Ministry of Higher Education and Scientific Research

BENHA UNIVERSITY

2025 Benha University

PGASC

4th Annual Conference of Post Graduate Studies for Applied Sciences

المؤتمر السنوي الرابع للدراسات العليا للعلوم التطبيقية بجامعة بنها

Under the Auspices of

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Minister of Higher Education and Scientific Research

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President of Benha University

Prof. Gehan Abdelhady Mousa
Vice President of Benha University for Postgraduate Studies and Research
Conference Chairman

Prof. Hesham Rashid
Vice Dean of post graduate studies and research affair Faculty of Medicine
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4th ANNUAL CONFERENCE OF POSTGRADUATE STUDIES APPLIED SCIENCE

Innovative Research for a Sustainable Future

ABSTRACTS BOOK

7-8 MAY 2025

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Table of Contents

About Conference

4th Annual Conference of Post Graduate Studies for Applied Science - Benha Univ..The annual conference for graduate studies in the field of applied sciences, which is organized annually by the Post Graduate Studies and Research Sector at Benha Univ. with the aim of capacities building of students and young researchers in presenting and discussing research papers or scientific articles in the various research areas of applied sciences.

Conference Objectives:

1) Opportunities for networking between Benha Univ. graduate students and other universities.
2) Deepening the scientific research methodology for postgraduate students.
3) Providing an environment for students to present their scientific research experiences in their theses.
4) Giving the opportunity for postgraduate students to participate in the exhibitions of ideas.
5) Achieving the Univ.'s objectives in supporting students' research projects.

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Prof. Nasser El-Gizawy

President of Benha University

The new competitive conditions resulting from the knowledge economy and the challenges of the fourth and fifth industrial revolution make it imperative that universities put in place new policies that promote innovative capacity-building and innovation. The development tools are used to connect universities with the industrial sector as an effective step towards achieving one of the State's objectives in the Science, Technology, and Innovation Strategy 2030, namely, "to create a conducive and supportive environment for science, technology and innovation", to encourage the application of scientific research outputs and to deepen local industrialization. In view of the Egyptian universities distinction in a number of scientific disciplines (engineering and technological sciences, physical sciences, life sciences, clinical and health sciences) according to the British Times rating of higher education institutions, Benha Univ. is currently aiming to serve as a leading model for Egyptian universities in education, scientific research and undergraduate and community life. The Univ. is encouraging innovators to contribute to the community, and to turn innovative ideas and inventions into economically valuable products, raising the Univ. to a top regional and global level of innovation.

Therefore, the Univ. is seeking to invest in knowledge and transform third-generation universities to harness knowledge to build a positive work environment and culture that supports innovation and continuous development in the service of development and the national economy, and to apply systems and mechanisms that promote the participation of government institutions and the private sector in the application of innovation efforts and participation in achieving the strategic goals of the state in critical areas. This will lead to achieving an active and sustainable partnership between the Univ. and the public and private sectors, contributing to development, and helping to support new projects based on the generation of ideas and creativity.

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Prof. Gehan Abdelhady Mosa

Vice President for Postgraduate Studies & Research

Conference Chairman

Applied sciences continue to play a crucial role in addressing real-world challenges through practical and impactful research. The papers and presentations featured in this volume span a wide array of disciplines—including engineering, environmental science, health sciences, information technology, and industrial applications—demonstrating the breadth and depth of graduate-level research in this domain.

We are pleased to present the Book of the Conference on Applied Sciences for Graduate Studies, a comprehensive compilation of scholarly contributions that reflect the dynamic and interdisciplinary nature of applied sciences today. This conference serves as a vital platform for graduate students, researchers, and professionals to engage with current scientific advancements, share innovative research, and foster collaboration across diverse fields of study.

This collection not only highlights the rigorous academic efforts of emerging scholars but also encourages meaningful dialogue and the exchange of ideas that drive scientific progress and innovation. We extend our gratitude to all contributors, reviewers, and participants whose efforts have made this event and publication a success.

We hope that this book will contribute to achieving further cooperation and progress within the applied sciences community.

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Prof. Hesham Rashid

Vice Dean for Post Graduate Studies & Research

Faculty of Medicine

Conference Rapporteur

In the beginning, I would like to thank His Excellency the President Benha Univ. Prof. Nasser Al-Gizawy for their confidence to participate in organizing the 3rd Annual Conference of Post Graduate Studies for Applied Science Benha Univ., which aims to bring together young researchers at the Univ. and abroad under the slogan "Building the Capabilities of Young Researchers"

The conference, which lasts for two consecutive days, is structured around four main themes: Medical, Basic Science, Engineering Sciences, Applied Biosciences, and the best research will be presented.

My sincere thanks and appreciation to my colleagues in the organizing committee of the conference, and my wishes to graduate students for a distinguished scientific conference to realize our aspirations in distinguished applied scientific research beneficial to our society and our beloved Egypt.

