondroitin sulfate as a biodegradable, biocompatible mucopolysaccharide is known for its anti-inflammatory, anti-osteoarthritis, anti-atherosclerotic, anti-oxidant, and anti-coagulant effects. Besides these therapeutic functions, CS thrived to play a major role in nanocarriers as a matrix material, coat, and targeting ligand. This review focuses on the role of CS in nanocarriers as a matrix material or as a targeting moiety for colon cancer therapy, relating the present applications to future perspectives.

ARTICLE TITLE	**A Crisis Amidst Many Others: Covid-19 Response Satisfaction During the Economic Collapse and Post-Beirut Port Explosion in Lebanon** ***(Joint Publication with Faculty of Medicine)***
AUTHORS	**Itani R.,** Karout L., Kassab M., Karout S., Rabah M., El Mais H., Safar O., Al Hajj I., Awad M., **El-Lakany A.**
JOURNAL	**Journal of Public Health and Development**
YEAR	2024
PUBLICATION INFO	22(1): 12-21
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	The COVID-19 pandemic in Lebanon has been compounded by the economic collapse and devastating Beirut port explosion, leading to a severe humanitarian crisis. This study aimed to assess the satisfaction of the Lebanese population with the government›s response to the pandemic and evaluate the public perception of the economic crisis and the Beirut port blast›s impact on the COVID-19 situation. This is a web-based cross-sectional study that utilized a self-administered questionnaire comprising closed-ended questions with predefined response options. To identify predictors of the governmental response score, a multiple linear regression analysis was conducted. A total of 2,384 participants were enrolled, with a mean COVID-SCORE of 15.38 ± 5.28 (out of 40 points). The majority of participants (2,163, 90.7%) expressed mistrust in the Lebanese government›s ability to effectively address unexpected health threats related to the COVID-19 pandemic. Two-thirds of the participants (1,849, 77.6%) believed that the economic crisis had impacted the government›s response to the pandemic. Nearly 70% of the participants perceived that the Beirut port explosion contributed to COVID-19 transmission. Government mistrust, along with the economic crisis impact, were significantly associated with lower satisfaction scores ($P < 0.001$). This study revealed a significant level of dissatisfaction among the Lebanese population regarding the government›s response to the COVID-19 pandemic, underscoring a lack of trust in its ability to effectively manage the crisis. The compounding challenges arising from the Beirut port explosion, economic collapse, and depleted resources have further impeded Lebanon›s ability to navigate the pandemic successfully. Urgent interventions and collaborative efforts are required to effectively manage the economic and political repercussions, rebuild a resilient healthcare system, and alleviate the humanitarian crisis in Lebanon.

ARTICLE TITLE	**Evaluation of Pharmacotherapy Standards During Pregnancy Among Jordanian Pharmacy Colleges Graduates**
AUTHORS	Daghash M., Al-Saideh A., **Itani R.**
JOURNAL	**Jordan Journal of Pharmaceutical Sciences**
YEAR	2023
PUBLICATION INFO	16(3):607-620
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	**Background** Pharmacists› knowledge of medication risks and benefits during pregnancy, as well as their competence in making appropriate therapeutic decisions to optimize medication use among pregnant women, is crucial. This study aims to evaluate the knowledge of Jordanian pharmacists regarding medication risks and safety during pregnancy and assess their abilities to make appropriate therapeutic decisions and optimize medication use. **Methods** A self-administered questionnaire was sent to 400 randomly selected pharmacists practicing in Amman, Jordan. A validated questionnaire, consisting of six sections with predefined options, was employed. **Results** A total of 233 pharmacists completed the questionnaire, resulting in a response rate of 58.2%. Nearly 73.4% of pharmacists (N = 171) correctly identified the drug of choice for hypertension during pregnancy. Over 70% of pharmacists (N = 169) determined the correct dose of aspirin to prevent preeclampsia. About 50% of pharmacists exhibited limited knowledge regarding drug risks and safety during pregnancy. There was a significant difference in the pharmacists› scores on all tests based on their marital status and years of experience ($p = 0.04$ and $p = 0.01$, respectively). Among pharmacists, 79.8% stated that they studied pharmacotherapy during pregnancy in their undergraduate courses. **Conclusion** Pharmacists have demonstrated an inadequate level of preparedness in providing appropriate pharmaceutical care for pregnant women. Therefore, there is an urgent need to collaborate between national health authorities and academic institutions to empower pharmacists and enhance their knowledge and skills necessary to improve the health outcomes of pregnant women. Keywords: Pregnancy, Drug Therapy, Health Safety, Pharmaceutical Care.

ARTICLE TITLE	**Experimental Investigation and Molecular Simulations of Quinone Related Compounds as COX/LOX Inhibitors**
AUTHORS	Chaaban I., Hafez H., Hazzaa A., **Domiati S., Abd El Galil H.,** Hdeib F., Belal F., Ragab H.
JOURNAL	**Inflammopharmacology**
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s10787-024-01501-3
THEME / SUBTHEME	Health and Wellbeing/Drug Discovery
ABSTRACT	Quinone-containing compounds have risen as promising anti-inflammatory targets; however, very little research has been directed to investigate their potentials. Accordingly, the current study aimed to design and synthesize group of quinones bearing different substituents to investigate the effect of these functionalities on the anti-inflammatory activities of this important scaffold. The choice of these substituents was carefully done, varying from a directly attached heterocyclic ring to different aromatic moieties linked through a nitrogen spacer. Both in vitro and in vivo anti-inflammatory activities of the synthesized compounds were assessed relative to the positive standards: celecoxib and indomethacin. The in vitro enzymatic and transcription inhibitory actions of all the synthesized compounds were tested against cyclooxygenase-2 (COX-2), cyclooxygenase-1 (COX-1), and 5-lipoxygenase (LOX) and the in vivo gene expression of Interleukin-1, interleukin 10, and Tumor Necrosis Factor-α (TNF-α) were determined. The IC50 against COX-1 and COX-2 enzymes obtained by the immunoassay test revealed promising activities of sixteen compounds with selectivity indices higher than 100-fold COX-2 selectivity. Out of those, four compounds revealed selectivity indices comparable to celecoxib as a reference drug. Furthermore, all the tested compounds inhibited LOX with an IC50 in the range of 1.59–3.11 μM superior to that of the reference drug used; zileuton (IC50 = 3.50 μM). Consequently, these results highlight the promising LOX inhibitory activity of the tested compounds. The obtained in vivo paw edema results showed high inhibitory percentage for the compounds 9a, 9b, and 11a with the significant lower TNF-α relative mRNA expression for compounds 5a, 5d, 9a, 9b, 12d, and 12e. Finally, in silico docking of the most active compounds (5b, 5d, 9a, 9b) against COX2 enzymes presented an acceptable justification of the obtained in vitro inhibitory activities. As a conclusion, Compounds 5b, 5d, 9a, 9b, and 11b showed promising results and thus deserves further investigation.

ARTICLE TITLE	**Exploring the Impact of Subjective Well-Being on Medication Adherence: A Cross-Sectional Study Among Individuals with Multiple Chronic Diseases**
AUTHORS	*Ismail M., El-Nayal M.,* **Domiati S.**
JOURNAL	Exploratory Research in Clinical and Social Pharmacy
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.rcsop.2024.100496
THEME / SUBTHEME	Health and Wellbeing/Clinical Pharmacy and Practice
ABSTRACT	**Background** Medication non -adherence is a significant barrier to optimal treatment goals. The study explores the association between subjective well -being (SWB) and medication adherence among Lebanese individuals with multiple chronic diseases and identifies additional factors that may influence adherence in this population. **Methods** An exploratory, cross -sectional study was conducted for three months at six community pharmacies. Adherence was assessed using the Adherence to Refills and Medication Scale Arabic Lebanese Version (ARMS -A). The SWB was measured using the Arabic Scale of Happiness (ASH), Love of Life Scale (LLS), Arab Hope Scale (AHS), and Satisfaction with Life Scale (SWLS). Spearmen›s Rho correlation analyzed the association between ARMS -A and SWB constructs. Binary logistic regression identified predictors of adherence among individuals with chronic diseases and on multiple chronic medications. **Results** Of 400 participants, 106 (26.5%) with a 95% CI, 0.22 - 0.31, were adherent. Lower medication adherence (reflected in higher ARMS -A scores) was associated with lower SWB (p=0.01). Multivariate analysis showed that lower education (OR= 2.21, 95% CI, 1.01 - 4.81), Journal Pre-proof Journal Pre-proof lack of a specific diet (OR=1.64, 95% CI, 1.01 - 2.69), and frequent hospital and/or emergency visits (OR= 3.29, 95% CI, 1.75 - 6.17 for 2 visits; OR = 2.71, 95% CI, 1.43 - 5.14 for ≥3 visits) significantly increased the odds of non -adherence to chronic treatment. However, higher income (OR= 0.06, 95% CI, 0.01 - 0.38), healthcare provider occupation (OR= 0.42, 95% CI, 0.21 - 0.48), and having diabetes mellitus (OR = 0.59, 95% CI, 0.36 - 0.96) correlated with better adherence **Conclusion** A significant portion of participants failed to adhere to their prescribed chronic medications, influenced by multicomplex socioeconomic, psychological, and health -related factors . These findings demonstrate the need for culturally -tailored, pharmacist -led interventions to improve medication adherence and overall health outcomes.

ARTICLE TITLE	**Investigating the Therapeutic Promise of Drug-Repurposed-Loaded Nanocarriers: A Pioneering Strategy in Advancing Colorectal Cancer Treatment**
AUTHORS	**Mneimneh A.,** Darwiche N., Mehanna M.
JOURNAL	International Journal of Pharmaceutics
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.ijpharm.2024.124473
THEME / SUBTHEME	Health and Wellbeing/Drug Discovery
ABSTRACT	Globally, colorectal cancer is a major health problem that ranks in third place in terms of occurrence and second in terms of mortality worldwide. New cases increase annually, with the absence of effective therapies, especially for metastatic colorectal cancer, emphasizing the need for novel therapeutic approaches. Although conventional treatments are commonly used in oncotherapy, their success rate is low, which leads to the exploration of novel technologies. Recent efforts have focused on developing safe and efficient cancer nanocarriers. With their nanoscale properties, nanocarriers have the potential to utilize internal metabolic modifications amid cancer and healthy cells. Drug repurposing is an emerging strategy in cancer management as it is a faster, cheaper, and safer method than conventional drug development. However, most repurposed drugs are characterized by low-key pharmacokinetic characteristics, such as poor aqueous solubility, permeability, retention, and bioavailability. Nanoparticles formulations and delivery have expanded over the past few decades, creating opportunities for drug repurposing and promises as an advanced cancer modality. This review provides a concise and updated overview of colorectal cancer treatment regimens and their therapeutic limitations. Furthermore, the chemotherapeutic effect of various FDA-approved medications, including statins, non-steroidal anti-inflammatory drugs, antidiabetic and anthelmintic agents, and their significance in colorectal cancer management. Along with the role of various nanocarrier systems in achieving the desired therapeutic outcomes of employing these redefined drugs.

ARTICLE TITLE	**Knowledge, Attitude, and Experience of Lebanese Females Toward Oral Contraceptive Use**
AUTHORS	Al Rifaii N., *Alaeddine C.,* **Domiati S., El-Lakany A.**
JOURNAL	BAU Journal - Health and Wellbeing
YEAR	2024
PUBLICATION INFO	6(1): 1-11
THEME / SUBTHEME	Health and Wellbeing/Clinical Pharmacy and Practice
ABSTRACT	Family planning is a key to slow unsustainable population growth and the resulting negative impacts on the national development efforts. Birth control pills or oral contraceptives are commonly used among childbearing-age women for family planning. Accordingly, this study aimed to evaluate the knowledge, attitude, and experience of oral contraceptive use among Lebanese women. A descriptive, cross-sectional, questionnaire-based study was conducted in Beirut and suburbs in 2018. The questionnaire included sociodemographic information consisting of age, educational level, occupation, marital status, and past medical history. It also included four different sections describing the pattern of use of oral contraceptives, attitude, knowledge, and previous experience. Out of the 385 addressed, 367 participants completed the survey the age range from 20 to 44 years accounted for 77.11%. The most commonly used methods of contraception were withdrawal method (45%) and male condoms (20.7%) while the use of oral contraceptive pills accounted for 18.45%. The chief prescriber for pills was the physician (76.6%), whereas only 10% gave a role to the pharmacist. Side effects of oral contraceptives were a crucial cause that led two-thirds of pill users to stop them and use an alternative contraceptive method. Although the majority of women considered oral contraceptives effective and easy to use, only one-third preferred pills, and less than half thought that oral contraceptives were safe. Unfortunately, only 36% of the participants were aware that some medications could affect pill efficacy. Moreover, less than half of the women knew that missed doses should be retaken. Ineligibility for oral contraceptives was detected in a few participants. The results obtained revealed an inadequate level of knowledge of the Lebanese women regarding the use, safety, and efficacy of oral contraceptives, and this might have contributed to their negative attitude towards the use of pills.

ARTICLE TITLE	**Knowledge, Attitude, and Practices of Pharmacy Students in 7 Middle Eastern Countries Concerning Antibiotic Resistance: A Cross-Sectional Study**
AUTHORS	Naser A., Aboutaleb R., Khaleel A., Alsairafi Z., Alwafi H., Qadus S., **Itani R.,** El-Dahiyat F., Awaisu A., Awwad O., Alsous M., Abdelwahab G., Khojah H. M., AbuAlhommos A., Alsharif A., Alghanemi A., Al Rajeh A., Alqahtani J., Aldhahir A., Alqarni A., Jarab A., Hassanin A., Jaber M., Jaradat A., Taybeh E., Alhartani Y., El-Qasem A., Abukhalaf A., Hemmo S., Ahmad A., Bahlol M.
JOURNAL	**Medicine**
YEAR	2024
PUBLICATION INFO	DOI: 10.1097/MD.0000000000039378.
THEME / SUBTHEME	Health and Wellbeing/Clinical Pharmacy and Practice
ABSTRACT	Addressing antimicrobial resistance (AMR) stands as a major global health challenge threatening humanity. Resolving this issue can be initiated through emphasizing the significance of AMR education among students in health colleges during their undergraduate studies. Hence, the aim of this study is to assess the pharmacy students› knowledge, attitudes, and practices regarding antibiotic resistance in 7 Middle Eastern countries. A cross-sectional study was conducted among undergraduate pharmacy students at universities in Egypt, Jordan, Saudi Arabia, Lebanon, the United Arab Emirates, Qatar, and Kuwait between March 2021 and January 2022. The first section of the questionnaire gathered demographic information. The knowledge section comprised 7 questions. Subsequently, the questionnaire explored participants› attitudes (6 items) and practices (2 items) concerning antibiotic resistance. Mann-Whitney and Kruskal-Wallis tests were used to compare the median knowledge score between different demographic groups. Logistic regression was used to estimate odds ratios, with 95% confidence intervals (CIs) for being more knowledgeable about antibiotic resistance. A 2-sided P < .05 was considered statistically significant. A total of 4265 pharmacy students were involved in this study (Egypt (2249), Jordan (n = 704), Saudi Arabia (n = 531), Lebanon (n = 401), United Araba Emirates (n = 130), Qatar (n = 129), and Kuwait (n = 121)). The median knowledge score for the participating pharmacy students was 5.00 (IQR = 4.00-6.00) out of 7, equals to 71.4% with 4th, and 5th year students and bachelor of pharmacy program students have higher odds of being more knowledgeable about antibiotics resistance compared to other students (P < .05). The majority of the students agreed that antibiotic resistance is increasing, they should be more concerned regarding antibiotic consumption and that government should create more awareness of antibiotic resistance, and that they should have enough knowledge to prevent antibiotic resistance. Around 3 quarters of the students (73.0%) confirmed that they take antibiotic only after getting prescription from their physician and almost half (51.7%) reported that they take antibiotic to manage their fever. The study concluded good educational programs in Middle East pharmacy schools with the need for targeted educational interventions promoting responsible antibiotic stewardship practices among future pharmacists.

ARTICLE TITLE	**Evaluating Nutrition-related Knowledge, Attitudes, and Practices for the Prevention of Breast Cancer among Women in Jordan**
AUTHORS	Ajlouni B., Al-Nabulsi A., Issa S., Abu Farha R., Ta'an W., Abu Saleh S., **Itani R.,** Tawalbeh R., Mukattash T.
JOURNAL	**Jordan Journal of Nursing Research**
YEAR	2024
PUBLICATION INFO	12(4): 289-298
THEME / SUBTHEME	Health and Wellbeing/Prevention and Health Promotion in Health Sciences
ABSTRACT	**Background** A healthy diet plays a significant role in preventing and treating various diseases, including colon and breast cancer. Purpose: This study aims to evaluate knowledge, attitudes, and practices related to nutrition in breast cancer prevention and to explore the relationship between demographic characteristics and nutrition practices for breast cancer prevention. Methods: A cross-sectional web-based survey was conducted to assess the level of knowledge, attitudes, and practices concerning breast cancer among 1511 women in Jordan. The survey underwent content validation and received IRB approval from King Abdullah University Hospital. Results: A total of 1511 participants completed the survey. Knowledge levels, with a mean score of 12, significantly varied based on education level (ρ-value = 0.04), field of education (ρ-value ≤ 0.001), and physical activity (ρ-value ≤ 0.001). The mean scores for attitudes and practices toward nutrition-related breast cancer prevention factors were 21.5 and 37, respectively. Conclusion: The study found that education level, family history, physical activity patterns, and sleep habits were factors associated with nutrition knowledge and positive practices, potentially reducing the risk of breast cancer. However, increasing nutrition knowledge alone was not sufficient to change dietary behavior. **Implications for Nursing** Risk reduction strategies can be enhanced by incorporating evidence-based practices, such as those identified in this study. Additionally, current prevention and treatment options, including education, counseling, and psychosocial support, should be further developed to increase nutrition-related knowledge, attitudes, and practices for breast cancer prevention. Keywords: Breast cancer, Nutrition, Knowledge, Attitude, Practice, Awareness, Lifestyle.

ARTICLE TITLE	**Evaluating the Influence of a 3-Min Online Video on the Community Knowledge of Stroke in Four Arab Countries**
AUTHORS	Iskandar K., **Rahme D.,** Salameh P., Haddad C., Sacre H., Bahlol M., Darwish M., El Khatib S., Safwan J., Sakr F., Hosseini H., Cherfane M.
JOURNAL	**Frontiers in Public Health**
YEAR	2024
PUBLICATION INFO	12(2024): 1-13
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Introduction
Studies from developed and developing countries showed that the knowledge levels of stroke need improvement. Educational campaigns varied and were of limited influence predominantly because of their short duration and the need for financial support. The study aims to test the impact of a 3-min online video on the knowledge of stroke and factors influencing the knowledge score in four Arab countries.

Methods
A cross-sectional web-based pre-post study was conducted in Egypt, Jordan, Lebanon, and the United Arab Emirates. The data were collected using the snowball technique. Participants were adults aged 18 years and above. The questionnaire sequence was conducting a pretest, followed by the educational video explaining stroke occurrence, types, risks, warning signs, preventive measures, and treatment, and finally, a posttest to evaluate the differences in knowledge from baseline. Statistical analysis included paired t-tests comparing pre-post-education stroke knowledge scores, while repeated measures ANOVA, adjusting for covariates, assessed mean changes.

Results
The total number of participants was 2,721, mainly younger than 55 years. The majority had a university degree and were not healthcare professionals. A significant improvement was noted in the total knowledge score in all countries from a mean average (Mpretest = 21.11; Mposttest = 23.70) with $p < 0.001$. Identification of the stroke risks (Mpretest = 7.40; Mposttest = 8.75) and warning signs (Mpretest = 4.19; Mposttest = 4.94), understanding the preventive measures (Mpretest = 5.27; Mposttest = 5.39) and the importance of acting fast (Mpretest = 0.82; Mposttest = 0.85) improved from baseline with ($p < 0.001$) for all score components.

Conclusion
The educational tool successfully enhanced public understanding of stroke risks, the identification of stroke signs, and the critical need for emergency action. The advantages of this video include its short length, free online access, use of evidence-based content in lay language, and reflective images. The ultimate goal remains the long-term improvement of sustainability by mandating full-scale trials.

ARTICLE TITLE	**Ramadan Fasting Intentions Among Pregnant Women in Lebanon**
AUTHORS	**Alaeddine C.,** Schreiber J., Amin K.
JOURNAL	**Journal of the Egyptian Public Health Association**
YEAR	2024
PUBLICATION INFO	99(1):1-11
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Background
According to Islam's teachings, women are religiously exempt from fasting during pregnancy if a woman is concerned about her health or that of the fetus. This study assesses the intentions of pregnant women to fast during Ramadan and evaluates the contribution of items derived from the theory of planned behavior (TPB) in predicting these intentions.
Methods: A cross-sectional survey was carried out in Arabic on a convenience sample of 181 pregnant women in Lebanon using a mixture of in-person (46), telephone (31), and online recruitment (104) techniques from February to April 2020. An Exploratory Bayes Tree Analysis was done to examine which TPB items appeared to separate the intention to fast in the best possible way. Then, an ordinal regression was completed followed by a latent class analysis to examine specific classes of participants that could be determined based on the regression results.