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Under Auspices of:

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Minister of Higher Education and Scientific Research

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President of Benha University

Gehan Abdelhady Mosa
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Keynote Speakers: 7-8 May 2025


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العلوم التطبيقية :ابداع بحثي نحو مستقبل مستدام
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KEYNOTE SPEAKER
Professor. Qifa Zhang
Professor at Huazhong Agricultural University, Wuhan, China.
Academician of the Chinese Academy of Sciences
Speech Title:
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Prof. Hesham Ramzy Tantawy
Department- Professor of Chemical Engineering Department (MTC)
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Electromagnetic Shielding Materials
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العلوم التطبيقيه ،ابداع يحتى نحو مستقبل مستدام
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KEYNOTE SPEAKER
Dr. Rasha Ayad Ragheb
Executive Director of the National Training Academy
Speech Title:
Training and the Challenges of Future Jobs
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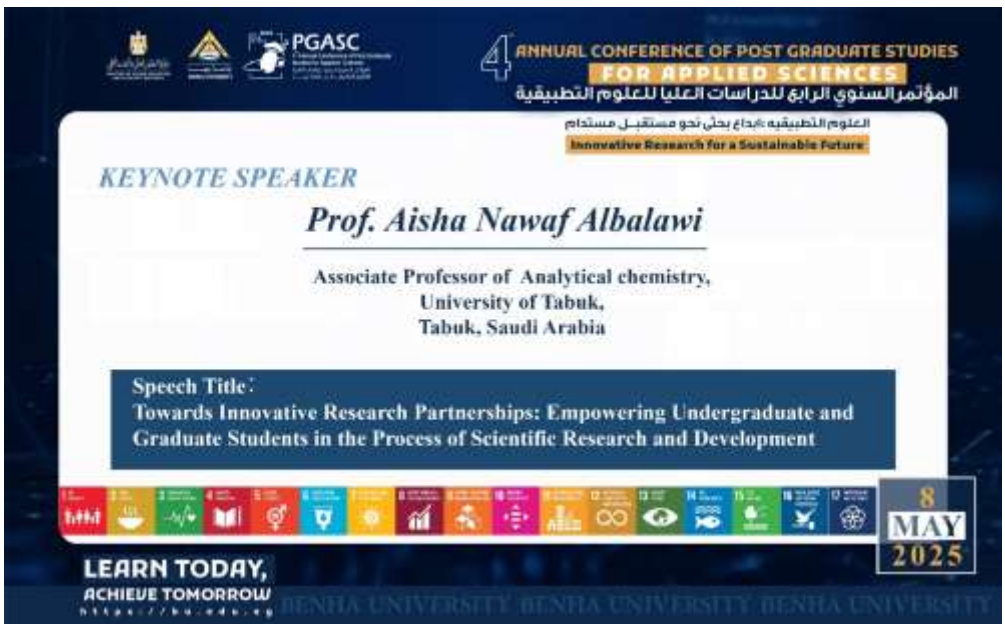
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FOR APPLIED SCIENCES
المؤتمر السنوي الرابع للدراسات العليا للعلوم التطبيقية
العلوم التطبيقيه ،ابداع يحتى نحو مستقبل مستدام
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KEYNOTE SPEAKER
Prof. Aisha Nawaf Albalawi
Associate Professor of Analytical chemistry,
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Tabuk, Saudi Arabia
Speech Title:
Towards Innovative Research Partnerships: Empowering Undergraduate and Graduate Students in the Process of Scientific Research and Development
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العلوم التطبيقيه «إبداع بحثي نحو مستقبل مستدام
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1. Speckle Tracking Echocardiography for Early Detection of Myocardial Damage in Children with Glycogen Storage Diseases

Rana Maher Ibrahim[1], Eman Gamal Abdelrahman[1], Ola Galal Ali 1, Ali Galal Ali [2] and Safaa Salah Imam [3]

[1] Pediatric Department, Faculty of Medicine, Benha University

[2] National Heart Institute, Cairo, Egypt

[3] Cardiology Department, Faculty of Medicine, Benha University

Abstract:

Hereditary glycogen storage disorders (GSDs) manifest as abnormalities in glycogen types or deposits in tissues and are caused by a deficiency in one or more enzymes involved in glycogen production or breakdown. These illnesses are considered uncommon due to their very low prevalence. An estimated 1 case per 2,000–43,000 live births is the total incidence of GSDs. Twelve different kinds of GLDs, all of which are inherited in an autosomal recessive fashion, have been recognized as a result of human enzyme deficiencies. The hereditary unusual enzyme shortage may impact several organs and tissues, including the brain, skeletal muscles, heart, kidneys, and liver. Our research will use speckle tracking echocardiography to determine how GSDs influence the anatomy and function of the heart. To identify early myocardial involvement in young patients with GSDs, longitudinal myocardial left ventricular strain evaluated with speckle tracking is a promising method. This data has significant therapeutic value since it enables early diagnosis and therapy of myocardial dysfunction.

***Keywords*:** Speckle, Myocardial, Glycogen.

2. Covid -19 Associated Ischemic and Haemorrhagic Stroke

Amira Ahmed EL-Sebaey, Ahmed Hamdy Abd-Elrahman, Ehab Elshahat Afifi and Fatma Ahmed AbdelFattah

Anaesethia, ICU and Pain Management Department, Faculty of Medicine, Benha University

Abstract:

The novel coronavirus from the Coronaviridae family, which was promptly named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), was swiftly identified as the causative agent of this unusual sickness. The purpose of this research was to examine the typical stroke processes in order to assess the short-term outcomes of individuals who had a stroke linked with SARS-CoV-2. Approach: One hundred individuals hospitalized with acute stroke at Banha University Hospital were part in this observational research. One subset of the study's participants was the patients: A total of 38 patients with acute stroke and a positive SARS COV-2 PCR nasal sample were included in the study. The control group consisted of 62 patients with acute stroke who did not have a positive SARS COV-2 PCR sample. Findings: The patient group required considerably more low flow oxygen (p value < 0.001). There were notable disparities in the lymphocytic count (p value < 0.001), hemoglobin level (p value < 0.001), D dimer (p value < 0.001), and CRP (p value < 0.001) between the sick group and the control group. Researchers found that stroke patients with COVID-19 had lower total leukocytic counts, lymphocytic counts.

***Keywords*:** CPAP, SARS COV-2, PCR.

3. Short Term Outcome in Patients Presenting with Acute Coronary Syndrome with Left Main Coronary Artery Disease

S.M.Zeidan,K.E.E.El-Rabaat, S.I.Farag and H.I.Allam

Cardiovascular Medicine Department, Faculty of Medicine, Benha University, Benha, Egypt

Abstract:

Acute coronary syndrome (ACS) is a leading cause of mortality and is linked to negative outcomes. Patients with Acute Coronary Syndrome (ACS) who also have left main (LM) disease may have a higher risk of complications and death. Despite considerable improvements in treatment methods, a small number of Patients still suffer from severe hemodynamic compromise and lethal arrhythmia as a result of left main ACS (LMACS). The obstructive Left Main (LM) coronary artery disease (occurs in about 6% of ACS Patients who undergo coronary angiography) supplies 75-100% of the left ventricular myocardium. Consequently, significant LM stenosis might lead to potentially fatal consequences. In Patients presenting with ST-elevation myocardial infarction (STEMI) requiring rapid revascularization (class IIa recommendation) or unstable angina/non -ST segment elevation myocardial in farction (UA/NSTEMI) who are not candidates for cor onary artery bypass grafting (CABG), current guidelines suggest percutaneous cor onary in tervention (PCI) for LM disease. Multivessel coronary artery disease is the most common cause of LM stenosis; yet, only 6-9% of individuals experience it as an isolated lesion. We want to assess the demographics, symptoms, and prognosis of Patients with ACS who receive LM-PCI in this concise study.

***Keywords*:** Acute Myocardial Infarction, Left Main, PCI, Revascularization.

4. Left Ventricle Stroke Volume and Pulmonary Artery Systolic Pressure as Predictors of Adverse Events in Patients with Pulmonary Embolism

E.El Agamy, T.Helmy, M.Akl and B.Mohamed

Cardiovascular Medicine Department, Faculty of Medicine, Benha University, Benha, Egypt

Abstract:

Pulmonary embolism is a severe, acute condition that can immediately threatens life. It happens when an artery in the lungs is blocked by a material that enters the bloodstream from another area of the body. This substance is typically caused by a blood clot in the pelvis or legs. When an artery supplying the lungs becomes blocked, it can cause serious harm and even death. Pulmonary embolism, the world's third leading cause of cardiovascular death, requires prompt diagnosis and treatment to prevent potentially lethal consequences. PE's varied clinical presentation might make it harder to diagnose and, consequently, delay the start of life-saving therapies. To address these challenges, a number of risk scoring systems and diagrams have been created to evaluate the clinical likelihood of PE based on history, physical examination, and test results. Objective: In comparison to PESI and Bova scores, the index of pulmonary artery systolic pressure (PASP) The left ventricular stroke volume (LVSV) is reviewed in this review article for its potential to predict adverse clinical outcomes in patients with pulmonary embolism. Conclusions: One of the leading causes of morbidity and mortality is pulmonary embolism (PE), a potentially lethal condition. PE has seen numerous advancements in recent years, necessitating a thorough evaluation of their effects on patient care. Despite PE being one of the world's leading causes of death, there are still issues with treatment and follow-up. The consensus methods for the multidisciplinary approach to acute PE diagnosis, prognosis, and follow-up are described in this paper.

***Keywords*:** left ventricular stroke volume, pulmonary embolism, and pulmonary artery systolic pressure.

5. Immunohistochemical Markers of Melanocyte Content in Vitiligo Skin

Aya KH. Elsaied Khamis [1], Essam M. Akl [1], Shymaa M. Rezk [1]and Asmaa G. Abdou[2]

[1]Dermatology, Venereology & Andrology Department, Faculty of Medicine, Benha University, Egypt
[2] Pathology Department, Faculty of Medicine, Menoufia University, Egypt

Abstract:

Vitiligo is an acquired pigmentary condition, affecting people all around the world. lesions of vitiligo develop when melanocytes are lost in skin that has been affected, leading to a decrease in the amount of melanin pigment. Even after depigmentation, questions about the existence of remaining melanocytes and the best ways to identify them persist. Objectives: This paper aims to examine if the Melan-A marker and HMB 45 marker may be used to diagnose vitiligo by detecting melanocytes. Conclusions: Both the detection of melanocytes in vitiligo patients' skin and the estimation of melanocyte concentration may be aided by the use of Melan-A and HMB-45 markers.