Results
Overall, 58% of participants had the intention to fast all days of Ramadan, 22% had the intention to fast some days and 20% did not intend to fast for any duration. A model was run with perceptions of physical ability, Islam guidance, husband's opinion importance, mother's opinion beliefs, and impact on general health as predictors ($R2 = 0.74$). A four-cluster model was chosen as the most parsimonious one in interpretation, where classes one and two included the groups of women who intended to fast month-long with differences in predictors. Class three represented the group of women who did not have the intention to fast and the final class represented the group of women who had the intention to fast some days of the month. The women's belief in their physical ability to fast and the opinion of the pregnant women's mothers were very important in deciding the participants' intention to fast.

Conclusions
Items derived from TPB constructs helped in producing a model predicting women's intention to fast during Ramadan. Educational messages and interventions related to fasting while pregnant may be delivered by individuals with legitimacy among pregnant women such as those viewed by the target population as powerful motherly figures in their communities.
Keywords Religious fasting, Ramadan, Pregnancy, Theory of planned behavior.

ARTICLE TITLE	**Review on Chemical Constituents and Biological Activities of Genus Ferula**
AUTHORS	Boukhary K., *Omeiche Z.,* **Hijazi A.,** *Assi A. W., Houri T., Al Jawiche L., Dirani M., Abdel Nabi R., Tabbara M.,* **El-Lakany A., Aboul Ela M.**
JOURNAL	**BAU Journal - Health and Well-Being**
YEAR	2024
PUBLICATION INFO	99(1):1-11
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery
ABSTRACT	Genus Ferula comprises about 220 species of flowering plants belonging to family Apiaceae, distributed in the Mediterranean region and Asia and used in the treatment of different diseases as anti-oxidant, aphrodisiac, carminative, antinociceptive, anti-depressant, antibacterial, anti-fungal, anti-leishmanial, and anti-inflammatory. Moreover, species of this plant are used for dizziness, asthma, bronchitis, and gastrointestinal discomfort. It was reported that all the pharmacological effects of these plants are due to the presence of different phenolic constituents including flavonoids, sesquiterpenes, coumarins and polysulfides. Sesquiterpene coumarins were responsible for the anti-inflammatory and anti-cancer activities by blocking the 5-lipoxygenase enzyme that catalyzes the biosynthesis of leukotrienes (LTs) being a group of lipid mediators of inflammation . This review covers most of the identified chemical constituents of plants from the genus Ferula reported in literature between 2001 and 2023. In addition, the biological activities of the different species of genus Ferula are presented.

ARTICLE TITLE	**Review on Chemical Constituents and Biological Activities of Genus Juniper**
AUTHORS	**Abdul Majid G., Hijazi M., El Lakany A., Aboul Ela M.**
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2024
PUBLICATION INFO	16(7): 12-20

THEME / SUBTHEME	Health and Wellbeing/Drug Discovery
ABSTRACT	Juniper species belonging to the family Cupressaceae are evergreen shrubs or trees that thrive in dry, rocky, or sandy soils. There are roughly 67 species in the genus, all indigenous to the northern hemisphere. Several species of this genus have been reported to have a variety of pharmacological activities, including diuretic, anti-inflammatory, anti-fungal, hepatoprotective, antidiabetic, and anti-hyperlipidemic properties. Additionally, some species have been shown to have antioxidant, antimicrobial, and neuroprotective properties in Parkinson›s disease patients. The majority of these activities are caused by the phytochemical constituents found in these species. This article covers most of the constituents of plants of the genus juniper reported from 2010 to 2023. Furthermore, the biological activities of plants of the genus juniper are presented.

ARTICLE TITLE	**Review on Phytochemical Constituents and Pharmacological Activities of Genus Galium**
AUTHORS	**Kanso M., Hijazi M., El-Lakany A., Aboul-Ela M.**
JOURNAL	**Journal of Applied Pharmaceutical Sciences**
YEAR	2024
PUBLICATION INFO	1(1):1-16
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery
ABSTRACT	Medicinal plants are a rich source of phytochemical constituents of diverse structures that are behind their various pharmacological effects. Plants of genus Galium named Bedstraws, family Rubiaceae, are distributed throughout North and South America, Europe, the northern U.S., southern Canada, and tropical Asia. More than 600 species have been used in traditional medicine for treating different ailments. Owing to the valuable published uses of these plant species, and the versatility of their bioactive metabolites such as Galium verum, Galium aparine, Galium mollugo, and G. odoratum, it was deemed interesting to summarize the previous studies done on this genus to discuss the pharmacological profile of all isolated classes of metabolites. The search was adopted using some essential keywords such as Galium, phytochemistry, pharmacology, and biological activity from journals and books in databases such as Scopus, Elton B. Stephens CO, ScienceDirect, Embase, security identifier, and Medline from 1995 to 2024.

ABSTRACT

The results showed that species belonging to Galium have various pharmacological activities including antimicrobial, antioxidant, anti-cancer, immunomodulatory, and anti-inflammatory effects because they are rich in phenolic compounds, iridoid glycosides, anthraquinones, phytosterols, saponins, and essential oils. Accordingly, this review will stimulate the scientific community for further research and boost the discovery of novel bioactive compounds from various species belonging to this genus distributed worldwide.

ARTICLE TITLE	**The Hidden Dangers Lurking at Home: Unveiling the Prevalence of Leftover Antibiotics and its Associated Factors Among Lebanese Households**
AUTHORS	Saadeh W., Chaccour S., **Rahme D.,** Lahoud N., Saleh N.
JOURNAL	**Public Health in practice**
YEAR	2024
PUBLICATION INFO	22(1): 12-21
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Background
Antimicrobial Resistance (AMR) is a major global concern. Irrational use of antibiotics including self-medication (SM) with leftovers without a medical prescription can be a leading cause. This study aimed to investigate the prevalence and related factors of leftover antibiotics (LA) in Lebanese households.

Study design
A cross-sectional study of the Lebanese population was conducted between March and October 2022.

Methods
Through random proportional stratified sampling, a total of 494 families participated in this study. Data collection was carried out through phone calls using a comprehensive and reviewed questionnaire. The data was then analyzed using SPSS version 26. Logistic regression was utilized to identify the factors associated with LA, with the presence of LA in households as the dependent variable and other factors such as age, region of residence, and presence of elderly individuals at home as the independent variables.

ABSTRACT

Results
Among selected households, 118 households (23.89%) had LA. The most common type of antibiotic found was penicillin (59.84%). Most of the LA were in the form of tablets and capsules (94%) with valid expiration dates (87%). Antibiotics were mainly prescribed by doctors (61%), and the main reason for prescribing was acute respiratory tract infections (47.46%). SM was reported by 42.37% of the families with LA. A family with elderly patients ($p = 0.002$; OR = 2.23; 95% CI = 1.33–3.73) and those residing in Mount Lebanon ($p = 0.019$; OR = 2.28; 95% CI = 1.14–4.56) had significantly higher odds of having LA.

Conclusion
Leftover antibiotics were found in nearly a quarter of the addressed Lebanese families. Therefore, public educational campaigns should be launched to limit injudicious antibiotic use including SM, and to promote proper disposal of any leftovers. It is also crucial to adopt the One Health approach by developing national programs for the safe disposal of LA and implementing regulations to restrict the distribution of antibiotics in pharmacies without a prescription.

ARTICLE TITLE	**The Specialized Competency Framework for Industry Pharmacists (SCF-IP): Validation and Pilot Assessment**
AUTHORS	Sacre H., **Saab M.,** Haddad C., Haddad M., Zeenny R. M., Akel M., Hajj A., Iskandar K., Salameh P.
JOURNAL	**Journal of Pharmaceutical Policy and Practice**
YEAR	2023
PUBLICATION INFO	DOI: 10.1186/s40545-023-00602-8
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Objectives
This study aimed to validate a specialized competency framework for industry pharmacists and assess correlates related to the competency domains in a pilot sample.

Methods
A team of experts assessed the old framework and improved its content validity after a thorough literature review, using the Delphi technique. Domains and their respective competencies and behaviors were re-defined in the framework. Afterward, a web-based cross-sectional study was carried out between March and October 2022, enrolling a convenient sample of ten industry pharmacists who worked in Lebanese pharmaceutical plants. Participants were contacted through the Syndicate of the Pharmaceutical Industries in Lebanon.

Results
The specialized competency framework for Lebanese industry pharmacists comprised seven domains. Behavioral items had appropriate loading on their respective factors, which could involve one, two or three competencies. Cronbach alpha values for all domains were close to one, showing appropriate reliability. Each domain was correlated with at least another one, except for domains related to pharmaceutical and industrial development and emergency preparedness, which were not correlated with other domains. The lowest confidence was found in the research and development domain, particularly among participants with only a PharmD.

Conclusions
This study validated the specialized competency framework for Lebanese industry pharmacists. Some domains, specifically those related to industrial development and emergency preparedness, were found to diverge from others. Therefore, it would be recommended to include additional education in the emergency preparedness, research and development fields and to integrate industry-specific skills, courses, and training programs into academic curricula. Furthermore, specialized postgraduate degrees may be necessary to produce practice-ready pharmacists to operate effectively in this vital setting.

ARTICLE TITLE	**Utilization of the FTIR spectroscopic method for the quantitative determination of the narrow therapeutic index levothyroxine sodium in pharmaceutical tablets**
AUTHORS	**AlBathish M., Gazy A.,** *Al Jamal M.,* Bejjani A.
JOURNAL	**Pharmacia**
YEAR	2024
PUBLICATION INFO	DOI: 10.3897/pharmacia.71.e125879
THEME / SUBTHEME	Health and Wellbeing/Pharmaceutical Analytical Chemistry

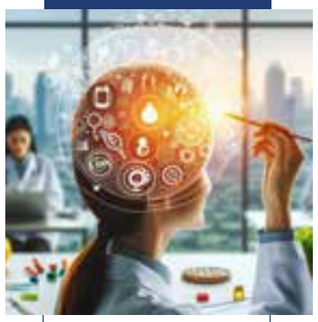
ABSTRACT

Levothyroxine sodium is a narrow therapeutic index drug used for the treatment of hypothyroidism. The medication is marketed in tablet form with very low doses ranging from 25 to 150 μg, which requires the development of a sensitive quantitative analytical method to ensure a safe and effective pharmacological response. In the present work, a Fourier transform infrared method has been developed and validated for levothyroxine sodium determination in various pharmaceutical formulations. The proposed method involves selectively extracting levothyroxine sodium from the studied tablets using chloroform as solvent, then depositing it on a KBr pellet, followed by infrared measurements and spectra analysis. The peak band area corresponding to the C=C centered at 1409 cm-1 has been chosen for the quantification. The method has been validated according to ICH guidelines and was found to be simple, precise, accurate, and specific. The linearity, detection, and quantitation limits are 25–800, 8.121, and 24.545 μg/pellet, respectively. These values confer the method's sensitivity and applicability for the determination of different pharmaceutical tablets with various dosages. A statistical comparison with a reference HPLC method showed no significant difference. Accordingly, the developed method can be employed for quality control testing of levothyroxine sodium due to its simplicity and the absence of sophisticated instrumentation and procedures.

Prevalent SDG

SDG 3
93%

Prevalent Theme



Health and Wellbeing
87%

Prevalent Subtheme

Molecular Biology and Therapeutics of Diseases
40%

% of Highly Indexed Journals

27%

Faculty of

MEDICINE

23-24

RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**All is Fair in Love and Hypomania**
AUTHORS	Abou Kassm S., **Chahoud M.,** Naja K., Haddad G., Robert G., Naja W.
JOURNAL	**Annales Medico-Psychologiques**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.amp.2023.05.009
THEME / SUBTHEME	Health and Wellbeing / Epidemiology of Communicable and Non-communicable disease

ABSTRACT

Background
Many studies have found increased hypomanic scores in people in love. However, none controlled for the presence of cyclothymic or hyperthymic temperaments. Our primary objective was to test the hypothesis postulating that passionate love is similar to a hypomanic state while controlling for the presence of a susceptible underlying temperament. Our secondary objective was to look for an association between hypomanic symptoms and love intensity as measured by the Passionate Love Scale.

Methods
An online survey including the hypomanic check list-32 (HCL-32) and the passionate love scale (PLS) was administered to university students.

Results
Two-hundred and eighty-two responses were retained. The mean age of the participants was 21.1 years (SD 2.8) and 62.1% (n = 175) were females. 74.6% of participants in love were found to have a positive HCL-32 result as compared to 63.1% of participants who were not in love (p = 0.038). The association remained significant and the difference more prominent after excluding people in whom a hyperthymic or cyclothymic temperament was suspected (70.3% vs 45%; p = 0.025). A statistically significant but weak correlation was found between the HCL-32 and PLS scores (Pearson correlation coefficient r = 0.239; P = 0.005). The latter association was lost after excluding participants in whom a hyperthymic or cyclothymic temperament was suspected.

Conclusions
Love seems similar to hypomania, at least phenomenologically. It also seems that hypomanic symptoms are linked to the state of love per se, rather than to its intensity. The positive association between love and hypomania is also discussed from psychiatric, neurobiological, and anthropological perspectives.

ARTICLE TITLE	**Are Female Physicians as Trusted as their Male Colleagues? A Cross-Sectional Study**
AUTHORS	**Shaarani I.,** *Izmirli N., Zahra N., Salem J., Yassine A., Treiki M., Tabbikha K.*
JOURNAL	Journal of Public Health
YEAR	2024
PUBLICATION INFO	DOI: 10.1007/s10389-024-02222-1
THEME / SUBTHEME	Society, Culture and Human Behavior/ Healthcare Jurisdictions and Policies

ABSTRACT

Aim
Trust is the cornerstone of the patient–physician relationship. Many studies have addressed factors that could affect this relationship, yet only few have explored its association with the physician's gender. The aim of this study is to assess the extent of trust in female physicians among the Lebanese population as compared with their male colleagues.

Subject and methods
This is a cross-sectional study involving 517 individuals who had visited a physician within the previous 2 weeks. Respondents were interviewed in pharmacies. Pharmacies were selected by systematic random sampling and stratified by Lebanese governorates. The questionnaire included a validated tool to assess the level of trust in the visited physician.

Results
According to the Trust in Physician Scale score, the level of trust in physicians appeared not to be affected by the physicians' gender (p-value = 0.4). Other respondent-related social factors such as higher education, working in the field of health, and initial medical encounters were significantly associated with lower levels of trust in physicians, regardless of their gender (p-value < 0.05). Respondents trusted female physicians the least in the fields of Cardiology, Orthopedics, and Urology.

Conclusion
There is no significant association between the gender of physicians and the level of the Lebanese population's trust in them. Nonetheless, some medical specialties are still perceived as male- or female-predominant.

ARTICLE TITLE	**Beliefs and Practices of Physicians in Lebanon Regarding Promotional Gifts and Interactions with Pharmaceutical Companies**
AUTHORS	**Shaarani I.,** *Hasbini J., Farhat R., Safawi N., Sleiman J., Hammoud K., Fayad T., Khazaal D., Elkhatib O., Berjaoui H.*
JOURNAL	Eastern Mediterranean Health Journal
YEAR	2024
PUBLICATION INFO	DOI: 10.26719/emhj.24.027.
THEME / SUBTHEME	Society, Culture and Human Behavior/ Ethical Considerations in Medicine

ABSTRACT

Background
Pharmaceutical companies invest greatly in promotional gifts to influence prescription of medications by physicians, yet there is limited published information evaluating its impact on healthcare.

Aim
This study aimed to assess the beliefs and practices of physicians in Lebanon regarding promotional gifts and their interactions with representatives of pharmaceutical companies.
Methods: This cross-sectional study was conducted between December 2019 and January 2020 through an email-based questionnaire sent to 5936 physicians of different specialties registered in the Lebanese Order of Physicians. Assessment was done using a validated tool and data analysis was conducted using SPSS version 26.0.

Results
Of the 268 respondents, 188 (70.4%) reported that physicians in Lebanon accepted gifts from representatives of pharmaceutical companies. Most of the physicians (31.7%) interacted with company representatives more than once a week. Medication samples (251 respondents) and stationary items (222 respondents) were the most common gifts accepted by physicians who admitted accepting gifts. Overall, 225 (84.9%) respondents believed that prescriptions by physicians in Lebanon were influenced by the gifts. Only 74 (40.0%) of those who accepted gifts from pharmaceutical companies believed that it was unethical, and around half did not know if the Lebanese Code of Medical Ethics allowed them to accept gifts from pharmaceutical companies.

Conclusion
Although physicians in Lebanon were aware of the effect that gifts from pharmaceutical companies could have on their prescription behaviours, many of them still accepted the gifts. This study provides evidence to policymakers for decision-making regarding ethical guidance on interactions between physicians and pharmaceutical companies in Lebanon.

ARTICLE TITLE	**Chronic Bilateral Olecranon Bursitis: A Case Report**
AUTHORS	Nassar Y., Hanna B., **Abou Chahine Y.,** Ayche M., Srour A.
JOURNAL	**Cureus**
YEAR	2024
PUBLICATION INFO	DOI: 10.7759/cureus.65881
THEME / SUBTHEME	Health and Wellbeing/Chronic Disease Management
ABSTRACT	Olecranon bursitis is a common condition that primarily affects men between the ages of 30 and 60. Although the conservative treatment of acutely inflamed olecranon bursitis is relatively straightforward, managing chronic olecranon bursitis can be challenging. In this publication, we report a case of rare bilateral chronic olecranon bursitis and discuss the rationale for choosing the best treatment option.

ARTICLE TITLE	**Concurrent Presentation of Jeune Syndrome Features in a Preterm Infant Born to a mother with Gestational Diabetes and Hypertension: A Rare Case Report**
AUTHORS	*Hasbini J.,* Safawi N., **Berjaoui C.,** Rajab M., **Naous A.**
JOURNAL	**Journal of Neonatal Nursing**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.jnn.2024.04.003
THEME / SUBTHEME	Health and Wellbeing/Molecular Biology and Therapeutics of Diseases
ABSTRACT	Jeune syndrome, also known as Asphyxiating thoracic dysplasia, is an autosomal recessive osteochrondroplasia characterized by a small, narrow chest, and variable limb shortness resulting from primary cilia dysfunctionleading to respiratory distress. This syndrome gives rise to various complications, including renal, hepatic, pancreatic, and ocular issues. Another factor contributing to respiratory distress in newborns is preterm birth, often linked to maternal diabetes, which poses perinatal, fetal, and maternal risks.

ABSTRACT	Several studies have demonstrated a correlation between maternal diabetes and higher risks of macrosomia, fetal death, fetal malformations, respiratory distress syndrome (RDS), neonatal hypoglycemia, birth injuries and shoulder dystocia. In this paper, we report a case of 30 + 1 weeks very preterm male born to a mother diagnosed with gestational diabetes and hypertension. Complications such as large ventricular septal defect (VSD), atrial septal defect (ASD), pulmonary stenosis, and pulmonary hypertension were observed. The infant also exhibited features associated with Jeune syndrome, such as syndactyly, polydactyly, and pectus excavatum.

ARTICLE TITLE	**Congenital Adhesion Band: A Rare Case in a Neonate**
AUTHORS	**Naous A., Itani R., Itani M., Naja Z.,** Rajab M.
JOURNAL	**Radiology Case Reports**
YEAR	2024
PUBLICATION INFO	19(2): 499-502
THEME / SUBTHEME	Health and Wellbeing/Molecular Biology and Therapeutics of Diseases
ABSTRACT	Diseases of the gastrointestinal system may be congenital or acquired. Intestinal obstruction is common in children and neonates, and it has various causes. Obstructions due to congenital adhesion bands are rare. Few cases were reported in the literature. In this paper, we will discuss the case of an 8-day-old girl who was presented to the emergency department with signs of intestinal obstruction.

ARTICLE TITLE	**Lebanese Medical Students' Attitudes towards Patient Safety and Medical Error Disclosure: A Cross-Sectional Study**
AUTHORS	**Koleilat N.,** *Saadieh T., El Arwadi T., Abbas A., Demachkie R., El Masri N., Al Jishi A., Mawlawi R., El Masri R., Moety W., Choukeir H., Chamsedine A.*
JOURNAL	Journal of International Medical Research
YEAR	2024
PUBLICATION INFO	DOI: 10.1177/03000605241253728
THEME / SUBTHEME	Health and Wellbeing/Medical Education

ABSTRACT

Objective
To assess Lebanese medical students› attitudes towards patient safety and medical error disclosure.

Methods
This was a cross-sectional study involving medical students from seven different medical schools in Lebanon. The participants completed the Attitudes to Patient Safety Questionnaire (APSQ-III) online, which consists of 26 items across nine key patient safety domains. Items were scored from 1 (strongly disagree) to 5 (strongly agree). Demographic data were also collected.

Results
Of the 549 students enrolled in the study, 325 (59%) were female and 224 (41%) were male. More than half (287, 52%) were aged between 20 and 22 years and 95% were Lebanese. The overall attitude of students towards patient safety was positive (3.59 ± 0.85) with the most positive attitudes in the domains of ‹Team functioning› followed by ‹Working hours as an error cause›. More positive attitudes were perceived among male students in the domains of ‹Professional incompetence as an error cause› and ‹Disclosure responsibility› whereas more positive attitudes were seen in female students in the domain of ‹Working hour as an error cause›. Older medical students had more positive attitudes in the domain of ‹Team functioning› than younger students.

Conclusion
Medical students in Lebanon had an overall positive attitude towards patient safety. These findings may be used to guide improvements in patient safety education and enhance patient-centred care in medical institutions in Lebanon.