***Keywords*:** Vitiligo, Melanocyte, MELAN-A marker, HMB-45 marker.

6. Acne Vulgaris: Pathogenesis, Clinical Manifestations and Therapeutic Lines

Esraa Mahmoud Zahran[1], Adel Ali Ibrahim [1], Lina Abdelhady Mohammed [2], Samah Ezzat Ibrahim [1]

[1]Dermatology, Venereology and Andrology Department, Faculty of Medicine, Benha University

[2] Medical Biochemistry Department, Faculty of Medicine, Benha University

Abstract:

One example of a chronic inflammatory condition is acne vulgaris. Causes of chronic acne include overproduction of sebum, abnormal follicular infundibulum keratinisation, the spread of bacteria, and subsequent inflammation, as well as endocrinological variables like androgens. The pathophysiology of this condition usually starts in the early teen years but may continue far into adulthood. The most common areas to find lesions are on the chest, upper back, neck, and face. Among the many types of acne, you may find those specific to certain situations or occupations, such as neonatal or infantile acne, acne conglobata, acne fulminans, acne mechanica, excoriated acne, chloracne, or acne produced by certain medications, such as anabolic steroids, corticosteroids, lithium, or phenytoin. To lessen the emotional and social toll of the condition, there are a number of helpful medication options, both topically and systemically applied. Oral medications (such as tetracyclines, macrolides, and isotretinoin) and hormonal treatments (such as oral contraceptives and systemic glucocorticoids or GnRH agonists) are the most common methods of treating acne vulgaris, although topical medications (like benzoyl peroxide (BP), topical antibiotics, retinoids, azelaic acid, dapsone, etc.) and oral medications in general are also used frequently.The purpose of this review article is to identify the causes, symptoms, and treatment options for acne vulgaris.

***Keywords*:** Acne vulgaris, Pathogenesis, Clinical manifestations, Therapeutic lines, Inflammation.

7. The Role of MicroRNA-21 in Psoriasis Vulgaris

Yosif A. Musa[1], Ahmed A. Saleh[1], Aliaa E. Daifalla[2], Karem T.Khalil[1] And Seham G. Ameen[1]

[1]Dermatology, Venereology and Andrology Department, Faculty of Medicine, Benha University

[2]Clinical and Chemical Pathology, Faculty of Medicine, Benha University

Abstract:

A chronic inflammatory skin illness characterised by hyperproliferative keratinocytes and the invasion of immune cells such as T cells, dendritic cells, macrophages, and neutrophils is known as psoriasis. On average, microRNA-21s are 22 nucleotides long and are tiny non-coding RNAs. When compared to healthy skin, psoriasis skin lesions show a considerable increase in its expression. Information gathered: by scouring the Medline databases (Pub Med and Medscape) and investigating the function of miR-21 level in psoriasis vulgaris up to the year 2023. Methods for choosing a study: For inclusion, each study underwent an independent evaluation. Inclusion was contingent upon them meeting the following requirements: The purpose of these English-language, peer-reviewed articles is to examine the function of miR-21 expression in psoriasis vulgaris diagnosis. Information extraction: Research was deemed ineligible if it failed to meet the specified requirements. The study's quality was evaluated based on a number of factors, such as the following: the availability of acceptable controls, sufficient information, clearly defined evaluation measures, and whether or not ethical permission was obtained. In order to gather information pertinent to our relevant research results, data were independently extracted from all eligible studies utilising a data collecting form. In conclusion, we demonstrated that the psoriatic patients we analysed had considerably increased expression of miR-21. A favourable connection was observed between the miR-21 and the PASI score.

***Keywords*:** Pemphigoid skin condition, micro-RNA-21, PASI.

8. Cardiac Troponin T and Outcomes in Asphyxiated Neonates

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Abstract:

Worldwide, neonatal hypoxia is a major contributor to illness and death. A key result of prenatal hypoxia is hypoxic-ischemic encephalopathy (HIE), which is often associated with cardiac dysfunction. Objective: The purpose of this research is to determine if there is a connection between cTnT levels and newborn outcomes, HIE stages, the need of inotropic support, and asphyxiated neonates.Methods: Perinatal hypoxia was the subject of a prospective observational research including newborns. The levels of cTnT were assessed throughout the first twenty-four hours of life. By using the Sarnat staging technique, the severity of HIE was categorised. At discharge, we evaluated the neonate's neurodevelopmental state and noted their inotrope needs. In order to find connections, statistical analysis used regression.Results: Stage III newborns with severe HIE had elevated cTnT levels compared to stage I and stage II neonates with mild or moderate HIE ($p < 0.001$). The findings showed a strong positive relationship ($r = 0.76$, $p < 0.001$) between cTnT levels and inotrope needs. There was a correlation between high cTnT levels and unfavourable outcomes, such as death and extended hospital stays (OR = 3.5, CI: 1.8-6.8, $p = 0.002$).Conclusion: The degree of cardiac damage in newborns exposed to hypoxia may be reliably assessed by measuring cTnT levels. They have a high degree of correlation with newborn outcomes, inotropic support requirements, and HIE stages. Optimal care options for neonates with perinatal hypoxia may be achieved by early detection of high cTnT levels, which may help in risk categorisation.

***Keywords*:** Cardiac Troponin T levels, Inotrope requirements, HIE stages.

9. Use of Dermal Threads in Treatment of Acne Scars

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Abstract:

Examining the use of dermal threads for acne scar therapy and assessing their safety and effectiveness. Background: Approximately 12–14% of acne instances continue into adulthood, and it affects 95–100% of 16–17-year-old males and 83–85% of 16–17-year-old girls. The psychological anguish and potential social inhibition caused by scarring increases in proportion to the severity of the scarring, making it an already heavy weight to bear. The three primary forms of acne scars may be classified by the net loss or growth of collagen: atrophic, hypertrophic, and keloidal. Treatment options for acne scars differ based on the severity of the scars and the limits of available treatments. The face lift procedure makes use of a variety of thread types chosen for their ability to stimulate collagen production. Longevity and collagen production are two advantages of smooth polydioxanone (PDO) threads over their counterparts. Data sources: The function of dermal threads in acne scars up to the year 2024 was determined by exploring and analyzing Medline resources, including PubMed and Medscape. Study selection: The inclusion of all research was determined by separate evaluations. Inclusion was contingent upon them meeting the following requirements: Written in English and published in scholarly publications, these articles explore the use of dermal threads as a remedy for acne scars. Data extraction: Research was not considered for inclusion if it did not meet certain requirements. The study's quality was evaluated based on a number of factors, such as the following: the availability of acceptable controls, sufficient information, clearly defined evaluation measures, and whether or not ethical permission was obtained. We used a data collecting form to independently extract information relevant to our research results from all qualifying studies. Conclusion: In addition to improving the appearance of boxcar and rolling scars, dermal threads were well-tolerated.

***Keywords*:** Acne scar, dermal threads.

10. Uses of Chemical Peeling in Acne Scars

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Abstract:

People who suffer from severe acne are more likely to develop acne scars, which may significantly impact their quality of life. People who have dealt with acne vulgaris know too well the annoyance of acne scars. For those working in the field of dermatology and cosmetics, acne scars provide a significant difficulty. For many years, chemical peels have been one of the most popular aesthetic treatments offered by medical professionals. A chemical peel is a procedure that involves carefully removing layers of skin from the body by applying a chemical agent to the skin, the intensity of which may be adjusted. One method of skin resurfacing is chemical peeling, which uses exfoliants to bring back healthy skin cells. It has a long history of use in the treatment of several skin problems, including acne vulgaris. It is common practice to categorize chemical agents into three levels: superficial, medium, and deep peels, according to their different modes of action. By lowering the stratum cornium's barrier function, chemical peels increase the penetration and absorption of further topical treatments. These features, together with the fact that superficial peels are risk-free and compatible with other acne treatments, contribute to their high popularity. This article's goal is to review chemical peeling's efficacy in reducing the appearance of acne scars.

***Keywords*:** Acne Scars, Chemical Peeling.

11. Microneedling in Acne Scars

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And Nader Nasr Nazmy
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Benha University

Abstract:

Scarring is a cosmetic issue, a potential threat to patients' mental health that is caused by the buildup of collagen after an outbreak of inflammatory acne. It takes so long for acne scars to fade. A more modern approach to treat these scars is microneedling treatment, which is formally called percutaneous collagen induction. It is used in atrophic acne scars effectively. In microneedling, a non-surgical technique for skin treatment, a specialized apparatus and needles are used to create microscopic punctures on the skin's surface to stimulate the body to produce more collagen and elastin, this therapy improves the skin's innate healing capabilities. Microneedling has several beneficial effects on the look of skin that has been impacted by acne like, improving the skin's texture. Microneedling improves the absorption and penetration of topical skincare products by creating microscopic channels in the skin. This improved delivery mechanism enables the targeted administration of acne-fighting compounds, such as retinoids, anti-inflammatory medicines and topical antibiotics to the affected areas. The purpose of this study was to research the effectiveness and safety of microneedling for treatment of acne scars.

***Keywords*:** Acne Scars, Microneedling, Skin-texture.

12. Carbon Monoxide induced toxicity: A literature Review of the Challenges in Early Diagnosis of Cardiotoxicity and Neurotoxicity

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Abstract:

Carbon monoxide (CO) is known as silent killer; since it is a colorless, odorless and non-irritating but highly toxic gas. It results from incomplete combustion of carbonaceous substances. The current method for CO poisoning begins with clinical suspicion and a review of the patient's medical history. It is then confirmed by detecting elevated CO-Hb levels (greater than 10%), which can be measured through invasive blood gas analysis or non-invasive techniques like multi-wave pulse oximetry. Objective: we summarize recent advances in understanding challenges in early diagnosis of CO induced cardiotoxicity and neurotoxicity. Cardiac enzymes, ECG, brain computerized tomography scans are essential markers in diagnosis of CO induced cardiotoxicity and neurotoxicity, while heart-type fatty acid-binding protein and neurogranin are emerging as promising biomarkers. Conclusions: Recent markers are needed for early detection of acute in CO induced cardiotoxicity and neurotoxicity other than traditional markers.