ARTICLE TITLE	**Multisystem Inflammatory Syndrome in Neonates Associated with Pneumothorax: Case Report**
AUTHORS	**Naous A.,** *Ghannoum W.,* Abbas A., Darwish H., Naja Z., *Rajab M.*
JOURNAL	Radiology Case Report
YEAR	2024
PUBLICATION INFO	19(11): 5124-5127
THEME / SUBTHEME	Health and Wellbeing/Epidemiology of Communicable and Non-communicable disease

ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic that was spread worldwide since 2019 and showed a highly contagious character affecting the lifestyle of people worldwide causing symptoms that are not limited to the respiratory system only but had multi-systemic effects that may progress to severe complications that roughly affect people's health. A newly recognized SARS-CoV-2-associated syndrome called pediatric multisystem inflammatory syndrome has been described worldwide. Initially, it was reported as hyper-inflammatory shock and "Kawasaki-like" symptoms with fever and conjunctivitis, a similar syndrome is also reported in neonates and called Multisystem Inflammatory Syndrome of neonates (MIS-N). In this paper, we presented a case of a newborn baby girl born by caesarian section affected by multisystem inflammatory syndrome of neonates presenting with respiratory distress on her third day of life, then she developed bilateral pneumothorax and pneumomediastinum respectively that required intubation, which highlights that the recognition of pneumothorax and pneumomediastinum as potential presentations of immunoglobulin G (IgG) positive MIS-N in newborns remains crucial.

ARTICLE TITLE	**Mycoplasma Pneumonia Complicated by Stevens-Johnson Syndrome: A Case Report**
AUTHORS	*Hasbini J., Safawi N., Berjaoui C.*, Rajab M., **Naous A.**
JOURNAL	Respiratory Medicine Case Reports
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.rmcr.2024.102081
THEME / SUBTHEME	Health and Wellbeing/Epidemiology of Communicable and Non-communicable disease
ABSTRACT	Mycoplasma pneumoniae is a leading cause of a community-acquired respiratory illness occurring in children with manifestations occurring throughout the year but peaking in summer and early fall. Predominantly affecting school-aged children, the infection presents as pneumonia, featuring fever, cough, dyspnea, and sore throat. Extrapulmonary manifestations such as StevensJohnson have been rarely associated with mycoplasma pneumoniae infection presenting with ocular, oral, and genital involvement. We report a case of a 7-year-11-month-old girl presenting with a 9-day fever history and 3-day bilateral conjunctivitis, aphthous stomatitis, and mucositis. After several investigations, a diagnosis was made and results showed a mycoplasma pneumoniae infection complicated with Steven-Johnson syndrome.

ARTICLE TITLE	**Patients'Attitudes towards Medical Students'participation in Procedures and Clinical Examinations in Lebanon**
AUTHORS	**Taleb R.,** Ftouni R., *Abdel Khalek M., Uweis L., Yassine A.*
JOURNAL	BAU Journal - Health and Wellbeing
YEAR	2024
PUBLICATION INFO	6(1): 1-11
THEME / SUBTHEME	Health and Wellbeing/Medical Education

ABSTRACT

Medical practice revolves around patients' safety and ensuring their well-being. Patients' cooperation with medical students in their examination and management is an indispensable aspect of clinical education. They have the right to accept or refuse the participation of students in their care. However, students need to be integrated in this learning process. This presents a conflict between patients' healthcare rights and medical students' learning opportunities. Therefore, this study aims to explore patients' attitudes towards the participation of medical students in procedures and examinations in Lebanon and identify the factors that affect their participation. A descriptive cross-sectional study was conducted using a 34-item questionnaire in Arabic language that was distributed via WhatsApp online platform among the Lebanese adult population in the different governorates during January and February 2021. A total of 729 participants with a mean age of 30.8 completed the survey. Overall, participants showed a positive attitude towards medical students' involvement in their care. It was noted that 61.7% were knowledgeable of their right to accept or refuse medical students' participation in procedures. Participants showed a great acceptance towards medical students' presence in outpatient clinics (71.74%), reading medical files (80.24%), and history taking (81.6%). However, their negative attitude was towards the student's involvement in performing genital/rectal examination (54.5%), giving an epidural injection (69.7%) and prescribing medications (53.2%). Patient's medical condition was the main reason that influences participants' decisions about medical students' presence during their procedures (43.8%). A positive attitude towards medical students' participation in procedures and examinations was reflected by the Lebanese population. Patients' medical conditions, personalities and religious beliefs were the main reasons affecting participants' decisions.

ARTICLE TITLE	**Pericardial Effusion Complicated by Umbilical Vein Catheter in a Preterm Infant with Respiratory Distress Syndrome: A Case Report**
AUTHORS	*Hasbini J., Safawi N.,* Mneimneh S., Rajab M., Berjaoui C., **Naous A.**
JOURNAL	Radiology Case Reports
YEAR	2024
PUBLICATION INFO	19(2): 741-744
THEME / SUBTHEME	Health and Wellbeing/Molecular Biology and Therapeutics of Diseases
ABSTRACT	Respiratory distress syndrome (RDS) is the most common respiratory illness in premature infants. This syndrome is characterized by a deficiency in surfactant, necessary for proper lung function. Serious complications of RDS include pericardial effusion and pulmonary hypertension. Although pericardial effusion is a rare complication of RDS, it is potentially fatal if not treated.

ABSTRACT

The most common cause of pericardial effusion (PCE) is the placement of a central venous catheter (CVC), a widely used procedure in neonatal intensive care unit to support premature infants. In this paper, we report a case of a 36 + 4 weeks preterm male infant presenting for RDS. During his hospital stay, at 24 hours of life, the patient started to develop bradycardia where he was intubated. After 48 hours of birth, a central venous catheter was inserted, and on echocardiography results showed pericardial effusion, and pulmonary hypertension.

ARTICLE TITLE	**Pneumatocele-Induced Pneumothorax after COVID-19 Infection in a 45-Day-Old Infant**
AUTHORS	**Rahil S., Naous A.,** Naja Z., Rajab M.
JOURNAL	Radiology Case Reports
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.radcr.2023.11.033
THEME / SUBTHEME	Health and Wellbeing/Molecular Biology and Therapeutics of Diseases
ABSTRACT	Throughout the literature, many pathologic lung lesions and complications following coronavirus disease 2019 (COVID-19) infection have been reported including pneumatocele formation which could potentially lead to pneumothorax development. This case report discusses the clinical course of a 45-day-old male with respiratory distress, whose condition worsened over time. Investigations revealed elevated COVID-19 immunoglobulin G (IgG) antibodies with negative COVID polymerase chain reaction (PCR) accompanied by radiologic evidence of pneumatocele formation, which was further complicated by pneumothorax. The clinical presentation of the patient was consistent with post-COVID infection but he had no history of contact with a sick individual which prompted further investigation of the source of the infection. Upon reviewing the history of the mother, symptoms consistent with COVID-19 around 32 weeks of pregnancy were revealed, which raises the possibility of maternal-fetal exchange of COVID-19 infection. This article presents the youngest reported patient with COVID-19 pneumonia that led to pneumatocele formation.

ARTICLE TITLE	**Prevalence and Characteristics of Medical Student Mistreatment in Lebanon**
AUTHORS	*El Nouiri A., El Kassem S., Al Maaz Z., Alhajj Y., Al Moussawi A., El Yaman A., El Hajjar H., Abdallah M., Assi G., Houri M.,* **Azakir B.**
JOURNAL	International Journal of Public Health
YEAR	2024
PUBLICATION INFO	DOI: 10.3389/ijph.2024.1606710
THEME / SUBTHEME	Health and Wellbeing/Occupational Health and Wellbeing

ABSTRACT

Objective
This study aimed to determine the prevalence of medical student mistreatment in Lebanon, the framework of the incidents, and the extent of students' knowledge on mistreatment characteristics. Methods: This is a cross-sectional study conducted using an online-based survey among medical students who have performed clinical rotations in Lebanon.

Results
Out of 300 respondents, 48.7% reported being subjected to mistreatment during clinical practice, which was significantly associated with gender, type of university, and family income. The two most common sources of mistreatment were patients and their families/friends (77.4%), and attending physicians (52.7%), followed by residents (49.3%). Students mostly chose to be passive and pacifying. Additionally, 64.7% of students stated they were not trained about the ideal way to handle these incidents.

Conclusion
This study showed that medical student mistreatment is highly prevalent in Lebanon. It also highlighted the lack of proper education on mistreatment characteristics and the necessity for investigating its effects.

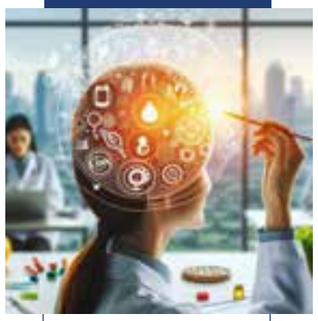
ARTICLE TITLE	**Surgical Management of Congenital Pouch Colon in Lebanon: A Case Report and Review of the Literature**
AUTHORS	**Naous A.,** *Berjaoui C., Osta M., Hafez A., Sinno K.*
JOURNAL	Radiology Case Report
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.radcr.2024.06.062
THEME / SUBTHEME	Health and Wellbeing/Epidemiology of Communicable and Non-communicable disease
ABSTRACT	Congenital pouch colon (CPC) is a rare congenital abnormality, in which a pouch-like dilatation partially or completely replaces the colon, creating a fistula with the urogenital. Congenital colonic pouch is an extremely rare congenital disease mainly reported in India, and to date there are no reported cases in Lebanon. In this paper, we present a case of full-term male neonate diagnosed with a congenital colon pouch in Lebanon. A full-term neonate presented with imperforate anus, abdominal distention, and vomiting. Diagnostic assessments revealed a well-encapsulated mass compressing the intestines and ureter. Surgical intervention identified a type I CPC with a meconium-filled pouch directly connected to the small intestine, and an absent ileocecal valve, prompting an ileostomy. Following the surgery, no postoperative complications were noted. Early imaging can help address the diagnosis to start the appropriate management, plan for surgery to prevent the development of a megacolon and therefore, perforation. The objective is to be aware and consider congenital colonic pouch diagnosis after encountering newborns with such clinical presentation in order to direct clinical investigations toward the diagnosis and treatment of the case early, thus reducing the risk of complications and improving the patient's quality of life.

ARTICLE TITLE	**The Impact of Medical Errors and Provided Support on Lebanese Family Physicians: Needs in Education**
AUTHORS	**Taleb R., El Ghazzawi A., Itani R., Itani L., Itani M.**
JOURNAL	Education for Health: Change in Learning and Practice
YEAR	2023
PUBLICATION INFO	36(2): 88-89
THEME / SUBTHEME	Health and Wellbeing/ Occupational Health and Wellbeing
ABSTRACT	Medical errors are considered a common cause of patient mortality and morbidity despite all the efforts to improve patient safety. Physicians who have made medical errors may also experience harm afterward, which negatively affects their career and personal life. Not only can support be provided to these physicians, but also educating them to disclose their errors and implementing coping strategies can help decrease the negative impacts experienced. Second victims are health-care professionals who become distressed after encountering a patient-safety incident, an unintended event that could have resulted or has resulted in harm to a patient. The negative effects experienced following an error include physical symptoms (mainly fatigue, sleep disturbance, and tachycardia) and psychosocial symptoms (such as depression, frustration, and difficulty concentrating).

Prevalent SDG

SDG 3
93%

Prevalent Theme



Health and Wellbeing
69%

Prevalent Subtheme

Oral Health Related Quality of Life
60%

% of Highly Indexed Journals

6%

Faculty of

DENTISTRY

23-24

RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**Activated Charcoal: A Natural Protective Measure Against the Lingual Degenerative Effect of Tacrolimus Immunosuppressant**
AUTHORS	**Abdel Fattah H.,** Essawy M., Eissa A.
JOURNAL	**Alexandria Dental Journal**
YEAR	2024
PUBLICATION INFO	49(1): 34-42
THEME / SUBTHEME	Health and Wellbeing/ Oral Health Related Quality of Life
ABSTRACT	**Objectives** The presented work was conducted to test the effectiveness of activated charcoal on the lingual mucosa of male rats subjected to the immunosuppressive drug tacrolimus. Design: After random allocation of thirty healthy male Wistar albino rats into three groups (10 per group), in the control group animals received saline, whereas those in the tacrolimus (TAC) group received daily subcutaneous injections of the immunosuppressant. In the third cohort (tacrolimus and activated charcoal; TAC+AC), rats received activated charcoal orally administrated besides the TAC. After three weeks of treatment, the evaluation of dissected tongues exempted histological, immunohistochemical, and morphometrical analyses. **Results** Histological findings revealed mucosal and connective tissue degenerative changes induced by TAC. However, the AC group showed the preserved structure of the lingual mucosa and associated minor salivary glands. The immunohistochemical detection of Melan-A revealed the profound drop in the mean area percent and optical density of melanophages to 0.82 ± 0.2% and 0.12 ± 0.01, respectively, upon AC counteraction of TAC melanosis. **Conclusions** AC exerted protective action against the degenerative effect of TAC on the lingual mucosa, encouraging its adjuvant uptake throughout the immunosuppressants course.

ARTICLE TITLE	**Assessment of Caries Prevalence and Related Risk Factors Among a Group of Lebanese Children with Autism Spectrum Disorder: A Case-Control Study**
AUTHORS	**Kassab R., Osman A., Tarabaih A.**
JOURNAL	The International Arab Journal Dentistry
YEAR	2023
PUBLICATION INFO	14(2): 13-21
THEME / SUBTHEME	Society, Culture and Human Behavior/ Preventive and Community Dentistry

ABSTRACT

Objectives
The study aimed to assess dental caries prevalence and its associated risk factors for children with Autism Spectrum Disorder (ASD) among different age groups.
Material and Methods: Forty-five children with autism aged between 3-16 years matched to 45 healthy children were selected. Children were recruited from autistic centers/schools in Saida, South Lebanon. Each child assessed for caries prevalence and risk factors using DMFT/dmft indices and the WHO standardized questionnaire. Student's t-test, Pearson's correlation test, and One Way ANOVA followed by Tukey's post hoc tests were used. Statistical significance was set at 95%.

Result
DMFT/dmft scores in non-ASD group were 0.85±1.53 and 2.15± 3.03 respectively and in ASD group were 0.72±1.34 and 1.87±3.09 respectively with no significant difference in both groups ($p>0.05$).

Conclusion
Preventive dental programs targeting autistic children and their parents/caregivers are needed to enhance their oral health status and general well-being.

ARTICLE TITLE	**Assessment of Mandibular Cortical Bone Thickness for Miniscrew Placement in Relation to the Vertical Facial Patterns using CBCT: A Cross-Sectional Study**
AUTHORS	*Rima Daoui R.,* **Aly Osman A.**
JOURNAL	International Arab Journal of Dentistry
YEAR	2023
PUBLICATION INFO	14(2): 78-89
THEME / SUBTHEME	Health and Wellbeing/Oral Health Related Quality of Life

ABSTRACT

Introduction
The need of more anchorage in the orthodontic daily practice has introduced the use of temporary anchorage devices (TADs). Cortical bone thickness has been one of the major factors on the success rate of the stability of TADs. Different vertical dimension patterns can be found among orthodontic patients with potentially variable cortical bone thickness.
Aim of the study: to assess the cortical bone thickness in the posterior region of the mandible in relation to different vertical facial patterns using Cone-beam computed tomography (CBCT) and to evaluate the progressive change in the thickness of cortical bone from 4,6 to 8 mm from the crest of the alveolar bone toward the apical region.

Methods
Thirty-six participants were selected and their cephalometric x-rays and CBCTs were analyzed and compared. Vertical facial pattern was measured with the use of the mandibular plane angle and participants were grouped in 3 categories according to the measures. On the CBCTs, buccal and lingual cortical bone thickness were measured from 4,6 and 8 mm from the alveolar crestal bone and compared. All analyses were conducted using IBM SPSS Statistics for Windows, v.26 (IBM Corp., Armonk, NY, USA). The significance level was set at $\alpha = 0.05$ for all statistical analyses.

Results
There was no statistically significant differences were observed between the vertical dimensions groups in terms of buccal and lingual measurements at 4, 6, and 8 mm from cemento-enamel junction (CEJ) between 44/45, 45/46, and 46/47 ($P>0.05$).

Conclusions
There was a progressive increase in cortical bone thickness in most of the studied groups from the alveolar crest to the apical region.

ARTICLE TITLE	**Automatic Detection of Temporomandibular Joint Osteoarthritis Radiographic Features Using Deep Learning Artificial Intelligence. A Diagnostic Accuracy Study**
AUTHORS	Mourad L., **Aboelsaad N.,** Talaat W., Fahmy N., Abdelrahman H., El-Mahallawy Y.
JOURNAL	**Journal of Stomatology, Oral and Maxillofacial Surgery**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.jormas.2024.102124
THEME / SUBTHEME	Health and Wellbeing/Towards Digital Dentistry

ABSTRACT

Objective
The purpose of this study was to investigate the diagnostic performance of a neural network Artificial Intelligence model for the radiographic confirmation of Temporomandibular Joint Osteoarthritis in reference to an experienced radiologist.

Materials and Methods
The diagnostic performance of an AI model in identifying radiographic features in patients with TMJ-OA was evaluated in a diagnostic accuracy cohort study. Adult patients elected for radiographic examination by the Diagnostic Criteria for Temporomandibular Disorders decision tree were included. Cone-beam computed Tomography images were evaluated by object detection YOLO deep learning model. The diagnostic performance was verified against examiner radiographic evaluation.

Results
The differences between the AI model and examiner were non-significant statistically, except in the subcortical cyst (P = 0.049*). AI model showed substantial to near-perfect levels of agreement when compared to those of the examiner data. Regarding each radiographic phenotype, the AI model reported favorable sensitivity, specificity, accuracy, and highly statistically significant Receiver Operating Characteristic (ROC) analysis ($p < 0.001$). Area Under Curve ranged from 0.872, for surface erosion, to 0.911 for subcortical cyst.

Conclusion
AI object detection model could open the horizon for a valid, automated, and convenient modality for TMJ-OA radiographic confirmation and radiomic features identification with a significant diagnostic power.

ARTICLE TITLE	**Clinical, Radiographic, and Histological Evaluation of the Mineralized Plasmatic Matrix/Xenograft Mixture in Maxillary Sinus Floor Augmentation (A Randomized Controlled Clinical Trial)**
AUTHORS	**Arakji H., Essam Osman A., Aboelsaad N.,** Shokry M.
JOURNAL	**European Journal of Dental and Oral Health**
YEAR	2023
PUBLICATION INFO	4(2): 7-13
THEME / SUBTHEME	Health and Wellbeing/ Oral Health Related Quality of Life

ABSTRACT

Introduction
Maxillary sinus pneumatization and alveolar ridge resorption following the extraction of posterior teeth make the installation of dental implants in the maxillary posterior region challenging. The direct sinus lift procedure proved to be a viable treatment option for such conditions. Aim of the study: to evaluate the mineralized plasmatic matrix/xenograft mixture in sinus elevation surgery.

Materials and Methods
Eighteen patients were selected and randomly allocated into two groups; study group received a mineralized plasmatic matrix/xenograft mixture, while the control group received xenograft alone following sinus lifting.
Results: The early wound healing index score showed a non-significant difference between both groups. Also, bone height was evaluated at the 6-month follow-up period, and there was a non-statistically significant difference. Core biopsies were taken for histological examination by H&E from both groups, revealing the presence of a more mature bone matrix in relation to the test group.

Conclusion
The addition of mineralized plasmatic matrix to xenograft can speed up bone formation, thus reducing treatment duration.

ARTICLE TITLE	**Comparison between Hyaluronic Acid and Chlorhexidine in the Treatment of Orthodontically Induced Gingival Enlargement: A Randomized Controlled Trial**
AUTHORS	*Saleh S.,* **Aboelsaad N., Osman A.**
JOURNAL	International Arab Journal of Dentistry
YEAR	2023
PUBLICATION INFO	14(2): 56-68
THEME / SUBTHEME	Health and Wellbeing/Oral Health Related Quality of Life

ABSTRACT

Introduction
The study aimed to assess and compare the effectiveness of chlorhexidine and hyaluronic acid when used as an adjuvant to professional mechanical plaque removal (PMPR) in the treatment of orthodontically induced gingival enlargement.

Methods
The study conducted was a randomized controlled clinical trial involving 45 patients. The patients will be categorized into 3 groups; control group receiving conventional PMPR, study 1 group receiving PMPR and chlorhexidine (CHX), and study 2 group receiving PMPR and hyaluronic acid (HA). Probing depth (PD), Gingival overgrowth index (GOI), gingival bleeding index (GBI), and plaque index (PI), will be recorded at baseline, 1 month, 2 months, and 4 months' post therapy. A bivariate analysis was conducted to evaluate the parameters in function of the three study groups, and to evaluate the changes in PD and GBI between baseline, month 1, month 2 and month 4 in the three study groups.

Results
A significant reduction in probing depth and gingival bleeding was observed in the three groups (p 0.05). The change in PD, PI, GBI and GOI was more in Group 1 and Group 2 than in the control group. Hyaluronic acid demonstrated the same effect of chlorhexidine.
Conclusions: HA is just as effective as CHX in treating gingival enlargement. Based on the acceptance of HA by patients generally and the negative effects of CHX, HA may be a potential alternative to CHX.

ARTICLE TITLE	**Cyclic Loading of Veneer-Supported Fixed Dental Prosthesis versus Conventional Resin Bonded Prosthesis for Replacing missing central incisor: An in-vitro study**
AUTHORS	Fouad M., Mokhtar S., **Osman A.,** Hussein N.
JOURNAL	Ain Shams Dental Journal
YEAR	2022
PUBLICATION INFO	28(4): 28-35
THEME / SUBTHEME	Science and Technology/Towards Digital Dentistry

ABSTRACT

Statement of Problem
Resin bonded fixed dental prosthesis (RBFDP) are not indicated when the mesiodistal width of the missing tooth is needed to be adjusted. A New design of Veneer retained resin bonded dental prosthesis (VRFDP) is suggested to restore and redistribute the space.

Materials and Methods
Two 3D models for 8 maxillary anterior teeth and first premolars; with missing tooth number 11, were drawn on AutoCad software to accommodate resin-bonded FDP (RBFDP) and veneer-supported fixed dental prosthesis (VRFDP). the file was exported and 10 epoxy resin models were 3D printed from each type using stereolithography technology. Ten FDP were milled from each STL file. Using high translucency zirconia blanks (Esthetic Explore) and sintered according to the manufacturer's recommendations. Then, the FDP of each type were bonded to their corresponding dies according to the manufacturer's directions. All specimens were subjected to cyclic loading test Specimens were cyclic loaded till failure. Data were collected, tabulated, and statistically analyzed.

Results
Descriptive Statistics showed higher mean values of the VRB group (520.16±117.07) than the RBB group (449.19±163.97). One-Way ANOVA showed no significant difference between tested groups (P= 0.28).

Conclusions
VRFDP scored higher cyclic loads mean values than RBFDP. VRFDP could present an acceptable treatment option for treating the missing central incisor situation. More investigations are needed to support or reject this claim.

ARTICLE TITLE	**Knowledge, Attitude and Clinical Management of Orthodontically - Induced External Root Resorption Among Lebanese Orthodontics: A Questionnaire Survay**
AUTHORS	**Fakih D., Tarabaih A., Ossman A.**
JOURNAL	The International Arab Journal Dentistry
YEAR	2023
PUBLICATION INFO	15(1): 21-28
THEME / SUBTHEME	Health and Wellbeing/ Management of Musculoskeletal Disorders

ABSTRACT

Objective
The aim of this study was to assess the knowledge, attitude, and clinical management orthodontically induced external root resorption (OIERR) among Lebanese orthodontists of varying years of experience.

Methods
An online validated survey of 22 questions regarding OIERR was done among a randomly selected registered sample of 145 male and female Lebanese orthodontists.
Results: Significant differences were found among orthodontists with different years of experience
for: the factors leading to further investigation, the stage at which additional screening measures were taken, the periodic follow up assessment method, and the clinical management in case of generalized root loss of one-third or more than 4 mm, with p-values 0.035, 0.001, 0.007 and 0.024 respectively.

Conclusions
Lebanese orthodontists had knowledge on potential risk factors, screening methods
and period for OIERR. Those with more experience should depend on evidence-based literature for clinical management of OIERR.

ARTICLE TITLE	**Early Childhood Caries Assessment and Related Risk Factors among a Group of Lebanese Preschool Children: A Cross-Sectional Study**
AUTHORS	**Tarabaih A.**
JOURNAL	Annali Di Stomatologia
YEAR	2024
PUBLICATION INFO	15(1): 21-26
THEME / SUBTHEME	Society, Culture and Human Behavior/ Preventive and Community Dentistry

ABSTRACT

Objective
The study aimed to assess the prevalence of Early Child Caries and its associated risk factors among a group of Lebanese preschool children.

Materials and Methods
An observational, cross-sectional study design that included 388 children recruited from different schools in Beirut, Lebanon. The parents were interviewed to answer a questionnaire developed by the World Health Organization (WHO, 1997) and Caries Assessment Risk tool developed by the American Academy of Pediatric Dentistry (AAPD, 2019). Then, caries prevalence was assessed by examining the children using the WHO decayed, missed or filled primary teeth (dmft) index and the rating scores of dental caries were classified as very low <1.2, low 1.2 – 2.6, moderate 2.7 – 4.4 and high 4.4 (WHO, 1997).

Results
The mean age of the children was 4.03 ± 0.82 years. The prevalence of ECC was 71.1% and the mean dmft index was noted to be 3.11 ± 3.67. Based on the risk assessment results, 68% of the preschool children had high caries risk whereas 32% had low caries risk. A statistically significant differences in mean dmft scores were noted in which 3-years-old children exhibited a lower mean dmft value compared to 4 and 5 years olds ($p<0.001$). In addition, a significant difference was also found in dmft scores between middle socioeconomic status (SES) schools and low SES schools ($p=0.016$).

Conclusion
Oral health promotion programs are to be implemented on regular basis to enhance the oral health status and general well-being of young children.

ARTICLE TITLE	**Effect of Bone Marrow Mesenchymal Stem Cells Derived Exosomes Loaded in Collagen Hydrogel on Bone Regeneration in Male Rat Calvarial Critical-Size Bone Defect**
AUTHORS	Hamza S., Noureldin M., Heikal L., Omar E., **Abdel Fattah H.**
JOURNAL	**Alexandria Dental Journal**
YEAR	2024
PUBLICATION INFO	49(1): 22-33
THEME / SUBTHEME	Science and Technology/In Vivo Tissue Regeneration

ABSTRACT

Introduction
Expanded bone damage in defects of critical size demands interventions for the complete regeneration. However, limitations of the previous strategies include reduced availability of autograft donors. The therapeutic efficacy of exosomes has been extensively studied in numerous circumstances such as wound healing, bone and periodontal regeneration.
Aim: This research work aimed to test the efficacy of collagen thermoresponsive hydrogel loaded by BMMSC-derived exosomes on bone regeneration in rats' calvarial critical-size bone defects.

Materials and Methods
Twenty albino rats were allocated into 2 groups, 10 rats each. Group I- collagen hydrogel (COLL), Group II- (COLL+ exosomes). Calvarial critical-size bone defects were surgically created in all groups. The defects in Group I were filled with collagen hydrogel, and in Group II were filled with exosomes-loaded collagen hydrogel. Rats were euthanized after 4 and 8 weeks, and the calvariae were collected and processed. The regenerated bone was evaluated by histology, histomorphometry, and immunohistochemical expression of the bone formation marker osteocalcin.

Results
Analyzing the new bone using histology and histomorphometry revealed an enhanced quantity and pattern of bone formation in defects augmented with collagen hydrogel loaded by exosomes compared to the bare collagen hydrogel group after 4 weeks. However, after 8 weeks no significant difference was detected between groups. Immunohistochemical expression of osteocalcin showed higher values in group II (Coll + exosomes) in comparison to group I collagen hydrogel (COLL).

Conclusion
Bone marrow mesenchymal stem cells derived exosomes loaded collagen thermoresponsive hydrogel provides a precious substitution to cell-based therapy in bone regenerative procedures

ARTICLE TITLE	**Effect of Low-Level Laser on Miniscrew Displacement During Canine Retraction: A Randomized Controlled Clinical Trial**
AUTHORS	**Osman A.,** El Harouni N., **Shokry M.**
JOURNAL	**International Arab Journal of Dentistry**
YEAR	2023
PUBLICATION INFO	14(1): 5-13
THEME / SUBTHEME	Health and Wellbeing/Oral Health Related Quality of Life

ABSTRACT

Background
Anchorage is an important consideration for successful orthodontic treatment. Skeletal anchorage by miniscrews provided better anchorage control then the ordinary extra-oral and intra-oral appliances. However, the stability of the miniscrews is still questionable since they might move under orthodontic loading.

Objectives
The aim of this study was to evaluate the effect of Low Level Laser on the miniscrew displacement when subjected to orthodontic force during canine retraction using CBCT.

Methods
Twelve patients who required bilateral extraction of upper first premolar and absolute anchorage were recruited from the outpatient clinics of the Department of Orthodontics, Faculty of Dentistry, Beirut Arab University of age ranging 14-28 years. Twenty-four miniscrews were assessed; two miniscrews were inserted into the buccal alveolar bone between the second premolar and first molar on the right and left side for each patient in a 60o oblique direction at the mucogingival junction to avoid root injury. They were divided into 2 sides; test side and a control side, the test side received 4 application of low-level laser therapy during the first twelve days of insertion with a 60 seconds for each application. While the control side did not receive any laser application. After waiting a period of twelve days from miniscrew insertion to allow for soft tissue healing, the upper right and left canines were retracted by 150g of nickel-titanium (NiTi) closed coil springs. A cone-beam computed tomography was taken to evaluate the miniscrew position before application of the force at baseline (T0) and after canine retraction at 6 months (T1).

Results
There was no statistically significant difference of miniscrew head and tail displacements of the test side and a statistically significant difference of the heads for the control sides when compared to baseline.

Conclusions
Miniscrews used in the current study with the suggested protocol underwent non-significant displacement when using low level laser. The miniscrews remained stable throughout the follow-up period (6 month) without any significant displacement on the test side.

ARTICLE TITLE	**Efficiency of Hyaluronic Acid Versus Red Injectable Platelet-Rich Fibrin (I-PRF) in Treatment of Stage III Periodontitis: Randomized Controlled Clinical Trial**
AUTHORS	*Mazloum T., Amhaz G., H. Abdullah G.*, **Aboelsaad N.**
JOURNAL	International Arab Journal of Dentistry
YEAR	2023
PUBLICATION INFO	14(2): 1-12
THEME / SUBTHEME	Health and Wellbeing/Oral Health Related Quality of Life

ABSTRACT

Introduction
This study aims to compare clinical efficacy of red injectable platelet-rich fibrin (i-PRF) and hyaluronic acid (HA) as adjuncts to professional mechanical plaque removal (PMPR) in non-surgical management of stage III periodontitis.

Methods
75 patients were split into groups: group one (G1) received HA, group two (G2) received red i-PRF, and group three (G3), received only PMPR. Periodontal evaluation was done at baseline, 4th, 8th, and 12th weeks following treatment.
Results: The plaque index, gingival index, and bleeding on probing were significantly improved in all groups. Moreover, the probing depth in all three groups displayed lower levels over the three months, with G1 and G2 experiencing the greatest declines. Additionally, G1 and G2 showed a considerable increase in clinical attachment level, while G3 showed no improvement.

Conclusions
Thus, the application of HA and red i-PRF in conjunction with PMPR significantly improves all periodontal metrics, however, there is no statistically significant distinction between them.

ARTICLE TITLE	**Evaluation of Amnion Chorion Membrane for Socket Preservation after the Extraction of Maxillary Single Rooted Teeth: A Randomized Controlled Clinical Trial**
AUTHORS	*Soussi K.*, **AboelSaad N.**, Aly Z.
JOURNAL	International Arab Journal of Dentistry
YEAR	2023
PUBLICATION INFO	14(2): 22-36
THEME / SUBTHEME	Health and Wellbeing/Oral Health Related Quality of Life

ABSTRACT

Introduction
The aim of this study was to assess the efficiency of using dehydrated de-epithelial ized amnion chorion membrane (ddACM) on socket preservation in the anterior region, clinically and radiographically.

Methods
26 unrestorable maxillary anterior or single rooted premolars, with buccal fenestration, were selected. The socket was filled with allograft material and covered with ddACM for the test group, and allograft material with a collagen membrane for the control group divided equally. Clinical parameters including gingival healing and tissue thickness was assessed. Volumetric bone change was measured 4 months later using a CBCT.

Results
Test group showed clinical statistically significant results than the control group (P-value = 0.020, effect size = 0.574) along with a radiographic higher mean bone width measurement than control group after four months (P-value = 0.372, Effect size = 0.357).

Conclusion
As compared to collagen membrane, intentionally exposed ACM is similarly successful in ridge preservation. Moreover, the use of ACM may help to reduce postoperative VAS ratings and may result in excellent bone quality available for implant placement.

ARTICLE TITLE	**Evaluation of Guided Bone Regeneration Using Xenograft/ A-PRF Mixture in Atrophic Posterior Mandible(Clinical and Radiographic Study)**
AUTHORS	*Richa, R.,* Osman E., Attia N., **Arakji H.,** Shokry M.
JOURNAL	European Scientific Journal
YEAR	2023
PUBLICATION INFO	19(36): 9-26
THEME / SUBTHEME	Health and Wellbeing/ Oral Health Related Quality of Life

ABSTRACT

Introduction
The rehabilitation of the posterior mandible with dental implants represents a hard challenge for clinicians today due to the lack of supporting bone. Different surgical techniques are currently being used to augment the posterior mandible, where GBR is considered the most commonly used. Materials and Methods: Fifteen patients were selected to treat mandibular alveolar ridge resorption with guided bone regeneration using a titanium-reinforced membrane and a filling mixture of xenograft bovine bone and PRF. The membrane was fixed using a Meisinger pin control kit and Profix 3mm microscrews. A PRF membrane was used to cover the Ti-d-ptfe.

Results
Swelling, pain, and numbness were evaluated using the mixture of PRF/xenograft as well as PRF membranes. The results showed promising results in terms of primary wound healing, whereas a significant bone quantity with a mean bone volume of 5.78 ± 0.81 was reported after 6 months. The primary implant stability recorded high values and significantly increased at a period of 6 months post-insertion ($p = 0.037$). Conclusion: It could be concluded that the PFR/xenograft mixture can be promising when used with the titanium-reinforced d-ptfe membrane in 3D ridge reconstruction of the atrophic posterior mandible; moreover, using the PRF membrane to cover the TI-d-ptfe membrane could enhance soft tissue healing as well as prevent soft tissue dehiscence due to the concentration of growth factors that can be released during primary wound healing. The xenograft/PRf mixture can be consistently utilized for the creation of new bone in severely atrophic ridges if used in GBR. The high ISQ at primary implant placement and at a period of 6 months post-insertion, according to Osstell, can explain the successful application of this mixture in 3D bone augmentation of the atrophic posterior mandible.

ARTICLE TITLE	**Evaluation of Modified Shell Technique in 3D Ridge Reconstruction: A Clinical and Radiographic Study**
AUTHORS	*Richa R.,* **Osman E.,** Attia N., **Arakji H.,** Mohamed Shokry M.
JOURNAL	European Journal of Dental and Oral Health
YEAR	2023
PUBLICATION INFO	4(6): 21-26
THEME / SUBTHEME	Health and Wellbeing/ Oral Health Related Quality of Life

ABSTRACT

Introduction
As a result of tooth loss, alveolar ridge resorption sacrifices bone volume including bone width. In order to replace the lost dentition with implants functionally and esthetically, bone augmentation procedures are carried out.

Materials and Methods
Fifteen patients were selected to treat mandibular alveolar ridge resorption with an autogenous block graft harvested using piezoelectric surgical tips and split into two shells using a diamond disk then fixated on the decorticated defective ridge. Particulate xenograft bovine bone was then inserted between the fixated shell and ridge, the second shell was used to roof the bone particles.

Results
The modified shell technique could be an alternative to other ridge augmentation techniques. This study shows promising clinical and radiographic results that carry the advantages of being: safe and precise cutting using Piezoelectric tips, the statistical data showed a significant difference in 3D bone volume where no unfavorable complication was detected.

Conclusion
The modified shell technique showed a reliable technique in cases of 3D ridge reconstruction since it holds the advantages of autogenous bone properties and the rigidity of the bone shells that maintain the space necessary for augmentation. The use of PRF can accelerate wound healing and minimize the risk of flap dehiscence as well as it can speed up bone formation.

ARTICLE TITLE	**Leukocytic Platelet Rich Fibrin (L-PRF) Versus Subepithelial Connective Tissue Graft (SCTG) using Tunneling Technique in Treatment of Gingival Recession: Randomize Controlled Clinical Study**
AUTHORS	Jouni J., Badr A., **Aboelsaad N.**
JOURNAL	International Arab Journal of Dentistry
YEAR	2023
PUBLICATION INFO	14(2): 37-47
THEME / SUBTHEME	Health and Wellbeing/Esthetics and Oral Rehabilitation

ABSTRACT

Introduction
Gingival recession is a problem encountered daily in clinical practice, its etiology is often a multifactorial one. Surgical treatment is the only method to reverse this condition.

Objective
to evaluate the effectiveness of leukocytic platelet rich fibrins (L-PRF) versus subepithelial connective tissue graft (SCTG) in the management of recession defects Miller's class I or II (RT1) using the tunnel technique (TUN).

Methods
20 systemically healthy patients were allocated randomly to TUN with L-PRF (group A), and TUN with SCTG (group B). Probing depth, clinical attachment level, recession depth, width of keratinized tissue, gingival thickness, and recession esthetic score and wound healing index are clinical variables measured at baseline,14 days, 3 months, and 6 months postoperatively.

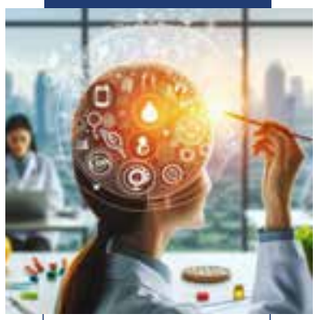
Results
Significant improvement in mean CAL, and RD for both groups, and significant difference in GT and WKT for group B as well as higher RES. A significant difference was also recorded in group A for WHI

Conclusions
Both grafting modalities in combination with tunnel technique improved gingival phenotype switching. Although SCTG gives higher esthetic and functional results including better color matching, tissue contour and increased width of keratinized tissue, L-PRF has superior healing properties and can be used as an alternative to treat multiple gingival recession defects where the need of second surgical site is eliminated.

Prevalent SDG

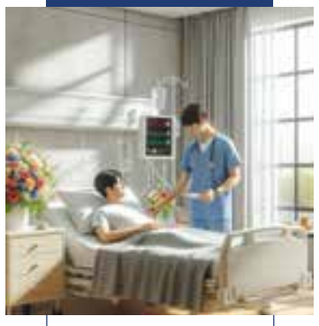
SDG 3
71%

Prevalent Theme



Health and Wellbeing
90%

Prevalent Subtheme



Illness and Therapy
52%

% of Highly Indexed Journals

76%

Faculty of

HEALTH SCIENCES

23-24

RESEARCH REPORT

I. ARTICLES

ARTICLE TITLE	**ABCA4-Related Retinopathies in Lebanon**
AUTHORS	**Ibrahim M.,** Jaffal L., Assi A., Helou C., **El Shamieh S.**
JOURNAL	**Heliyon**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.heliyon.2024.e30304
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy
ABSTRACT	Variants in ATP-binding cassette transporter type A4 (ABCA4) have been linked to several forms of inherited retinal diseases (IRDs) besides the classically defined Stargardt disease (STGD), known collectively as ABCA4 retinopathies. ABCA4 is a sizable locus harboring 50 exons; thus, its analysis has revealed over 2,400 variants described, of which more than 2,000 are causal. Due to the clinical and genetic heterogeneity, diagnosing ABCA4 retinopathies is challenging. To date, no ABCA4-related retinopathy has been detected in Lebanon. Using next-generation sequencing, we analyzed our IRDs› cohort retrospectively (61 families) and identified five with ABCA4-related retinopathies, making it a relatively abundant cause of IRDs (about 8 %). Three families were diagnosed with rod-cone dystrophy (RCD), two with STGD, and one with cone-rod dystrophy (CRD). In conclusion, our study showed the presence of ABCA4 variants with a high degree of heterogeneity in Lebanon.

ARTICLE TITLE	**AI-Based Epidemic and Pandemic Early Warning Systems: A Systematic Scoping Review**
AUTHORS	El Morr C., Ozdemir D., Asdaah Y., Saab A., El-Lahib Y., **Sokhn E.**
JOURNAL	**Health Informatics Journal**
YEAR	2024
PUBLICATION INFO	DOI: 10.1177/14604582241275844.
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy

ABSTRACT

Background
Timely detection of disease outbreaks is critical in public health. Artificial Intelligence (AI) can identify patterns in data that signal the onset of epidemics and pandemics. This scoping review examines the effectiveness of AI in epidemic and pandemic early warning systems (EWS). Objective: To assess the capability of AI-based systems in predicting epidemics and pandemics and to identify challenges and strategies for improvement. Methods: A systematic scoping review was conducted. The review included studies from the last 5 years, focusing on AI and machine learning applications in EWS. After screening 1087 articles, 33 were selected for thematic analysis. Results: The review found that AI-based EWS have been effectively implemented in various contexts, using a range of algorithms. Key challenges identified include data quality, model explainability, bias, data volume, velocity, variety, availability, and granularity. Strategies for mitigating AI bias and improving system adaptability were also discussed.

Conclusion
AI has shown promise in enhancing the speed and accuracy of epidemic detection. However, challenges related to data quality, bias, and model transparency need to be addressed to improve the reliability and generalizability of AI-based EWS. Continuous monitoring and improvement, as well as incorporating social and environmental data, are essential for future development.

ARTICLE TITLE	**An Exploratory Study to Assess the Knowledge, Attitudes and Practices of Lebanese Residents Towards Acrylamide**
AUTHORS	Kalash N., Kharroubi S., Ballout R., **Saleh F.**
JOURNAL	**PLOS ONE**
YEAR	2024
PUBLICATION INFO	19(4):8-22
THEME / SUBTHEME	Health and Wellbeing/Prevention and Health Promotion in Health Sciences

ABSTRACT

Introduction
For years, heat treatment has been an essential method for ensuring mature food that meet the desired quality and safety characteristics. However, this process could lead to the formation of harmful compounds such as acrylamide. In this study we aimed to investigate the knowledge, attitudes and practices (KAPs) of the Lebanese population toward the potential risk associated with acrylamide.