***Keywords*:** Carbon monoxide, H-FABP, Neurogranin, Cardiotoxicity, Neurotoxicity.

13. Comparative Study between Outcome of Laparoscopic Inguinal Hernia Repair (TAPP) versus Novel Open 3 Cones Mesh Plug Hernioplasty (Saleh Technique)

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Abstract:

Inguinal hernia repair is one of the most common surgical procedures worldwide. While the Lichtenstein tension-free repair remains the gold standard for open repair, laparoscopic transabdominal preperitoneal (TAPP) repair has gained popularity due to its reduced postoperative pain and faster recovery. This study aims to compare the novel 3-Cones Mesh Hernioplasty (Saleh technique) with TAPP repair in terms of operative time, intraoperative complications, postoperative recovery, and recurrence rates.Methods: This prospective study included 40 male patients with primary inguinal hernia, randomized into two groups: Group A (3-Cones Mesh Hernioplasty) and Group B (TAPP repair). Operative time, blood loss, and complications were recorded intraoperatively. Postoperative outcomes such as pain scores (VAS), recovery time, and recurrence rates were evaluated after 6 months.Results: Saleh technique had a shorter operative time (82 ± 14 min vs. 133 ± 31 min, $p < 0.001$) but resulted in higher blood loss (70 mL vs. 30 mL, $p < 0.001$). Intraoperative and postoperative complications showed no significant differences ($p > 0.05$). The TAPP group had lower pain scores (median 3 vs. 4, $p = 0.003$) and faster recovery (4 vs. 8 days, $p < 0.001$). Recurrence rates were comparable ($p = 0.661$).Conclusions: Saleh technique provides a time-efficient alternative to TAPP repair, demonstrating comparable safety and recurrence rates. While TAPP repair offers superior postoperative recovery, the Saleh technique remains a viable and practical option, particularly in resource-limited settings.

***Keywords*:** Inguinal Hernia, TAPP Repair, Saleh technique, 3-Cones Mesh Hernioplasty.

14. The Link between Acne Vulgaris and Metabolic Syndrome

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Abstract:

More than eighty percent of teenagers and young adults have acne vulgaris. Many researches focus on the possible link between metabolic syndrome (MetS) and acne vulgaris. Objective: The purpose of this article is to provide a synopsis of the research on the association between metabolic syndrome and acne vulgaris, as well as its correlation to acne severity. Data Sources: A search of the Medline databases (Pub Med and Medscape) was conducted to gather literature on the origins, pathophysiology, clinical images, and the influence of metabolic syndrome on patients with acne vulgaris up to 2024. Conclusions: Hormonal shifts, insulin resistance, oxidative stress, and persistent inflammation are shared features of both MetS and acne vulgaris.

***Keywords*:** Acne Vulgaris, Obesit, Die, Metabolic Syndrome.

15. Study the Correlation between Genetic Expression of Interleukin-37 and Disease Activity Indices in Patients of Rheumatoid Arthritis in a Group of Egyptian Population

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Abstract:

Rheumatoid arthritis (RA) is a long-term, systemic autoimmune condition familiar with inflammation, predominantly targeting the joints and resulting in progressive disability and systemic complications. Its development involves a multifaceted interaction between genetic susceptibility and dysregulated immune responses, with pro-inflammatory cytokines playing a pivotal role in disease progression. Among these cytokines, interleukin-37 (IL-37) has recently gained attention for its potential anti-inflammatory capabilities. IL-37 is acknowledged for its extensive inhibitory effect on inflammatory pathways, which encompasses the suppression of pro-inflammatory cytokine production and the regulation of immune cell activity. Objectives: to assess the relationship between IL-37 gene expression and both RA activity and severity. Data Sources: The investigation involved a systematic review of studies available up to 2022, retrieved from Medline databases such as PubMed and Medscape, focusing on the role of IL-37 in RA. Study Selection: Studies were independently assessed for inclusion based on criteria requiring them to be published in English, appear in peer-reviewed journals and review IL-37's role in RA. Data Extraction: Studies that did not meet these criteria were excluded. The assessment of study quality considered ethical approval, defined eligibility criteria, proper control groups, comprehensive data, and clearly established evaluation methods. Data was extracted from each qualifying study using a standardized form to collect information relevant to the study objectives. Conclusions: IL-37 contributes to RA pathogenesis and is associated with disease severity.

***Keywords*:** Rheumatoid arthritis, RA, Interleukin 37.

16. Anti-Mullerian Hormone (AMH) Variability in Cases of Polycystic Ovary Syndrome (PCOS) Phenotypes

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Abstract:

Polycystic ovarian syndrome (PCOS) affects 8–13% of women and affects their hormones, metabolism, and mental wellbeing. The major goal of this research was to determine if anti-mullerian hormone (AMH) measurements in blood may be used to diagnose polycystic ovary syndrome (PCOS) and to predict its prognosis. Methods: An obstetrician-gynecologist at Benha University Hospital and one hundred of her patients took part in the investigation. The patients were divided into two equal groups. In Group I, 50 women, which was called the PCOS group, were found to have PCOS according to the Rotterdam criteria. In Group II, 50 women were used as controls. Results: Impressively, the AMH was able to predict PCOS with an 88% sensitivity and a 72% specificity. Conclusions: PCOS women had higher hormonal levels of LH, FSH, testosterone and androstenedione, and higher FG score, while had lower ovarian volume. Additionally, the current study concluded that AMH is a significant predictor of PCOS with a sensitivity of 88% and a specificity of 72%.