Materials & methods
An online survey (n = 598) was conducted among residents in Lebanon aged 18 years and above. The survey was divided into five sections including participants' sociodemographic characteristics, knowledge, attitude and practice sections, and some questions related to consumer's preferences.

Results & discussion
The results showed that the majority of the participants had low food safety knowledge regarding acrylamide. Specifically, 82.9% of the consumers had no idea about the chemical, its formation, the foods with a high risk of acrylamide formation and the health risks associated with its exposure. Despite lack of knowledge, good domestic food practices (storage, pre-treatment) were noticed among participants. Moreover, the majority of consumers (> 80%) showed positive attitude towards proper acrylamide labeling. Participants with a bachelor's degree appeared to have a more positive attitude toward food safety compared to those with no qualifications ($p<0.001$).

Conclusion
Despite the high consumption of acrylamide by the consumers in Lebanon through fried potatoes, bread, and coffee, the majority have no idea about acrylamide's presence in food, its sources and its adverse health effects. Raising awareness among the public, involving policy makers in addressing the issue of clear labeling and encouraging the adoption of alternative practices to reduce acrylamide are all crucial to protect consumers' health in Lebanon and promote healthier food consumption habits.

ARTICLE TITLE	**An Overview about Nutritional Status of Childbearing Age Women, Children and Adolescents, Living in Rural Areas of Madagascar: Preliminary Results of The Tany Vao Project - CORRIGENDUM**
AUTHORS	Conti M., **Itani L.,** Beretta A., Bono E.
JOURNAL	**Public Health Nutrition**
YEAR	2024
PUBLICATION INFO	27(1): 1-11
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy
ABSTRACT	**Objective** To describe the food consumption, nutrition knowledge and nutritional assessment of childbearing age women and their children, living in rural villages in Madagascar. The results presented are related to the Tany Vao research study. Design: A cross-sectional pilot study. **Setting** The study was carried out in Ampanitosoha village on Nosy Mitsio island in Madagascar. Participants: 32 women (14-49 years) and 36 children and adolescents (2-17 years). Results: 70 % of the women lacked nutrition knowledge and did not reach the Minimum Dietary Diversity Index for Women cut-off. The median BMI was 21·1 kg/m2 but 55·2 % of the women exceeded the cut-off for waist-to-hip ratio, 51·7 % for waist-to-height ratio and 81·2 % for mid-upper arm circumference (MUAC). Almost all had adequate intake of energy, protein and carbohydrates, while 27·6 % had excessive fat intake and 75·9 % of added sugars. Over half of the women did not meet the micronutrients Reference Daily Intake (RDI). For children, the MUAC z-score was lower for boys than for girls (P-value = 0·041). **Conclusions** These results underline the importance of increasing women›s nutritional knowledge to promote healthy pregnancy and lactation. Moreover, it is fundamental to provide people living in rural areas with sustainable tools to improve dietary diversity and support long-term health.

ARTICLE TITLE	**Assessment of Mycotoxins in Cornfakes Marketed in Lebanon**
AUTHORS	Hassan H., ***Awada F.,*** Dimassi H., El Ahmadieh C., Hassan N., El Khatib S., Alwan N., Abiad M., Serhan M., **El Darra N.**
JOURNAL	**Scientific Reports**
YEAR	2023
PUBLICATION INFO	13(2023):1-6
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Cornflakes are a popular and convenient breakfast cereal made from corn and widely consumed worldwide, including in Lebanon. However, they are susceptible to mycotoxin contamination, which can have harmful effects on human health. Our study evaluated the occurrence of five mycotoxins (AFB1, OTA, FUM, ZEA, DON) levels in packed cornflakes marketed in Lebanon. A market screening identified 35 different cornflake stock-keeping units (SKU) in the Lebanese market, originating from 10 different brands and having different tastes and shapes. SKUs were collected and tested for five mycotoxins in triplicates using enzyme-linked immunosorbent assay technique. The results showed the presence of the five mycotoxins in the samples. The average levels of AFB1, OTA, ZEA and FUM among positive samples (above limit of detection) were 1.58, 1.2, 15.1 and 774.1 μg/kg, respectively, and were below the EU limits. On the other hand, the average level of DON was 1206.7 μg/kg, exceeding the EU limit. Furthermore, out of the positive samples, 60%, 17%, 9%, 14%, and 6% exceeded the EU limits for DON, OTA, AFB1, FUM, and ZEA, respectively. Notably, SKUs made in Lebanon had significantly ($p< 0.05$) higher levels of AFB1 and FUM. The packing size of the cornflakes had no significant ($p> 0.05$) effect on the levels of the five mycotoxins detected in the samples. AFB1, FUM and ZEA levels differed significantly among SKUs ($p> 0.05$). Considering these findings, further studies should be conducted to assess the exposure to mycotoxins from the consumption of cornflakes in Lebanon, especially among children.

ARTICLE TITLE	**Association between Dietary Practice and Gait Speed in Community-Dwelling Older Adults with Overweight and Obesity: A Cross-Sectional Study**
AUTHORS	**Itani L.,** Pellegrini M., ***Saadeddine D.,*** Samouda H., **Kreidieh D.,Tannir H.,** El Ghoch M.
JOURNAL	**Diseases**
YEAR	2024
PUBLICATION INFO	12(3):1-11
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences
ABSTRACT	Slow gait speed is associated with poorer clinical outcomes and higher rates of functional limitation and mortality in older adults, especially when combined with overweight or obesity. Aging is also associated with nutritional deficits. The aim of our study was to assess the potential association between dietary practice and gait speed performance in community-dwelling older adults with overweight and obesity. Participants underwent body composition measurement with the Tanita MC-780MA Bioimpedance Analyzer (BIA). Dietary patterns were assessed with the Mini Nutritional Assessment (MNA) questionnaire, and a dietary adequacy (DA) score system was constructed. The four-meter gait speed test was performed in order to assess gait speed. Of 222 participants, aged 67.6 ± 6.6 years, with a body mass index (BMI) of 31.9 ± 4.5 kg/m2, 34.7% had reduced gait speed and lower DA compared to those with normal gait speed (2.99 ± 1.12 vs. 3.37 ± 1.07; $p < 0.05$). The DA score of participants with slower gait speed was more likely to fall below the median than that of participants with normal gait speed (70.1% vs. 51.7%; $p < 0.05$). Participants with slower gait speed were more likely to be nutritionally at risk of low DA (22.1% vs. 10.3%; $p < 0.05$). Logistic regression analysis, after adjustment for confounders, showed that the risk of having a slow gait speed was 75% lower among those with a higher DA score (OR = 0.25; 95% CI = 0.11–0.53). Older adults with overweight or obesity in community dwellings might need to be supported with nutritional interventions that can improve their gait speed.

ARTICLE TITLE	**Association between Sarcopenia and Reduced Bone Mass: Is Osteosarcopenic Obesity a New Phenotype to Consider in Weight Management Settings?**
AUTHORS	Lorenzo A., **Itani L.,** Gualtieri P., Pellegrini M., El Ghoch M., Renzo L.
JOURNAL	**Life**
YEAR	2023
PUBLICATION INFO	14(1): 2-9
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Sarcopenic obesity (SO) is a frequent phenotype in people with obesity; however, it is unclear whether this links with an impaired bone status. In this study, we aimed to investigate the association between SO and low bone mass, and to assess the prevalence of a new entity that combines excessive fat deposition, reduced muscle mass and strength, and low bone mass defined as osteosarcopenic obesity (OSO). Body composition was completed by a DXA scan in 2604 participants with obesity that were categorized as with or without SO, and with low or normal bone mineral content (BMC). Participants with both SO and low BMC were defined as OSO. Among the entire sample, 901 (34.6%) participants met the criteria for SO. This group showed a reduced mean BMC (2.56 ± 0.46 vs. 2.85 ± 0.57, $p < 0.01$) and displayed a higher prevalence of individuals with low BMC with respect to those without SO (47.3% vs. 25.9%, $p < 0.01$). Logistic regression analysis showed that the presence of SO increases the odds of having low BMC by 92% [OR = 1.92; 95% CI: (1.60-2.31), $p < 0.05$] after adjusting for age, body weight, and body fat percentage. Finally, 426 (16.4%) out of the total sample were affected by OSO. Our findings revealed a strong association between SO and reduced bone mass in adults with obesity, and this introduces a new phenotype that combines body fat, muscle, and bone (i.e., OSO) and appears to affect 16% of this population.

ARTICLE TITLE	**Association between the Dietary Inflammatory Index and Sleep Quality among Lebanese University Students**
AUTHORS	**El-Ali Z.,** Hebert J.,Wirth M., Mitri R.
JOURNAL	**Sleep Science**
YEAR	2024
PUBLICATION INFO	DOI: 10.1055/s-0044-1780501
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences
ABSTRACT	**Objective** The association between sleep quality and overall health has been extensively examined. However, few studies have investigated the relationship between sleep and the inflammatory potential of the diet. Thus, the purpose of the present study was to explore the association between the scores on the Energy-Adjusted Dietary Inflammatory Index (E-DII) and sleep quality in Lebanese university students. **Materials and Methods** We conducted a cross-sectional study with students attending the Tripoli campus of Beirut Arab University. A total of 270 students aged between 17 and 25 years were randomly selected. All students filled out a multicomponent questionnaire that included an assessment of their sleep quality using the Pittsburg Sleep Quality Index, and of their physical activity level using the short version of the International Physical Activity Questionnaire. The scores on the E-DII were calculated based on a validated food frequency questionnaire. **Results** Individuals in the highest (most proinflammatory) quartile of the E-DII were at an increased risk of having poor overall sleep quality compared with the lowest quartile (odds ratio [OR] = 2.86; 95% confidence interval [95%CI]: 1.27–6.44). Regarding the individual domains of sleep quality, subjects in quartiles 3 and 4 of the E-DII were at an increased risk of having poor sleep efficiency compared with those in quartile 1 (OR = 2.49; 95%CI: 1.12–5.54; and OR = 2.52, 95%CI: 1.13–5.62 respectively). However, individuals in quartile 3 were at a reduced risk of having daytime dysfunction compared with those in the lowest quartile (OR = 0.44; 95%CI: 0.23–0.83). **Conclusion** The inflammatory potential of the diet seems to be related to sleep quality in our sample of Lebanese university students. Future prospective studies are required to further explore this association.

ARTICLE TITLE	**Difference in Body Composition Patterns between Age Groups in Italian Individuals with Overweight and Obesity: When BMI Becomes a Misleading Tool in Nutritional Settings**
AUTHORS	Lorenzo A., **Itani L.,** El Ghoch M., Gualtieri P., Frank G., Raffaelli G., Pellegrini M., Renzo L.
JOURNAL	**Nutrients**
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/nu16152415
THEME / SUBTHEME	Health and Wellbeing/Prevention and Health Promotion in Health Sciences
ABSTRACT	Little is known about the changes in body composition (BC) in people with overweight or obesity. The aim of this study was to assess the differences in BC patterns in this population based on gender and age. A total of 2844 Italian adults of mixed gender and a body mass index (BMI) of ≥25 kg/m^2 underwent a BC assessment by means of dual-energy X-ray absorptiometry (DXA). The sample was categorized into three age groups: 'young' (20–39 years), 'middle' (40–59 years), and 'older' (60–80 years) adults, after being matched by body weight and BMI. Males showed higher total body fat percentage (BF%) and a lower total lean mass (LM), progressively from the young to the middle to the older age groups, while females showed similar values for these total compartments between the three age groups. However, in both genders, participants in the middle and older groups were more likely to have a higher trunk fat percentage by +1.23% to +4.21%, and lower appendicular lean mass (ALM) by −0.81 kg to −2.63 kg with respect to the young group, indicating expression of major central adiposity and sarcopenia. While our findings underscore the limitations of BMI to detect these differences between age groups, the identification of new tools suitable for this aim is greatly needed in this population. Moreover, further investigation that clarifies the impact of these differences in BC patterns between gender and age groups on health outcomes is also required.

ARTICLE TITLE	**Editorial: Nutrition and Health-Related Quality of Life: Is It an Ignored Outcome?**
AUTHORS	**Itani L.,** Vassilopoulou E., Sammarco R., **El Ghoch M.**
JOURNAL	Frontiers in Nutrition
YEAR	2023
PUBLICATION INFO	30(10):1-2
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

In recent years, there has been a growing interest in Health-Related Quality of Life (HRQoL) (1), defined as an individual›s or a group›s perceived physical and mental health over time (2). HRQoL is frequently assessed alongside medical and psychological outcomes in many clinical settings and public health services, across a wide spectrum of diseases (3) and is considered an important dimension to measure during the development of new treatments (4, 5).

Since the Ancient Greek era, the impact of nutrition on health has been widely reported (6, 7), yet there remains a lack of knowledge about the link between nutrition and HRQoL (8). Our Research Topic, entitled "Nutrition and health-related quality of life: is it an ignored outcome? Volume II," aimed to attract research from diverse backgrounds focusing on both human nutrition and HRQoL. We were particularly interested in work that may clarify the link between human nutrition and HRQoL, and the nature of their interaction. We received five submissions; two were rejected and three original research papers were accepted following peer review. The submissions are international, from America and Europe.

In the first study, conducted in America, Han et al. considered grip strength as a valid indicator of HRQoL in a study with 2,127 participants of both genders aged 60 years and above (9). They evaluated the association between dietary magnesium intake and handgrip strength, and whether this association was influenced by serum vitamin D status. They found that low magnesium intake was associated with reduced handgrip strength in participants with a deficient serum concentration of 25(OH)D. They concluded that there is a need to increase magnesium intake in people with this deficiency in order to maintain suitable muscle strength and good HRQoL.

In the second study, conducted in Spain, de Lourdes Moreno et al. validated a Spanish language version of the Coeliac Disease Questionnaire (CDQ). This simple instrument is widely used to assess HRQoL in patients with coeliac disease (10) and this work will enable better assessment of HRQoL in the Spanish population

ARTICLE TITLE	**Effect of Adding Motorized Cycle Ergometer Over Exercise Training on Balance in Older Adults with Dementia: A Randomized Controlled Trial**
AUTHORS	**Abbas R., Saab I.,** Al-Sharif H., Naja N., **El-Khatib A.**
JOURNAL	Experimental Aging Research
YEAR	2023
PUBLICATION INFO	40(2): 100-111
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

Falls secondary to balance disturbances have been considered as a burden on health systems in people with dementia aged above 65. Exercise has been increasingly recommended to address such problem and the main challenges being the commitment and supervision of training. The study›s aim was to investigate the effect of adding motorized cycle ergometer (MCE) on high intensity functional exercise (HIFE) training on balance and cognition in older adults with dementia.

Methods

Sixty participants over the age of 65 were randomly allocated into 3 groups, Mo, Ex, and MoEx undergoing, respectively, 50 minutes MCE, HIFE, or combination of both. Sessions were done 3 times per week for 12 weeks. Outcome measures taken before and after study period were Berg Balance Scale (BBS), timed up and go test (TUG), and Mini Mental State Exam (MMSE).

Results

All groups showed significant improvement in BBS scores but not on TUG or MMSE scores. Between group analysis showed no privilege of any used training methods over the other for all measures taken.

Conclusions

Training with HIFE, MCE, or combination of both is effective in improving balance but not cognition. However, MCE can be an alternative to supervised exercise training in addressing balance.

ARTICLE TITLE	**Effect of Adding Thoracic Manipulation for the Management of Patients with Adhesive Capsulitis: a Randomized Clinical Trial**
AUTHORS	**El Melhat A., Abbas R., Zebdawi M.**, Ismail A.
JOURNAL	**Physiotherapy Theory and Practice**
YEAR	2024
PUBLICATION INFO	DOI: 10.1080/09593985.2024.2316897
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background
Research is supporting thoracic spine manipulation (TSM) as an intervention in treating adhesive capsulitis (AC) when coupled with physical therapy interventions.
Purpose: To investigate whether TSM improves AC outcomes when combined with physical therapy interventions.

Method
A double-blinded, randomized, controlled trial with 40 patients assigned into two groups. The experimental group (EG) received physical therapy intervention and TSM; the control group (CG) had physical therapy with sham manipulation. Both groups received interventions biweekly for 12 weeks. Outcomes included Visual Analogue Scale (VAS), Shoulder Pain and Disability Index (SPADI), scapular upward rotation, and shoulder passive range of motion conducted at baseline, after 1 session, 6 and 12 weeks.

Results
Both groups improved significantly after 6 and 12 weeks in pain, disability ($p = 0.01$ for both; $d = 1.53$ and 1.46, respectively), scapular upward rotation, shoulder flexion ($p = 0.02$ for both; $d = 2.2$ and 0.92, respectively), abduction ($p = 0.04$; $d = 0.07$), and external rotation ($p = 0.03$; $d = 0.7$). However, CG showed no significant improvement in pain or disability after one session ($p = 0.14$ and $p = 0.16$, respectively; $d = 0.46$ for both). Between groups, results favored EG significantly in pain, disability, scapular upward rotation, shoulder flexion, and abduction ($p = 0.02$, $p = 0.01$, $p = 0.02$, $p = 0.05$, and $p = 0.04$, respectively) at 6 weeks ($d = 0.81$, $d = 0.87$, $d = 0.67$, $d = 0.64$, and $d = 0.69$, respectively).

Conclusion
The results suggest that adding TSM yielded superior clinical benefits when compared to physical therapy interventions in AC patients. Nevertheless, it is imperative to acknowledge a specific limitation in our study is the omission of passive internal rotation assessment. This aspect represents a notable constraint in our research.

ARTICLE TITLE	**Effect of Adding Virtual Reality Training to Traditional Exercise Program on Pain, Mental Status and Psychological Status in Unilateral Traumatic Lower Limb Amputees: A Randomized Controlled Trial**
AUTHORS	**Abbas R.,** Cooreman D., Al Sultan H., El Nayal M., **Saab I., El Khatib A., El Kawam A., El Melhat A.**
JOURNAL	**Games For Health Journal**
YEAR	2024
PUBLICATION INFO	13(3):1-7
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences

ABSTRACT

Background
Lower limb amputation is an emotionally devastating condition that causes a complete change in the quality of life, may lead to phantom limb pain in most of the cases, and puts the individual in a high risk of developing psychological disorders. The objective of this study is to evaluate the consequence of adding virtual reality (VR) to a traditional exercise program on pain, mental status, and psychological status in traumatic unilateral lower limb amputees (LLAs). Methods: Thirty-two traumatic LLAs were randomly assigned into two equal groups in this randomized control trial. Participants did accomplish a post fitting exercise program at least 6 months before enrolment; the control group (CG) underwent a traditional rehabilitation program, and experimental group (EG) had the same program, in addition to VR training. Data were collected before and after 6 weeks of intervention using visual analog scale (VAS) for pain, Beck's depression inventory (BDI) for depression, and 12-item short form survey for mental health summary (MHS) and physical health summary (PHS). Results: Thirty-two amputees (29 males and 3 females) were included with mean age in CGs and EG (27.6– 4) and (27.6 – 7.6) years, respectively. Post intervention, the VAS score was significantly reduced only in EG ($P = 0.003$). Both groups showed significant improvement in BDI, MHS, and PHS ($P < 0.05$). However, the EG showed a superior significance in BDI and MHS scores ($P < 0.05$). There was no significance between groups in PHS score.

Conclusion
Adding VR to conventional training is beneficial in decreasing pain and in improving depression and MHS of traumatic unilateral LLAs.

ARTICLE TITLE	**Effect of Hand Dexterity Exercises on Physical Therapist Students' Self-Efficacy: A Randomized Clinical Trial**
AUTHORS	**El Melhat A.,** Abd El Wahed A., **Saab I., Abbas R., Zebdawi M.,** *Abdelhamid S.,* **El Khatib A.**
JOURNAL	Bulletin of Physical Therapy Research and Studies
YEAR	2024
PUBLICATION INFO	DOI: 10.21608/BPTRS.2024.278866.1031
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy

ABSTRACT

Background
Hand-dexterity exercises have been widely used by healthcare professionals, such as surgeons and dentists, who rely on their manual skills to improve performance and outcomes; however, there is little evidence that investigates the effects of these exercises on the subjective self-efficacy of physical therapists Purpose: To investigate the effect of hand dexterity exercises on subjectively reported self-efficacy of Physical Therapists. Bulletin of Physical Therapy Research and Studies journal homepage: https://bptrs.journals.ekb.eg/ ISSN: 2636-4190

El Melhat A. M et al., BPTRS (Vol.1-Issue 1- June 2024) 15 Methods: Fifty Senior Physical Therapy students were divided into control (CG) and experimental (EG) groups. The CG received normal clinical training plus sham hand exercises, whereas the (EG) received normal clinical training with addition of real hand dexterity exercises. The interventions were performed for four weeks. The outcomes were hand dexterity and function measured using the Simple Test for Evaluating Hand Function (STEF) and physical therapist self-efficacy measured using the Physical Therapist Self-Efficacy questionnaire (PSE). Outcomes measures were taken at baseline and following the conclusion of the 4-week timeline. Results: In the CG, no significant difference was observed in the STEF scores after the intervention period, whereas a significant difference was seen in EG favoring post-intervention scores (P=0.000). The between- group results showed a significant difference favoring the EG (P=0.000). For self-efficacy, the EG showed a significant difference in 11 questions post-intervention (P=0.001-0.049). The between -group results showed a significant difference favoring EG in 4 questions (P=0.002-0.039).

Conclusion
Hand dexterity exercises were seen to increase self-efficacy and confidence levels in the musculoskeletal domain when compared to sham hand dexterity exercises in undergraduate physical therapists.

ARTICLE TITLE	**Effect of Psychosocial Aspects on Medication Adherence in Patients with Heart Failure Amid Socioeconomic Challenges**
AUTHORS	**Deek H.,** *Massouh A.*
JOURNAL	Nursing Open
YEAR	2023
PUBLICATION INFO	11(1):1-10
THEME / SUBTHEME	Health and Wellbeing/ Cardiology and Cardiac Patients

ABSTRACT

Objective
To evaluate stress, depression and quality of life among community-dwelling patients with heart failure (HF) and evaluate their effect on perceived medication adherence in a socioeconomically challenged setting. Design A cross-sectional design with self-administered questionnaire with data collected between October 2021 and September 2022.

Methods
Patients with confirmed diagnosis of HF were sought for data collection in the community and cardiology clinics through an electronic platform. Confirmation of cases was done through the ejection fraction, medication list and frequent symptoms of the patients. The Patient Health Questionnaire-9, the COVID-19 Stress Scale, the Minnesota Living with HF Questionnaire and the Lebanese Medication Adherence Scale were used to evaluate depression, stress, quality of life and medication adherence, respectively. Univariate analysis was done to present the descriptive statistics, whereas bivariate and multivariate analyses were done to evaluate the relationship between the variables.

Results
A total of 237 participants were included in the final analysis. The mean age was 61.3±17.36 years, and the majority (57.8%) were male participants. Only 44.7% were on ACE inhibitors/angiotensin receptor blockers and 54.9% on beta-blockers. The mean scores for stress, depression, quality of life and medication adherence were 75.86 (SD=24.5), 14.03 (SD=5.7), 55.73 (SD=23.05) and 6.79 (SD=6.93), respectively, indicating high stress levels, depression, poor quality of life and medication adherence. Those with a history of hypertension and depression were significantly more adherent to their medications than those who were not. Multivariate analysis showed that anxiety, medical follow-up, quality of life and functionality class were predictors of medication adherence.

Conclusion
The study showed the population with HF in Lebanon to have psychological health problems with these variables acting as predictors for medication adherence. Sociodemographic characteristics also played a role on the outcome, which can be targeted when planning interventions to improve outcomes. Future studies should compare prescribed medication with consumed medication through longitudinal approaches and medical refilling techniques when possible.

ARTICLE TITLE	**Evaluation of Synergistic/Antagonistic Antibacterial Activities of Fatty Oils from Apricot, Date, Grape, and Black Seeds**
AUTHORS	Joujou F., **El Darra N.,** Rajha H., **Sokhn E.,** Alwan N.
JOURNAL	**Scientific Report**
YEAR	2024
PUBLICATION INFO	14(6532):1-14
THEME / SUBTHEME	Health and Wellbeing/ Food Technology & Processing
ABSTRACT	The increasing antimicrobial resistance requires continuous investigation of new antimicrobial agents preferably derived from natural sources. New powerful antibacterial agents can be produced by simply combining oils that are known for their antibacterial activities. In this study, apricot seed oil (ASO), date seed oil (DSO), grape seed oil (GSO), and black seed oil (BSO) alone and in binary mixtures were assessed. Fatty acid profiles of individual oils and oil mixtures showed linoleic acid, oleic acid, palmitic acid, stearic acid, and linolenic acid contents. Linoleic acid was the most abundant fatty acid in all samples except for ASO, where oleic acid was the dominant one. GSO showed the highest total phenolic content while ASO showed the lowest one. Antibacterial screening was performed against Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Proteus mirabilis, and Staphylococcus aureus. Results showed antibacterial activity in all oils against tested strains except for ASO against S. aureus. Highest antibacterial activity recorded was for ASO against P. mirabilis. ASO-GSO mixture (AG) was the best mixture where it showed synergistic interactions against all strains except P. aeruginosa. In conclusion, seed oil mixtures are likely to show promising antibacterial activities against specific strains.

ARTICLE TITLE	**Erectile Dysfunction in Obese Men with Subjective Tinnitus: A Sedentary Lifestyle as The Link Between the Two Problems That Can Be Solved with Exercise Training**
AUTHORS	Ismail A., **El Melhat A.**
JOURNAL	**Health Problems of Civilization**
YEAR	2024
PUBLICATION INFO	DOI: 10.5114/hpc.2024.139096
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Obese people are more likely to experience subjective tinnitus, which is the only audible perception of sound that patients describe in the absence of any disease. Males with tinnitus have worse scores on many sexual function measures than males in good health. A new study published in 2021 reported that erectile dysfunction (ED) and tinnitus are connected. Men with tinnitus and ED experience disruptions in penile and cochlear functions due to a sedentary lifestyle and cardiovascular and psychological issues that accompany it. Treating tinnitus and ED together could be accomplished through an active lifestyle or consistent exercise. Physical exercise sessions not only improve tinnitus severity but also enhance distraction from concentration of hearing continuous ear ringing, hence quality of life improves.

ARTICLE TITLE	**Evaluation of the Phenolic Composition and Biological Activities of Six Aqueous Date (Phoenix dactylifera L.) Seed Extracts Originating from Different Countries: A Comparative Analysis** ***(Joint Publication with Faculty of Medicine)***
AUTHORS	*Swaidan A.,* **Azakir B.,** Neugart S., Kattour N., **Sokhn E., Osaili M., El Darra N.**
JOURNAL	**Foods**
YEAR	2023
PUBLICATION INFO	13(126):1-10
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Date seeds, which are the main by-products of date fruit consumption, were shown to possess promising biological activities and health benefits with minimal human use. The present investigation analyzed and compared the phenolic content of six date seed varieties from four different origins (Khudari, Sakai, and Safawi from Saudi Arabia, Majdool from Jordan, Zahdi from Iraq, and Kabkab from Iran). The aqueous extracts were examined for possible antioxidant, antibacterial, and anti-tumor potential. Date seed oil was extracted, and fatty acid profiles were compared. The results revealed that date seeds are a rich source of polyphenols, which have been linked to biological activities. Furthermore, the phenolic content seemed highly dependent on the variety, where Kabkab had the highest TPC value (271.2 mg GAE/g DM) while Majdool had the lowest value (63.2 mg GAE/g DM). Antioxidant activities of all varieties were highly correlated with the total phenolic content. The antibacterial investigation demonstrated that the Sakai variety possessed the dominant activity, whereas Majdool showed no activity. The results further indicated the sensitivity of both Staphylococcus aureus and Bacillus cereus, with a stronger effect against B. cereus, while no effect was observed against Gram-negative strains (Salmonella Typhi and Escherichia coli). All varieties were able to decrease colon and lung cancer cell viability, especially Khudari and Sakai, with stronger effects against colon cancer cells. Analysis of date seed oil showed high oleic acid content, especially in Sakai. The findings suggest that date seeds are promising candidates for future pharmaceutical applications as nutraceuticals to help combat certain illnesses, as well as functional foods and natural additives that boost the nutritional value of food products, increase their shelf lives, and improve the overall health of consumers.

ARTICLE TITLE	**Extended Spectrum Beta-Lactamase Carriage Among Elderly Residents of a Long-Term Care Facility in Beirut**
AUTHORS	**Moghnieh W., Fadlallah M., Saleh F., El-Hariri S., Sokhn E.**
JOURNAL	American Journal of Infection Control
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.ajic.2023.11.013 0196-6553
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Background** Antimicrobial resistance is an emerging problem worldwide, endangering antimicrobials efficacy and resulting in high rates of morbidity and mortality. It is one of the major concerns that health care facilities are facing nowadays. Mainly, extended-spectrum beta-lactamases (ESBL)-producing Enterobacterales play a role in hydrolyzing β-lactams, specifically the third-generation cephalosporin.

ABSTRACT

This study aimed to investigate the prevalence of fecal carriage and molecular characterization of ESBL-producing Enterobacterales among Lebanese elderly residents in a long-term care facility (Dar Al-Ajaza Al Islamia Hospital). Methods: Rectal culture swab specimens were collected from 132 patients at Dar Al Ajaza Al Islamia hospital between January 2019 till June 2020. The phenotype of ESBL producers was confirmed by a modified double disc synergy test and antibiotic susceptibility was determined using the Kirby-Bauer disk diffusion method. Genotypically, multiplex polymerase chain reaction was used to detect the ESBL genes. Results: The main Enterobacterales strain observed was E coli (90.15%) followed by Klebsiella pneumoniae (4.54%) and Klebsiella oxytoca (3.80%). It has been found that the ESBL percentage rate has decreased when compared to a study conducted previously at the same hospital. Moreover, the predominant ESBL gene was CTX-M (cefotaximase).

Conclusions
This study is the first to demonstrate the improved current status of ESBL in one long-term care facility. In addition, the CTX-M is still the major type in ESBL-producing organisms.

ARTICLE TITLE	**Genotype-Phenotype Associations in CRB1 Bi-Allelic Patients: A Novel Mutation, A Systematic Review and Meta-Analysis**
AUTHORS	Daher A., Banjak M., Noureldine J., Nehme J., **El Shamieh S.**
JOURNAL	BMC Ophthalmology
YEAR	2024
PUBLICATION INFO	DOI: 10.1186/s12886-024-03419-4
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy
ABSTRACT	**Purpose** The goal of the study was to search for novel bi-allelic CRB1 mutations, and then to analyze the CRB1 literature at the genotypic and phenotypic levels. **Approach** We screened various variables such as the CRB1 mutation types, domains, exons, and genotypes and their relation with specific ocular phenotypes. An emphasis was given to the bi-allelic missense and nonsense mutations because of their high prevalence compared to other mutation types. Finally, we quantified the effect of various non-modifiable factors over the best-corrected visual acuity oculus uterque (BCVA OU) using multivariate linear regression models and identified genetic interactions.

ARTICLE TITLE	**Gram-Negative Bacterial Colonization in the Gut: Isolation, Characterization, And Identification of Resistance Mechanisms**
AUTHORS	*Khachab Y.,* **El Shamieh S., Sokhn E.**
JOURNAL	**Journal of Infection and Public Health**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.jiph.2024.102535
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy

ABSTRACT

Results
A novel bi-allelic missense in the exon 9 of CRB1; c.2936G > A; p.(Gly979Asp) was found to be associated with rod-cone dystrophy (RCD). CRB1 mutation type, exons, domains, and genotype distribution varied significantly according to fundus characteristics, such as peripheral pigmentation and condition, optic disc, vessels, macular condition, and pigmentation ($P < 0.05$). Of the 154 articles retrieved from PubMed, 96 studies with 439 bi-allelic CRB1 patients were included. Missense mutations were significantly associated with an absence of macular pigments, pale optic disc, and periphery pigmentation, resulting in a higher risk of RCD ($P < 0.05$). In contrast, homozygous nonsense mutations were associated with macular pigments, periphery pigments, and a high risk of LCA ($P < 0.05$) and increased BCVA OU levels. We found that age, mutation types, and inherited retinal diseases were critical determinants of BCVA OU as they significantly increased it by 33% 26%, and 38%, respectively ($P < 0.05$). Loss of function alleles additively increased the risk of LCA, with nonsense having a more profound effect than indels. Finally, our analysis showed that p.(Cys948Tyr) and p.(Lys801Ter) and p.(Lys801Ter); p.(Cys896Ter) might interact to modify BCVA OU levels.

Conclusion
This meta-analysis updated the literature and identified genotype-phenotype associations in bi-allelic CRB1 patients.

ARTICLE TITLE	**Identifying the Panorama of Potential Pandemic Pathogens and their Key Characteristics: A Systematic Scoping Review**
AUTHORS	Khachab Y., Saab A., El Morr C., El-Lahib Y., **Sokhn E.**
JOURNAL	**Critical Reviews in Microbiology**
YEAR	2024
PUBLICATION INFO	DOI: 10.1080/1040841X.2024.2360407.
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy

ABSTRACT

Methods
Samples were collected from all patients who had a stool culture at a tertiary care center in Lebanon. Each type of bacteria that was identified from the stool samples was subjected to critical evaluations, and all discovered strains underwent antimicrobial susceptibility testing. Polymerase chain reaction was used to profile the genes for Carbapenem-resistant Enterobacteriaceae (CRE), Extended-spectrum beta-lactamase (ESBL), and that of Pseudomonas aeruginosa strains. Results: Escherichia coli, Klebsiella species, and Pseudomonas aeruginosa turned out to be the predominant microbiota members. Escherichia coli strains had a high frequency of extended-spectrum beta-lactamase genes, with the most discovered gene being bla CTX-M. Additionally, a considerable percentage of isolates had carbapenemase-resistant Enterobacteriaceae genes, suggesting the rise of multidrug-resistant strains. Multidrug resistance genes, such as bla mexR, bla mexB, and bla mexA, were found in strains of Pseudomonas aeruginosa, highlighting the possible difficulties in treating infections brought on by these bacteria.

Conclusion
The findings highlight the critical importance of effective surveillance and response measures to maintain the effectiveness of antibiotics considering the introduction of multidrug resistance genes in Pseudomonas aeruginosa and ESBL and CRE genes in Escherichia coli.

ABSTRACT

This literature review provides insights for policymakers, healthcare professionals, and researchers in their quest to identify potential pandemic pathogens, and in their efforts to enhance pandemic preparedness through building early warning systems for continuous epidemiological monitoring.

ARTICLE TITLE	**Is there a Subgroup of Females with Patellofemoral Pain Syndrome Likely to Benefit from Proximal Control Exercises?**
AUTHORS	Shalash A., Chabara R., Azzam H., Mohamed A., **ElMelhat A.**
JOURNAL	**Physiotherapy Quarterly**
YEAR	2024
PUBLICATION INFO	DOI: 10.5114/pq.2024.135421
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Patellofemoral pain syndrome (PFPS) is one of the most popular complaints among young females. Proximal hip control exercises can improve hip strength and reduce the stresses and pain. However, there is a lack of studies that investigate predictors of the success of proximal hip control exercises in this disorder. This predictive validity diagnostic trial aimed to investigate the effect of body mass index, age, duration of symptoms, and knee angle valgus on proximal control exercise success to improve hip muscle abductors and external rotator isometric strength.

Methods
Fifty females with PFPS recruited from Ain shams University Hospital with a mean age of 25 years received proximal control exercises (transversus abdominis and multifidus activation, hip extensor, abductor and external rotator strengthening).
Participants were assessed for hip strength using a handheld dynamometer, and dynamic knee valgus via video analysis using the Kinovea v.0.8.15 computer program.

Results
Age was found to be a predictor of success in hip abductor strength, and duration of symptoms a predictor of success in hip external rotator strength with proximal control exercises in patellofemoral pain syndrome female individuals, with no specific
cut-off points.

Conclusions
Proximal control exercises can improve hip strength in females with PFPS with no specific cut-off points for thesignificant predictors found (age and duration of symptoms).

ARTICLE TITLE	**Knowledge and Prevalence of Urinary Tract Infection Among Pregnant Women in Lebanon**
AUTHORS	Abu Aleinein I., **Sokhn E.**
JOURNAL	**Heliyon**
YEAR	2024
PUBLICATION INFO	DOI: 10.1016/j.heliyon.2024.e37277
THEME / SUBTHEME	Health and Wellbeing/Medical Education

ABSTRACT

Urinary tract infections (UTIs) rank among the most prevalent medical complications during pregnancy, affecting a significant number of women of reproductive age. We aimed to determine the prevalence of urinary tract infections among pregnant women and assess their knowledge of developing UTIs in Lebanon. A cross-sectional descriptive study was conducted among 215 pregnant women in Lebanon recruited via convenience sampling from various gynecologists and midwives between March 2023 and May 2023. A structured questionnaire was utilized to evaluate UTI prevalence and participants› knowledge levels. Data analysis was performed using SPSS Statistics version 27. A significance level of $P < 0.05$ was considered statistically significant for all analyses. This analysis revealed a UTI prevalence of 42.79% (95% CI: 38.21%–47.37%), The mean age of participants was 28.57 years. Knowledge assessment revealed that 66.51% (143/215) had average knowledge about UTIs, 20.47% (44/215) demonstrated good knowledge, and 12.79% (28/215) showed poor knowledge. Significant correlations were found between UTI prevalence and socioeconomic factors ($P = 0.03$), indicating higher incidence among women from lower economic backgrounds. Abnormal vaginal discharge was strongly associated with UTI prevalence ($P < 0.001$), suggesting it as a prominent symptom or risk factor. Additionally, a history of abortion correlated significantly with increased UTI incidence ($P = 0.02$), highlighting its relevance in pregnancy-related UTI risk. The study underscores the need for education programs tailored to raise awareness about UTI risks during pregnancy and promote preventive measures. Implementing these programs could significantly enhance maternal health outcomes in Lebanon.

ARTICLE TITLE	**Non-Surgical Approaches to the Management of Lumbar Disc Herniation Associated with Radiculopathy: A Narrative Review**
AUTHORS	**El Melhat A.,** Youssef A., Zebdawi M., *Hafez M., Khalil, L., Harrison D.*
JOURNAL	Journal of Clinical Medicine
YEAR	2024
PUBLICATION INFO	13(4): 974-992
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Lumbar disc herniation associated with radiculopathy (LDHR) is among the most frequent causes of spine-related disorders. This condition is triggered by irritation of the nerve root caused by a herniated disc. Many non-surgical and surgical approaches are available for managing this prevalent disorder. Non-surgical treatment approaches are considered the preferred initial management methods as they are proven to be efficient in reducing both pain and disability in the absence of any red flags. The methodology employed in this review involves an extensive exploration of recent clinical research, focusing on various non-surgical approaches for LDHR. By exploring the effectiveness and patient-related outcomes of various conservative approaches, including physical therapy modalities and alternative therapies, therapists gain valuable insights that can inform clinical decision-making, ultimately contributing to enhanced patient care and improved outcomes in the treatment of LDHR. The objective of this article is to introduce advanced and new treatment techniques, supplementing existing knowledge on various conservative treatments. It provides a comprehensive overview of the current therapeutic landscape, thereby suggesting pathways for future research to fill the gaps in knowledge. Specific to our detailed review, we identified the following interventions to yield moderate evidence (Level B) of effectiveness for the conservative treatment of LDHR: patient education and self-management, McKenzie method, mobilization and manipulation, exercise therapy, traction (short-term outcomes), neural mobilization, and epidural injections. Two interventions were identified to have weak evidence of effectiveness (Level C): traction for long-term outcomes and dry needling. Three interventions were identified to have conflicting or no evidence (Level D) of effectiveness: electro-diagnostic-based management, laser and ultrasound, and electrotherapy.

ARTICLE TITLE	**Optimization of Aqueous Extraction of Polyphenols from Cuminum cyminum Seeds Using Response Surface Methodology and Assessment of Biological Activity *(Joint Publication with Faculty of Medicine)***
AUTHORS	**El Tannir H., Houhou D.,** Debs E., Koubaa M., Jammoul, A., **Azakir B., Khalil M., El Darra N.,** Louka N.
JOURNAL	Biotech
YEAR	2024
PUBLICATION INFO	DOI: 10.3390/biotech13010007
THEME / SUBTHEME	Health and Wellbeing/ Food Technology & Processing
ABSTRACT	**Background** Cumin seeds, extracted from the plant Cuminum cyminum, are abundant in phenolic compounds and have been extensively researched for their chemical makeup and biological effects. The objective of this research is to enhance the water extraction of polyphenols through the water bath (WB) technique and to evaluate the antiradical, antibacterial, and anticancer effects of the extract. **Methods** Response Surface Methodology was used to find the best parameters to extract polyphenols. Three experimental parameters, time, temperature, and solid-liquid ratio, were tested. The disc diffusion method has been used to determine the antimicrobial activities against Salmonella Typhimurium, Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus, and Candida albicans. The antiradical activity was performed using the DPPH method, while total phenolic content was performed using Folin-Ciocalteu. High-Performance Liquid Chromatography (HPLC) was conducted to analyze the phytochemical profile of WB extracts. The anticancer activity of the lyophilized extract was assessed against three cancer cell lines (colon (HT29), lung (A549), and breast (MCF7) cancer cell lines). **Results** The optimal conditions for water extraction were 130 min at 72 °C. The total phenolic compounds yield (14.7 mg GAE/g DM) and antioxidant activity (0.52 mg trolox eq./mL) were obtained using a 1:40 solid-liquid ratio. The primary polyphenols identified were the flavonoids rutin (0.1 ppm) and ellagic acid (3.78 ppm). The extract had no antibacterial or antifungal activities against the microorganisms tested. The extract showed anticancer activity of about 98% against MCF7 (breast cancer cell line), about 81% against HT29 (colon cancer cell line), and 85% against A549 (lung cancer cell line) at high doses. **Conclusions** Extraction time and a high solid-liquid ratio had a positive impact on polyphenol recovery and in maintaining their quantity and quality. Furthermore, the optimal aqueous extract exhibited strong antiradical activity reflected by the inhibition of free radicals in addition to a significant specificity against the tested cancer cell lines.

ARTICLE TITLE	**Perceptions of Bedside Nurses Caring for Patients with Left Ventricular Assist Devices (LVAD): A Qualitative Study**
AUTHORS	***El Zein S.,* Fawaz M.,** Al-Shloul M., Rayan A., ALBashtawy S., Abu Khader I., Jallad M., Al-Kharabsheh M., ALBashtawy, S., Alshloul D.
JOURNAL	SAGE Open Nursing
YEAR	2024
PUBLICATION INFO	DOI: 10.1177/2377960824125224
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Introduction
Bedside nurses in the intensive care units are exposed to multiple challenges in their regular practice and recently have taken in ventricular assist device care in Lebanon since its introduction as a fairly new practice.