***Keywords*:** Polycystic ovary syndrome, phenotypes, and anti-mullerian hormone.

17. Screening of Von Willebrand Disease Among Children with Severe or Recurrent Attacks of Epistaxis

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Abstract:

Mild mucosal bleeding is the hallmark of von Willebrand disease (VWD), a congenital bleeding illness caused by a malfunction or deficit of von Willebrand factor (VWF). Von Willebrand disease is a prevalent but underappreciated bleeding ailment; our study's objective was to assess infants with severe or recurring epistaxis for the likelihood of this disorder. Methods and Patients: A total of seventy children who presented to the emergency room or outpatient clinic with epistaxis were included in this cross-sectional research. Complete blood counts, PTs, APTTs, VWF Ag, and VWF activities were among the blood assays performed on all patients in addition to clinical examinations and history gathering. One patient was found to have VWD out of seventy who presented with severe or recurring epistaxis over the course of the research. In conclusion, children experiencing severe or recurring epistaxis should be evaluated for VWD.Topics: Epistaxis in Children with Von Willebrand Disease.

***Keywords*:** VWD, PTs, APTT, VWF.

18. Melasma: Pathophysiology, Clinical Picture and Treatment Lines Overview

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Abstract:

The appearance of many people can be drastically altered by melasma, a pigmented skin condition that affects a large portion of the population. This condition is characterized by symmetric hyperpigmentation and manifests as irregular brown to -brown macules on the face, specifically the cheeks, forehead, nasal bridge, upper lip, mandible, and upper arms. Skin inflammation (as in contact dermatitis and aesthetic operations) and environmental (sunlight) and hormonal (pregnancy, sex hormones) variables all contribute to this condition in those who are already genetically prone to it. A localized hypermelanogenic phenotype is induced and maintained by an interplay of structural and functional changes in the upper dermis, basement membrane, and epidermis in melasma-affected skin, in addition to hyperfunctional melanocytes. Treatment results are not always considered adequate, and melasma care is difficult because of the complicated etiology and recurrence of the condition. Recurrence may be caused by sun exposure, thus treating hyperpigmentation alone may not be beneficial unless combined with regenerative methods and photoprotection. Thus, the treatment plan begins with risk factor management and the implementation of strong UV protection measures. Subsequently, several techniques like as topical treatments, chemical peels, laser and light therapies, microneedling, and systemic therapy are used. The purpose of this paper is to provide a synopsis of melasma's pathogenesis, clinical presentation, and therapeutic options.

***Keywords*:** Melasma, Clinical Picture, Lines Overview.

19. Advances in the Treatment of Acne Vulgaris: A Comprehensive Review of Current and Emerging Therapies

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Abstract:

Acne vulgaris is a common chronic inflammatory skin disorder affecting individuals of all ages, with a significant impact on quality of life. It results from increased sebum production, follicular hyperkeratinization, Cutibacterium acnes proliferation, and an inflammatory response. Despite the availability of numerous treatments, acne management remains challenging due to antibiotic resistance, patient adherence issues, and variable treatment responses. Emerging therapies, including biologics, androgen receptor inhibitors, and microbiome-targeted treatments, offer new possibilities for improving outcomes.**Objective**: This narrative review provides a comprehensive evaluation of current and emerging acne treatments, including topical and systemic therapies, adjunctive procedures, and investigational approaches. Special considerations, such as acne in pregnancy, skin of color, and refractory cases, are also addressed.**Methods**: A literature review was conducted, analyzing clinical studies, systematic reviews, and advancements in acne treatment. The review discusses the efficacy, safety, and limitations of topical retinoids, benzoyl peroxide, antibiotics, hormonal agents, isotretinoin, biologics, and novel interventions.**Conclusion**: While existing therapies are effective, antibiotic resistance and treatment variability necessitate ongoing research. Personalized medicine, integrating genetic and microbiome-based approaches, may revolutionize acne treatment, optimizing outcomes and minimizing adverse effects.

***Keywords*:** Acne vulgaris, topical retinoids, antibiotic resistance, androgen receptor inhibitors, biologics, JAK inhibitors, microbiome therapy, isotretinoin.

20. Overview of hemophilia A in pediatrics

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Abstract:

Hemophilia A is a rare congenital, recessive X-linked disorder caused by lack or deficiency of clotting factor VIII. The defining clinical feature is bleeding into key joints including the ankles, knees, and elbows, which can lead to the development of arthropathy, particularly in severe instances that go untreated. Before the 1960s, the median life expectancy was about 30 years. However, a paradigm shift has occurred due to a better understanding of the disorder and the development of effective therapy based on prophylactic replacement of the missing factor. As a result, people with hemophilia can now anticipate a quality of life and life expectancy that is almost normal. However, for a significant number of patients, the possibility of developing inhibitory antibodies to infused factor remains a significant obstacle to overcome. Finally, gene therapy for hemophilia has progressed remarkably and could soon become a reality.