Objectives
To explore the experiences of nursing staff who work in Lebanese hospitals with Left Ventricular Assist Devices (LVAD).

Methods
This study employed a qualitative phenomenological research design, where semi-structured interviews were carried out among fifteen LVAD nurses in an acute care hospital.

Results
The qualitative data analysis produced six main themes. The first theme prevalent was "LVAD incompetence and shortage" and it reflected the deficit in properly structured training and the number of specialized LVAD nurses. The second theme that resulted from the analysis was titled, "Patient and family knowledge", which indicated the misconceptions that families and patients usually hold about LVAD which usually sugarcoats the situation. This was followed by "Burden of complications", "LVAD patient selection", "Perception of the LVAD team as invulnerable", and "High workload and patient frailty" which reflected the perspectives of LVAD nurses.

Conclusion
This study shows that the Lebanese LVAD nurses who participated in this study perceived inadequate competence, yet lacked proper training and induction. The nurses reported multiple challenges relating to care tasks, workload, and patient and family interactions which need to be addressed by coordinators.

ARTICLE TITLE	**Perceptions of Frontline Ground Zero Nurses in Lebanon Regarding Psychological Needs and Coping Mechanisms during the Most Recent COVID-19 Outbreak**
AUTHORS	**Fawaz M., El Tassi A., Itani M.**
JOURNAL	Journal of Psychiatric Nursing
YEAR	2024
PUBLICATION INFO	14(3): 210-216
THEME / SUBTHEME	Health and Wellbeing/Prevention and Health Promotion in Health Sciences

ABSTRACT

Introduction
Lebanese frontline nurses were not only fighting off a pandemic for the past year but also facing escalating political, social, economic, and humanitarian turmoil that have accentuated the pressures exerted upon them. However, their needs for psychological support and coping mechanisms have been uncharted in light of the documented stress frontline nurses have been living for the past year. This paper aimed at exploring the perceptions of frontline ground zero nurses in Lebanon regarding their psychological needs and coping mechanisms during the most recent COVID-19 outbreak.

Methods
This study was conducted in 2 main ground-zero hospitals in Beirut. This research paper has adopted a qualitative exploratory research design through employing the phenomenological approach, where online interviews were carried out among 15 frontline ground zero nurses in the 2nd week of January 2020.

Results
The results of this study showed that the nurses perceived a need for significant psychological support led by their hospital, while they had to employ various coping mechanisms. The qualitative analysis of the verbatim conveyed by participating nurses have resulted in the emergence of five themes; "Need for actual support," "Need for formal psychological counseling," "Praying and being spiritual," "Avoiding the news," and "Self-reminders."

Discussion And Conclusion
This study demonstrated that sufficient action has not been taken to enhance the mental health of these frontline nurses, where they shared their perspective of inadequate support mechanisms and the necessity for technical, systemic, and structured mental health support.

ARTICLE TITLE	**Personalized Nutritional Strategies to Reduce Knee Osteoarthritis Severity and Ameliorate Sarcopenic Obesity Indices: A Practical Guide in an Orthopedic Setting**
AUTHORS	Zmerly H., **El Ghoch M., Itani L., Kreidieh D.,** Yumuk V., Pellegrini M.
JOURNAL	**Nutrients**
YEAR	2023
PUBLICATION INFO	15(4): 2-17
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy
ABSTRACT	Knee osteoarthritis (KOA) is one of the most common joint diseases, especially in individuals with obesity. Another condition within this population, and which presents frequently, is sarcopenic obesity (SO), defined as an increase in body fat and a decrease in muscle mass and strength. The current paper aims to describe recent nutritional strategies which can generally improve KOA clinical severity and, at the same time, ameliorate SO indices. Searches were carried out in the PubMed and Science Direct databases and data were summarized using a narrative approach. Certain key findings have been revealed. Firstly, the screening and identification of SO in patients with KOA is important, and to this end, simple physical performance tests and anthropometric measures are available in the literature. Secondly, adherence to a Mediterranean diet and the achievement of significant body weight loss by means of low-calorie diets (LCDs) remain the cornerstone nutritional treatment in this population. Thirdly, supplementation with certain micronutrients such as vitamin D, essential and non-essential amino acids, as well as whey protein, also appear to be beneficial. In conclusion, in the current review, we presented a detailed flowchart of three different nutritional tracks that can be adopted to improve both KOA and SO based on joint disease clinical severity.

ARTICLE TITLE	**Personalized Physical Activity Programs for the Management of Knee Osteoarthritis in Individuals with Obesity: A Patient-Centered Approach**
AUTHORS	Zmerly H., Milanese C., El Ghoch M., **Itani L., Tannir H., Kreidieh D.,** Yumuk V., Pellegrini M.
JOURNAL	**Scientific Reports**
YEAR	2023
PUBLICATION INFO	14(6532): 1-14
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences
ABSTRACT	Physical activity (PA) plays a vital role in knee osteoarthritis (KOA) management. However, engaging individuals with KOA in regular exercise is challenging, especially when they are affected by obesity. The aim of the current review is to elucidate how to increase adherence to exercise in this population. When implementing a PA program with patients with KOA and obesity, a specific multi-step approach can be adopted. In phase I (the baseline assessment), the patients' eligibility for exercise is ascertained and a physical fitness assessment, sarcopenic obesity screening and quantification of the pain experienced are undertaken. Phase II adopts a patient-centered approach in implementing a PA program that combines an active lifestyle (>6000 steps/day) with land- or water-based exercise programs performed over eight to twelve weeks, with a frequency of three to five sessions per week, each lasting 60 min. In phase III, several strategies can be used to increase the patients' adherence to higher levels of PA, including the following: (i) personalizing PA goal-setting and real-time monitoring; (ii) enhancing physical fitness and the management of sarcopenic obesity; (iii) building a sustainable environment and a supportive social network for an active lifestyle; and (iv) reducing pain, which can ameliorate the clinical severity of KOA and help with weight management in this population.

ARTICLE TITLE	**Prevalence of Type 2 Diabetes (T2D) in Lebanon: Association with Inflammatory and Infectious Clinical Markers**
AUTHORS	**Chedid P., Sokhn E.**
JOURNAL	BMC Public Health
YEAR	2024
PUBLICATION INFO	23(2523): 1-9
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background
Diabetes is a growing health concern in the Middle East, particularly in countries with high rates of obesity and unhealthy lifestyles. Therefore, this study aimed to determine the prevalence of type 2 diabetes (T2D) in Lebanon and its association with clinical markers of inflammation and infection.

Methods
This cross-sectional study examined retrospectively the medical laboratory record of 4093 patients from all Lebanese regions.
Prevalence of T2D and its association with age, gender, calcium, vitamin D (VitD), neutrophils-to-lymphocytes ratio (NLR), and C-reactive protein (CRP) were determined. The prevalence of infection in a subpopulation of 712 patients tested from blood, body fluid, sputum, swab, tissue, and urine samples and its etiology was also assessed.

Results
Overall, 17% (n = 690) of our participants had T2D, and the mean HbA1c was 5.9% ± 1.2. Age, gender, triglycerides, NLR, and calcemia were significantly associated with T2D. The prevalence of infections in a subgroup of 712 patients was 11.1% (n = 79). Urinary tract infections (UTIs) caused by Escherichia coli (E. coli) were the most common cause of infection, with the highest prevalence in the pre-diabetic group. Serum CRP level was significantly higher in the diabetic group than the pre-diabetic and control groups. Diabetic patients also presented a significantly higher percentage of NLR > 3 compared to the pre-diabetic and control groups.

Conclusion
The prevalence of T2D is increasing in the Lebanese population compared to prior reports. These results should be considered to guide effective public health preventive strategies.

ARTICLE TITLE	**Psychometric Evaluation of the Arabic version of the Heart Failure Specific Health Literacy Scale in a Socio-Politically Challenged Setting**
AUTHORS	**Deek H.,** Türkoğlu N., Massouh A., Kavuran E.
JOURNAL	Journal of Advanced Nursing
YEAR	2024
PUBLICATION INFO	DOI: 10.1111/jan.16386
THEME / SUBTHEME	Health and Wellbeing/Prevention and Health Promotion in Health Sciences

ABSTRACT

Introduction
Low levels of formal education among Lebanese people with HF were reported. Additionally, limited discharge education is provided to this population. Therefore, it was necessary to evaluate the health literacy levels among this population following the translation of the heart failure-specific health literacy scale into Arabic and to evaluate its psychometric properties in the Lebanese setting.

Methods
A cross-sectional design conducted on participants from the community with confirmed cases of heart failure. A research team was trained for data collection. Following securing participants› consents, baseline sociodemographic characteristics and the Arabic version of the heart failure-specific health literacy scale were administered. Data collection took place between June and December 2022. A pilot sample analysis was done to confirm homogeneity between the English and the Arabic versions. Exploratory and confirmatory factor analysis were performed to evaluate content and construct validity of the scale. Cronbach alpha was done to evaluate reliability.

Results
The pilot analysis confirmed homogeneity of the items of the Arabic and English versions of the scale. The final sample of 343 participants was randomly divided to two parts for each of the exploratory factor analysis and confirmatory factor analysis. The mean age was 64 years with the majority being male participants. In terms of exploratory factor analysis, the three subscales of the literacy scale explained 60% of the variance. The best acceptable fit was found on 11 items of the scale after dropping the 10th item from the analysis. The Cronbach alpha of the scale was 0.68.

Conclusion
The Arabic version of the heart failure-specific health literacy scale was evaluated to be a valid and reliable tool. Further analysis should be done on the dropped item, and correlations should be done with significant variables such as self-care.
Reporting method: STROBE checklist.
Patient/public contribution: No patient/public contribution.

ABSTRACT

Contribution to the wider global community: Participants with heart failure were shown to have low levels of literacy in Lebanon. Additionally, low literacy levels are also common among Lebanese older adults living in high income, Western Countries. Therefore, this valid and reliable scale can be used to evaluate health literacy among people with heart failure in Lebanon and among Lebanese and other Arabic-speaking older adults globally.

ARTICLE TITLE	**Psychometric Properties of an Arabic Translation of the 10-Item Connor-Davidson Resilience Scale (Cd-Risc-10), the 8- and 10-Item Post-Traumatic Growth Inventory-Short Form (Ptgi-Sf) Scales**
AUTHORS	Fekih-Romdhane F., **Fawaz M.,** Hallit R., Sawma T., Obeid S., Hallit S.
JOURNAL	**PLoS One**
YEAR	2024
PUBLICATION INFO	19(1): 1-16
THEME / SUBTHEME	Health and Wellbeing/Psychology in Health Sciences

ABSTRACT

Background
Given their clinical significance and impact on stress response and their potential malleability, resilience and posttraumatic growth (PTG) should receive greater attention as relevant constructs in clinical and research practice in the Arab context. We aimed through the present study to test the psychometric properties of Arabic translations of the 10-item Connor-Davidson Resilience scale (CD-RISC-10), the 10-item and the 8-item Post-Traumatic Growth Inventory-Short Form (PTGI-SF) in a sample of Lebanese adults from the general population.

Methods
Three hundred eighty-seven Arabic-speaking participants (mean age = 26.17; 58.4% females) responded to a self-report web-based questionnaire. The forward and backward translation method was applied with the approval of the original developers of the scales.
Results: Confirmatory factor analysis indicated that fit of the one-factor model was acceptable, and all indices suggested that configural, metric, and scalar invariance was supported across gender for all the three scales. The CD-RISC-10, the 10-item and the 8-item PTGI-SF yielded a good internal consistency, with a McDonaldʂs ω of .89, .95, and .93, respectively. Higher resilience and higher PTG were significantly and positively associated with greater cognitive reappraisal and lower emotion suppression, supporting convergent validity.

ABSTRACT

Conclusion
We preliminarily suggest that these Arabic instruments are appropriate for use in Lebanese community adults to assess different positive responses after life crises, identify people with lack or low levels of resilience and growth who might need intervention, and monitor their response to therapy. Further cross-cultural validations should seek to extend their use in broader Arabic-speaking populations and settings.

ARTICLE TITLE	**Quality and Safety of Cheese Shipped to the United Arab Emirates**
AUTHORS	Osaili T., Bani Odeh W., Mohd A., Shahdad K., Bin Meskin, F., Garimella V., Bahir S., Obaid S., Holley R., **El Darra N.**
JOURNAL	**Food Production, Processing and Nutrition**
YEAR	2024
PUBLICATION INFO	6(54): 1-12
THEME / SUBTHEME	Health and Wellbeing/Illness and Therapy

ABSTRACT

During an examination of 3299 cheeses imported into the United Arab Emirates (UAE) from 2017 to 2021 for compliance with regulations regarding moisture and fat content, microbial quality, acidity, the presence of quinoline (a non-permitted colorant), sorbic acid, and the presence of rust discoloration, it was found that 91% of cheeses were compliant with UAE legislation. However, 9% were in violation of one or more of the mandated quality parameters, suggesting that adulteration had occurred. Within product categories the greatest level of non-conformity at 13% was noted for processed cheese, primarily due to violations caused by high moisture and low-fat content. This is important because moisture levels in processed cheese can influence its texture and shelf life. The microbial assessment of cheese showed that 85.7% of semi-hard and 77.5% of soft cheeses had non-compliant levels of E. coli. It was notable that 21.8% of non-compliant products originated from Turkey. Cheeses from Germany had the lowest level of non-conformity at 0.6%. This study illustrates the need for border scrutiny to include physicochemical examinations of cheese samples. The current initiative aims to promote the need for equity in global trade and to prevent the marketing of adulterated food items.

ARTICLE TITLE	**Rationalizing the Influence of Co-Design on Distress, Clinical Decision-Making and Disease Self-Management of Cancer Patients-as-Partners: A Quasi-Experimental Study**
AUTHORS	Alrayshouni Z., Dayekh A., **El-Tassi A.,** Pakai A.
JOURNAL	**Health Expectations**
YEAR	2024
PUBLICATION INFO	DOI: 10.1111/hex.14113
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences

ABSTRACT

Introduction
Cancer is regarded as a major worldwide burden. Patient distress has been linked to disease progression. Studies show that engagement strategies affect clinical decision-making and patient outcomes. The optimal engagement method is a partnership that integrates the patient's expertise into the comprehensive co-design of the healthcare system.

Objectives
This is the first study to investigate cancer patient-as-partner experience and its impact on distress levels, decision-making and self-management.
Methods: It is a quantitative and quasi-experimental study that adopted a partnership committee at a Lebanese hospital. A stratified random sampling approach was used, and data were collected by self-administered questionnaires. We utilized the standardized distress thermometer and PPEET.

Results
We recruited 100 patient partners. Cancer patients-as-partners had optimal engagement experience in QI projects (mean = 4; SD = 0.4). The main partnership benefit was improved hospitalization experience (49%). Almost half of PP reported no challenges faced (49%). Recommendations for improvement were training (19%), team dynamics management (12%) and proper time allocation (7%). The distress level post-partnership was significantly reduced ($t = 12.57$, $p < 0.0001$). This study highlights the importance of partnership and its ability to influence shared decision-making preference [$\chi 2(2) = 13.81$, $p = 0.025$] and self-management practices [$F(3, 11.87) = 7.294$, $p = 0.005$]

Conclusion
Research findings suggest that partners from disadvantaged groups can have optimal partnership experience. A partnership model of care can shape the healthcare system into a people-oriented culture. Further research is needed to explore diverse PP engagement methodologies and their effect on organizational development.
Patient or public contribution: Patients and family members were engaged in the co-design of the study methodology, especially the modification of a research instrument. Patient partners with lived experience were involved in the patient partnership committee as core members to improve healthcare system design and evaluation.

ARTICLE TITLE	**Recent Data Characterizing the Prevalence and Resistance Patterns of FimH-producing Uropathogenic Escherichia coli Isolated from Patients with Urinary Tract Infections in North Lebanon**
AUTHORS	*Moubayed S., Ghazzawi J.,* **Mitri R., Khalife S.**
JOURNAL	**Archives of Clinical Infectious Diseases**
YEAR	2023
PUBLICATION INFO	18(4):1-10
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background
The adhesin gene (FimH) of uropathogenic Escherichia coli (UPEC) plays a critical role in mediating the first contact of UPEC bacterial strains with uroepithelial cells, leading to colonization and invasion of host cells. Objectives: This study aimed to determine the prevalence of FimH in UPEC strains isolated from patients with urinary tract infections (UTIs) in North Lebanon and characterize the resistance profile of UPEC isolates

Methods
A total of 881 urine samples were collected from UTI-symptomatic patients admitted to different hospitals and laboratories in North Lebanon. Seventy UPEC isolates were identified and transferred to the Biomedical Laboratory of Beirut Arab University (BAU) for further analysis. All UPEC isolates were subjected to antimicrobial susceptibility testing, phenotypic assays for ESBL detection, and PCR to detect the FimH gene. Results: The prevalence of UTIs reached 42% (370/881), with UPEC representing 19% (70/370) of the detected uropathogens. The highest and the lowest resistance among UPEC isolates were reported against Ampicillin (80%; 56/70) and carbapenem (0%; 0/70), respectively. A high prevalence of MDR (68%; 48/70) and ESBL (64%; 45/70) was reported. Molecular analysis revealed that most of the tested UPEC (98.6%; 69/70) harbored the FimH gene. A significant correlation was found between FimH and the antimicrobial resistance properties of UPEC ($P < 0.05$).

Conclusions
This study highlighted the high prevalence of the FimH adhesin gene among UPEC isolates, revealing its crucial role in enhancing the resistance of these bacteria to antimicrobial agents.

ARTICLE TITLE	**Salmonella Prevalence and Antibiotic Resistance Profile in Raw Poultry Meat Sold in North Lebanon: Insights from the COVID-19 Pandemic and Economic Crisis**
AUTHORS	**Khalife S.,** El Safadi D.
JOURNAL	Preventive Veterinary Medicine
YEAR	2024
PUBLICATION INFO	230(106299):1-7
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences

ABSTRACT

Salmonella-related foodborne illness is a significant public health concern, with the primary source of human infection being animal-based food products, particularly chicken meat. Lebanon is currently experiencing a dual crisis: the COVID-19 pandemic and an unprecedented economic crisis, which has resulted in substantial challenges to the public health system and food safety. This study aims to assess the prevalence and antibiotic resistance profile of Salmonella in raw poultry meat sold in North Lebanon during this dual crisis. A cross-sectional study was carried out between May 2021 and April 2022 across six different districts in North Lebanon. A total of 288 whole, unprocessed chickens were examined. The isolation and identification of Salmonella isolates were done based on cultural and biochemical properties. All isolates were subjected to antimicrobial susceptibility testing and phenotypic assays for Extended-Spectrum Beta-lactamase (ESBL) detection. The prevalence of Salmonella in raw poultry meat purchased in North Lebanon reached 18.05 % (52/288). The dry season and chilled chicken were significantly associated with an increased risk of Salmonella contamination ($P < 0.05$). Additionally, 34.61 % of the isolates were potential ESBL producers, and 57.69 % exhibited multidrug resistance (MDR). This study highlights the existence of MDR in chicken meat in North Lebanon, posing a potential health risk if undercooked chicken meat is consumed. This emphasizes the importance of the implementation of preventive strategies and hygienic procedures throughout the food chain to reduce the risk of Salmonella spp. contamination in chicken meats and its potential transmission to humans.

ARTICLE TITLE	**Seroprevalence and Risk Factors of Toxoplasma Gondii Infection in Slaughtered Chickens in Tripoli, Lebanon**
AUTHORS	**Khalife S.**, El Safadi D.
JOURNAL	Veterinary Parasitology: Regional Studies and Reports
YEAR	2023
PUBLICATION INFO	46(1):1-10
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion in Health Sciences

ABSTRACT

Toxoplasma gondii is a cosmopolitan protozoan parasite that has a wide range of intermediate hosts. It infects all warm-blooded animals, including humans and birds. The latter typically pick up the infection by ground feeding, and people can contract the parasite from eating undercooked chicken meat. In recent years, investigations into T. gondii infection in poultry have been reported worldwide. However, there is no epidemiological data regarding the seroprevalence of anti-T. gondii antibodies in chicken in Lebanon. Thus, the current investigation was carried out to determine the seroprevalence and associated risk factors of T. gondii infection in chicken destined for human consumption in the Tripoli district of Lebanon. For this, a cross-sectional study was carried out between April 2021 and February 2022. Blood samples were collected from 400 chickens in four poultry abattoirs in Tripoli. The modified agglutination test (MAT) was used to test sera for T. gondii antibodies. The association of T. gondii seroprevalence with potential risk factors was assessed using the Chi-square test. Multivariate analysis was used to confirm the association. The seroprevalence of T. gondii antibodies reported in this study was 13% (52/400); it was higher in the free-range chicken group (19.3%, 29/150) than in the caged group (9.2%, 23/250) (OR = 2.365; 95% CI: 1.311–4.267) ($P = 0.004$). The wet season and the presence of cats in the poultry farms were significantly associated with an increased seropositivity to T. gondii infection ($P \leq 0.0001$). Given the occurrence of T. gondii antibodies in slaughtered chicken in this area, the consumption of raw or undercooked chicken meats may pose a serious threat to public health and highlight the need to implement appropriate precautionary strategies to halt the spread of T. gondii to humans.

ARTICLE TITLE	**Student to Nurse Transition and the Nurse Residency Program: A Qualitative Study of New Graduate Perceptions**
AUTHORS	Alsalamah Y., Al Hosis K., Al Harbi A., **Itani M., El Tassi A., Fawaz M.**
JOURNAL	Journal of Professional Nursing
YEAR	2022
PUBLICATION INFO	DOI: 10.1016/j.profnurs.2022.07.007
THEME / SUBTHEME	Health and Wellbeing/Nursing Education

ABSTRACT

Background
In past years, the attrition of new graduate nurses has been predicted to grow and this is what has been occurring recently due to challenging role transitions. Nurse residency programs are meant to help new graduate nurses transition into their new roles. These programs have been evaluated in a variety of ways.

Purpose
The purpose of this study was to explore more about new graduate nurses› transition perspectives and the function of nurse residency programs in mediating this shift.
Methods: At a major university hospital in Saudi Arabia, 29 Saudi nurses participated in a qualitative phenomenological study through focus group discussions.

Results
Two major themes emerged from thematic analysis in this study. The first theme was namely «Challenges of transition», where nurses expressed the lack of experience, high caseloads, and difficulty communicating with physicians. The second theme was namely, «Residency transition support», where the nurses expressed that it provided them with enhanced learning, peer communication and support, and helped them in building relationships.

Conclusion
The themes that emerged indicate that the journey from student to registered nurse is complicated and multidimensional. These findings imply that structures and practices meant to promote the shift, such as the residency program, can help new nurses have a better transition experience.

ARTICLE TITLE	**The Association between Obesity and Reduced Weight-Adjusted Bone Mineral Content in Older Adults: A New Paradigm that Contrasts with the Obesity Paradox**
AUTHORS	De Lorenzo A., Pellegrini M., Gualtieri P., **Itani L.,** Frank G., El Ghoch M., Di Renzo L.
JOURNAL	Nutrients
YEAR	2024
PUBLICATION INFO	16(3): 2-15
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

The relationship between body weight and bone mass in the elderly remains unclear, and whether obesity is a protective factor is still a matter of debate. For this reason, the aim of this study is to assess the association between body mass index (BMI) and bone mineral content adjusted by body weight, expressed as a percentage (w-BMC%), and to test the validity of the obesity paradox in this context. A cohort of 1404 older adults was categorized according to the World Health Organization's BMI cut-off points and completed a total and segmental body composition measurement by means of a dual X-ray absorptiometry scan. Individuals with obesity displayed a lower mean w-BMC% (3.06 ± 0.44%; 2.60 ± 0.37%) compared to those who were normal-weight (3.95 ± 0.54%; 3.38 ± 0.48%) and overweight (3.06 ± 0.44%; 3.04 ± 0.37%) in both genders. Linear regression analysis also showed a negative association between BMI and w-BMC% in males ($\beta = -0.09$; $p < 0.001$) and females ($\beta = -0.06$; $p < 0.001$). Finally, among individuals with obesity, and after adjusting for age, the linear regression models revealed a significant decrease of 0.75% and 0.28% in w-BMC% for every one-unit increase in the trunk fat/appendicular lean mass ratio in both males ($\beta = -0.749$; $p < 0.0001$) and females ($\beta = -0.281$; $p < 0.001$). In conclusion, we suggest a new paradigm regarding the impact of obesity on bone mass, in which the former does not appear to be a protective factor of the latter, especially in individuals with central obesity and low muscle mass.

ARTICLE TITLE	**The Psychological Conditions of Pregnant Women During the Covid-19 Outbreak in Lebanon**
AUTHORS	**Kadamani I.,** Samaha A., Gebbawi M., Yahfoufi N., Ghaddar A., Samaha A., ***Steitieyeh H.***
JOURNAL	**BAU Journal - Health and Wellbeing**
YEAR	2024
PUBLICATION INFO	6(1):1-7
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	In Lebanon, the psychological conditions of pregnant women during the COVID-19 pandemic have not been reported, which creates the need to conduct this study that aims to evaluate the psychological conditions of pregnant women during the COVID-19 pandemic. A cross-sectional design was adopted to reach the aim of this study. The study sample was reached through OBS/GYN clinics to be able to contact the pregnant women in the community, where a convenient sampling technique was followed. The total number of participants was 360 pregnant women: 101 (27.77%) first trimester, 140 (38.88%) second trimester, and 119 (33.33%) third trimester. There is significant evidence indicating that pregnant women may experience various psychological changes such as depression, anxiety, insomnia, and symptoms of PTSD. These four conditions were evaluated using four scales known to be valid and reliable. The ratings of first- and third-trimester pregnant women for four measures were substantially higher than those of second-trimester pregnant women .

ARTICLE TITLE	**Knowledge, Attitude, and Practice of Hepatitis B Vaccination among Dentists in Lebanon**
AUTHORS	Yared G., **Sokhn E., Al-Khatib A.,** Kassis C., Younes R.
JOURNAL	**The Journal of Contemporary Dental Practice**
YEAR	2024
PUBLICATION INFO	DOI: 10.5005/jp-journals-10024-3635
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Background** The hepatitis B virus (HBV) is a serious occupational hazard for healthcare workers, including dentists. The purpose of this study is to assess dentists› knowledge, attitude, and practice (KAP) with respect to hepatitis B vaccination. **Materials and Methods** A cross-sectional survey of a representative sample of dentists (n = 349) from Lebanon was carried out. Participants› knowledge of hepatitis B, attitudes toward vaccination, and immunization habits were assessed using a standardized questionnaire. To examine the data, descriptive statistics were used, and associations between variables were investigated using appropriate statistical tests. **Results** The study found that most participating dentists are HBV-vaccinated. These dentists boast a basic to a significantly substantial understanding of HBV infection prevention strategies, such as immunization, routine preventive measures, and handling equipment. Notwithstanding the generally positive attitudes towards vaccination, a proportion of dentists lacked some HBV prevention practices, specifically with respect to conducting regular follow-ups of anti-HBs titer levels and getting booster vaccination doses when warranted. **Conclusion** This study sheds light on the KAP of hepatitis B immunization among Lebanese dentists. The findings emphasize the significance of focused educational efforts in view of improving awareness and encouraging a more thorough understanding of the benefits of vaccination. The study provides useful data that can be used to influence public health policies as well as activities aimed at increasing hepatitis B vaccination rates among dental professionals in Lebanon. How to cite this article: Yared G, Sokhn ES, Al-Khatib A, et al. Knowledge, Attitude, and Practice of Hepatitis B Vaccination among Dentists in Lebanon. J Contemp Dent Pract 2024;25(2):134-140.

ARTICLE TITLE	**Lebanese and Saudi Nursing Students' Self-Confidence, Satisfaction, And Clinical Judgment in a High-Fidelity Simulation**
AUTHORS	Alsalamah Y., Alsalamah T., Albagawi B., **El Tassi A.,** Alkharj S., Aldrees B., Alsalamah R., **Fawaz M.**
JOURNAL	**The Open Nursing Journal**
YEAR	2022
PUBLICATION INFO	16(1):1-7
THEME / SUBTHEME	Health and Wellbeing/ Nursing Education
ABSTRACT	**Objective** This study aims at evaluating Lebanese and Saudi nursing students› self-confidence, satisfaction, and clinical judgment in a high-fidelity simulation. Background High fidelity simulation is an increasingly popular academic application gaining more corroboration in nursing curricula over the years. To prepare highly qualified nurses with refined clinical judgement skills, high fidelity simulation presents a promising academic technique. **Methods** A quantitative cross-sectional research methodology was used to recruit 673 Lebanese and Saudi nursing students from various academic levels for this investigation. Three questionnaires were used: a sociodemographic survey, the student satisfaction and self-confidence in learning questionnaire (13 items) and the Lasater clinical judgment rubric (11 items in 4 components). A convenience sample of 673 nursing students from all academic levels, genders and ages at two universities, one in Lebanon and one in Saudi Arabia, which both offer a similar 4 year nursing curriculum and include high fidelity simulation into their courses, was recruited. The sample was calculated based on a population of 891 nursing students, thus yielding a need for 269 students for a confidence interval of 95%, which makes the 673 students in the sample sufficient. **Results** Students who participated in simulation-based learning reported fairly high levels of learning satisfaction (p=0.00), self-confidence (p=0.00), and clinical judgment (p=0.03), with Lebanese students scoring better overall. In the case of satisfaction (p=0.00) and self-confidence (p=0.00) as predictors of clinical judgment, there was a strong connection between the variables. **Conclusion** Nursing students from Lebanon and Saudi Arabia who participated in simulation-based learning activities showed high levels of satisfaction, self-confidence, and clinical judgment.

ARTICLE TITLE	**Microbial Decontamination of Cuminum cyminum Seeds Using "Intensification of Vaporization by Decompression to the Vacuum": Effect on Color Parameters and Essential Oil Profile**
AUTHORS	Tannir H., Debs E., Mansour G., Neugart S., El Haj R., **Khalil M., El Darra N.,** Louka N.
JOURNAL	**Foods**
YEAR	2024
PUBLICATION INFO	14(2264): 1-16
THEME / SUBTHEME	Science and Technology/Food Technology & Processing
ABSTRACT	Cumin seeds are frequently utilized in herbal infusions and as flavoring agents in home cuisine. Nevertheless, studies have demonstrated that spices are frequently contaminated with pathogenic bacteria, including bacterial spores. The aim of this study was to assess the effectiveness of a new decontamination method called "Intensification of Vaporization by Decompression to the Vacuum" (IVDV) on intentionally contaminated Cuminum cyminum seeds. The study also examined the impact of this treatment on the color and oil profile of the treated samples. The untreated samples were inoculated with Escherichia coli (ATCC 25922) and Salmonella Typhimurium (ATCC 14028) and then subjected to IVDV treatment. Response surface methodology was employed to obtain safe, high-quality cumin seeds presenting a balance between microbial load, color, and oil profile. The optimal IVDV conditions were achieved at a pressure of 3.5 bar and a time of 133.45 s, resulting in typical 4 log reductions observed with 99.99% of Escherichia coli and Salmonella Typhimurium inactivation. The treated spices presented a mild color modification compared to the untreated ones, manifested by a darker shade (decreased L* value), reduced greenness (increased a* value), and heightened yellowness (increased b* value). The GC-MS analysis detected the existence of seven compounds in the treated cumin, with cuminaldehyde being the primary compound (83.79%). Furthermore, the use of IVDV treatment resulted in an increase in the total content of essential oils in some samples, whereby six monoterpenes were identified in the untreated sample compared to seven monoterpenes in IVDV-treated samples. This innovative technology demonstrated high efficacy in decontaminating C. cyminum seeds, improving the extractability of the essential oils while only slightly affecting the color.

ARTICLE TITLE	**Key Lifestyles and Interim Health Outcomes for Effective Interventions in General Populations: A Network Analysis of a Large International Observational Study**
AUTHORS	**Deek H., El Nayal M.,** and 37 International Authors
JOURNAL	Journal of Global Health
YEAR	2023
PUBLICATION INFO	13(1):1-14
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background
The interconnected nature of lifestyles and interim health outcomes implies the presence of the central lifestyle, central interim health outcome and bridge lifestyle, which are yet to be determined. Modifying these factors holds immense potential for substantial positive changes across all aspects of health and lifestyles. We aimed to identify these factors from a pool of 18 lifestyle factors and 13 interim health outcomes while investigating potential gender and occupation differences.

Methods
An international cross-sectional study was conducted in 30 countries across six World Health Organization regions from July 2020 to August 2021, with 16 512 adults self-reporting changes in 18 lifestyle factors and 13 interim health outcomes since the pandemic.

Results
Three networks were computed and tested. The central variables decided by the expected influence centrality were consumption of fruits and vegetables (centrality = 0.98) jointly with less sugary drinks (centrality = 0.93) in the lifestyles network; and quality of life (centrality = 1.00) co-dominant (centrality = 1.00) with less emotional distress in the interim health outcomes network. The overall amount of exercise had the highest bridge expected influence centrality in the bridge network (centrality = 0.51). No significant differences were found in the network global strength or the centrality of the aforementioned key variables within each network between males and females or health workers and non-health workers (all P-values >0.05 after Holm-Bonferroni correction).

Conclusions
Consumption of fruits and vegetables, sugary drinks, quality of life, emotional distress, and the overall amount of exercise are key intervention components for improving overall lifestyle, overall health and overall health via lifestyle in the general population, respectively. Although modifications are needed for all aspects of lifestyle and interim health outcomes, a larger allocation of resources and more intensive interventions were recommended for these key variables to produce the most cost-effective improvements in lifestyles and health, regardless of gender or occupation.

ARTICLE TITLE	**Phylogenetic Group Distribution and Antibiotic Resistance of *Escherichia Coli* Isolates in Aquatic Environments of a Highly Populated Area** ***(Joint Publication with Faculty of Science)***
AUTHORS	*Mansour R.,* **El-Dakdouki M., Mina S.**
JOURNAL	AIMS Microbiology
YEAR	2024
PUBLICATION INFO	DOI: 10.3934/microbiol.2024018
THEME / SUBTHEME	Health and Wellbeing/Industrial and Medical Microbiology

ABSTRACT

Background
Extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae including Escherichia coli (E. coli), are recognized as a global public health threat due to their multidrug-resistant (MDR) phenotypes and their rapid dissemination in aquatic environments. Nevertheless, studies investigating the prevalence and antimicrobial resistance (AMR) profile of ESBL-producing E. coli in Lebanese surface water are limited.

Objective
This study aimed to assess the physicochemical properties and microbial contamination load and to determine the distribution of AMR patterns of ESBL-producing E. coli in surface water samples from different sites in the North Governorate of Lebanon.

Methods
Water samples were collected from 25 major sites in North Lebanon. These samples were analyzed for the presence of total coliforms, E. coli, and fecal enterococci. Phenotypic and genetic characterizations were then performed for E. coli isolates to determine their resistance patterns and phylogenetic groups.

Results
Fifty-six samples out of 100 samples were positive for ESBL-producing E. coli, mostly harboring blaCTX-M (40/56, 71%) including blaCTX-M-15 (33/40, 82%), blaTEM gene (36/56, 64%), blaSHV (20/56, 36%), and blaOXA (16/56, 29%) including blaOXA-48 gene (11/16, 69%). Most ESBL-producing E. coli isolates belonged to the extra-intestinal pathogenic phylogroup B2 (40/56, 71.4%) while 10/56 (17.9%) belonged to the commensal phylogroup A.

Conclusion
Our results highlight the need to implement effective water monitoring strategies to control transmission of ESBL-producing E. coli in surface water and thus reduce the burden on human and animal health.

ARTICLE TITLE	**The Dependence Level among Adolescent Vape Users: A Cross-Sectional Study**
AUTHORS	Abo Karnib V., Abedallhalim G., Ikkawi A., Saad H. A., **Deek H.**
JOURNAL	**BAU Journal - Health and Wellbeing**
YEAR	2024
PUBLICATION INFO	6(1): 1-8
THEME / SUBTHEME	Health and Wellbeing/Prevention and Health Promotion in Health Sciences

ABSTRACT

Vape is a battery-powered device that works by heating a liquid called “e-liquid”. The use of vape has significantly increased in the past years among high and middle school students. The aim of the current study was to evaluate the level of dependence among adolescent vape users in Lebanon and to assess their knowledge about vape health hazards. A descriptive cross-sectional study with a self-administered questionnaire. A link for the survey was generated on Google Forms and sent to adolescents in the community. The survey was sent to parents of vape users and after their approval, it was shared with their adolescent children for data collection. The data collection form included sociodemographic characteristics, awareness, perception, vaping background, and the Penn State Electronic Dependence Index to evaluate the level of dependence among adolescent vape users. A total of 438 participants were included in this study. The findings revealed that 45.9% are current vape users, of which most of them have low dependence on these devices (43.8%), while the rest are medium dependent (24.8%), highly dependent (5.5%), and non-dependent (25.9%). While in terms of perception, vape users perceived vaping to be completely healthy and non-addictive. The findings of this study showed that 87.6% of vape users in Lebanon are dependent at some level. Additionally, a gap was seen in the knowledge about the health effects of vaping significantly among the vape users. Future research should address a larger scope of participants to account for all vape users in the country.

ARTICLE TITLE	**The Relationship between Work Readiness and Perceived Clinical Competence Among Graduates Transitioning into Professional Practice**
AUTHORS	Alsalamah Y. S., Alsalamah T. S., Albagawi B. S., Alslamah T., **El Tassi A., Fawaz M.**
JOURNAL	**International Journal of Africa Nursing Sciences**
YEAR	2023
PUBLICATION INFO	DOI: 10.1016/j.ijans.2023.100555
THEME / SUBTHEME	Health and Wellbeing/Emotion Regulation and Mental Health

ABSTRACT

Background
Nursing Residency Programs (NRPs) reportedly help close the disparities in job-related knowledge, expertise, and attitudes that affect new nurses, healthcare organizations, and care quality by offering instructions and resources for new graduate nurses.

Aim
This study aims to explore the relationship between work readiness and perceived clinical competence among graduates attending the NRP as compared to nurse interns at one university hospital.

Methods
This study employed a quantitative cross-sectional research design, recruiting 203 graduate nurses through a purposive sampling technique via electronic invitations.

Results
The results of this study showed that graduates attending the NRP had higher scores at all levels of work readiness and clinical competence, with work readiness being found as a predictor of clinical competence.

Conclusions
Healthcare organizations are responsible for exploring the transition to practice programs and their effectiveness in enhancing work readiness to increase the quality of care offered to patients and to prepare skillful new graduates for professional and safe practice.

ARTICLE TITLE	**Valorization of Sesame (Sesamum Indicum L.) Seed Coats: Optimization of Polyphenols' Extraction using Ired-Irrad® and Assessment of Their Biological Activities** ***(Joint Publication with Faculty of Science)***
AUTHORS	Khazaal S., Louka N., Debs E., **Khalil M.**, Albiss B., Al-Nabulsi A., Jammoul A., Osaili M., **El Darra N.**
JOURNAL	**Journal of Agriculture and Food Research**
YEAR	2024
PUBLICATION INFO	16(101105):1-10
THEME / SUBTHEME	Health and Wellbeing/Food Technology & Processing
ABSTRACT	Sesame (Sesamum indicum L.) seed coat (SSC) is a by-product generated during the production of sesame paste, known as tahini. Research has demonstrated that this by-product is abundant in valuable nutritional compounds. Various extraction methods are employed to enhance the value of industrial waste by recovering its bioactive compounds. The study aims to optimize the extraction of polyphenols utilizing an infrared technique Ired-Irrad® (IR), in comparison to the water bath (WB) extraction. To optimize the extraction of polyphenols from SSC using both the IR and WB extraction methods, the study utilized Response Surface Methodology (RSM). Under optimal conditions, IR extraction resulted in an improved polyphenol yield, which was 20% higher than that obtained using WB extraction. Similarly, the antiradical activity, quantified as mg of Trolox equivalent per milliliter, increased from 0.58 mg TE/mL in the WB extract to 0.68 mg TE/mL in the IR extract. The phytochemical profile of the IR and WB extracts was examined through High-Performance Liquid Chromatography (HPLC). The major polyphenols identified in both extracts were the flavonoids rutin (3.87 mg/L in IR, 1.72 mg/L in WB) and catechin (3.05 mg/L in IR, 1.32 mg/L in WB). The IR extract revealed the highest yield of polyphenols among the majority of compounds, compared to WB. The lyophilized SSC extracts obtained through both the IR and WB methods demonstrated the most effective antibacterial activity against Listeria monocytogenes, with a minimal bactericidal concentration (MBC) value exceeding 100 mg/mL. However, minor antibacterial effects were detected against the Gram-negative strains, Salmonella Typhimurium and Escherichia coli O157:H7, for extracts obtained with both the IR and WB methods.

ARTICLE TITLE	**Valorization of Sesame Seed Coat Waste: Phenolic Composition, Antibacterial Efficacy, and Nanoemulsion Encapsulation for Food Preservation** ***(Joint Publication with Faculty of Science)***
AUTHORS	Khazaal S., **Khalil M.,** Osaili M., Albiss B., Al-Nabulsi A., Louka N., **El Darra N.**
JOURNAL	**Frontiers in Nutrition**
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ABSTRACT	The study highlighted the potential of sesame seed coat (SSC), typically discarded during sesame paste processing, as a valuable resource for valorization through extracting bioactive compounds. It examined the phenolic composition and antioxidant activity of SSC, and evaluated its antibacterial properties against foodborne pathogens such as Listeria monocytogenes, Escherichia coli O157:H7, and Salmonella Typhimurium. Additionally, SSC underwent nanoemulsion coating, analyzed using dynamic light scattering and scanning electron microscopy, to enhance its application as a natural preservative. The research specifically focused on incorporating SSC nanoemulsion into milk to determine its effectiveness as a preservative. SSC demonstrated considerable antioxidant activity and phenolic content, with catechin identified as the predominant polyphenol. GC-MS analysis revealed seven major compounds, led by oleic acid. Notably, SSC effectively inhibited L. monocytogenes in broth at 100 mg/ml. The application of SSC and its nanoemulsion resulted in changes to bacterial morphology and a significant reduction in bacterial counts in milk, highlighting its potential as an effective natural antibacterial agent. The findings of this study highlight the potential use of SSC as a valuable by-product in the food industry, with significant implications for food preservation.

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