***Keywords*:** Overview of hemophilia, Pediatrics.

21. Metabolic Syndrome and Psoriasis

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Abstract:

Psoriasis vulgaris is a chronic inflammatory skin disease that manifests mainly as raised, erythematous, and scaly plaques. Psoriasis is associated with increased risk of several comorbidities, such as Crohn's disease, malignancy, obesity, and cardiovascular diseases. The relationship between psoriasis vulgaris and metabolic syndrome (MetS) has been a subject of increasing interest in recent years.**Objective:** This article aims to review the link between metabolic syndrome and psoriasis vulgaris and its correlation with psoriasis severity.**Data Sources:** The literatures on the causes, pathogenesis, clinical pictures of psoriasis vulgaris, discuss role of metabolic syndrome in patients with psoriasis vulgaris and its correlation with the disease's severity decline up to 2024 was sourced via a search of the Medline databases (Pub Med and Medscape). **Data Extraction:** If the studies did not fulfill the inclusion criteria, they were excluded. Study quality assessment factors included whether ethical approval was gained, eligibility criteria specified, appropriate controls, and adequate information and well-defined evaluation measures. Data from each eligible study were independently abstracted using a data collection form to capture information related to our concerned study outcomes. **Conclusions**: Both psoriasis vulgaris and MetS are associated with hormonal changes, insulin resistance, oxidative stress and chronic inflammation. Studies have shown that individuals with MetS are more likely to have severe psoriasis.

***Keywords*:** Psoriasis, Obesity, Diet, Metabolic syndrome.

22. Assessment of Serum Heat Shock Protein 70 (HSP70) in Patients with Alopecia

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Abstract:

An immune-mediated assault on hair follicles causes non-scarring hair loss in alopecia areata (AA), a common autoimmune condition. Numerous autoimmune and inflammatory diseases have been linked to heat shock protein 70 (HSP70), a molecular chaperone involved in immune regulation and cellular stress response. Recent research has also shown a possible connection between sensorineural hearing loss (SNHL) and autoimmune illnesses, maybe as a result of similar pathogenic pathways involving inflammation and immunological dysregulation. Goals: HSP70 serum levels are being investigated for their possible involvement in the etiopathogenesis of AA, their relationship to the severity of AA, and any possible connections to audiological problems in these individuals.

Data Sources: Medline databases (Pub Med and Medscape) were searched and analyzed in order to find research that examined the function of HSP70 in AA that were published up to 2024. Study Selection: Every study was evaluated for inclusion on its own. If they met the following requirements, they were accepted: 1. English-language writing and publication. 2. Printed in journals with peer review. 3. Examine the involvement of HSP70 in AA. Data Extraction: Studies were eliminated if they failed to meet the requirements for inclusion. Whether ethical permission was obtained, eligibility requirements were stated, suitable controls were used, sufficient information was provided, and evaluation metrics were clearly established were all taken into consideration when evaluating the quality of the study. To gather information on the research results we were interested in, data from every eligible study was separately abstracted using a data collecting form. Results: HSP70 may be a prognostic biomarker for AA, showing a correlation with the length of the illness but not its severity. There may be a connection between AA and hearing impairment, which might be caused by processes involving melanocytes.

***Keywords*:** Alopecia areata, heat shock protein 70, hearing sensitivity.

23. Evaluation of Serum Ionized Calcium as a Prognostic Marker for Neonatal Sepsis

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Abstract:

Neonatal sepsis (NS) is a leading cause of morbidity and mortality in newborns, with early diagnosis being crucial for improving outcomes. Serum ionized calcium (iCa) has been suggested as a potential prognostic marker, as abnormal iCa levels, particularly hypocalcemia, are commonly observed in septic neonates and may correlate with disease severity and outcomes. **Aim:** To investigate the role of serum iCa as a prognostic marker for NS. **Patients and Methods**: This case-control study was conducted at Benha University Hospital and Benha Children's Hospital, involving 50 full-term infants diagnosed with NS (Group A) and 25 age- and sex-matched healthy controls (Group B). Infants having congenital anomalies or a history of exchange transfusions were excluded. The study aimed to investigate several factors, including thorough history taking, clinical evaluation, hematological tests, blood cultures, blood gas analysis, and serum calcium levels. Ethical approval was granted, and informed consent was obtained from all participants' parents. Additionally, laboratory analyses were conducted to explore the role of iCa as a potential prognostic marker for NS. **Results:** Neonates with sepsis had significantly lower serum iCa levels than controls, with iCa demonstrating a negative correlation with the hematological scoring system. ROC curve analysis indicated a strong predictive ability of iCa for mortality, with an AUC of 0.856 (95% CI: 0.742–0.969) and a cutoff of ≤0.78 mg/dL, yielding sensitivity and specificity of 81.82% and 89.29%, respectively. Additionally, iCa predicted the need for mechanical ventilation, with an AUC of 0.724 (95% CI: 0.575–0.874). Multivariate analysis confirmed that iCa remained significantly associated with mortality (OR = 0.031, P = 0.003) after adjusting for other clinical factors, underscoring its potential as a prognostic marker in NS. **Conclusion:** This study highlights the critical impact of iCa as a potential biomarker for predicting mortality and the need for mechanical ventilation in neonates with sepsis. Our findings demonstrate that decreased iCa levels are strongly associated with adverse outcomes, including increased mortality and prolonged need for respiratory support. iCa can be an excellent tool for early identification of high-risk neonates. Additionally, iCa levels were significantly correlated with various biochemical and hematological parameters, suggesting its potential role in reflecting the overall physiological state in septic neonates.

***Keywords*:** neonatal, sepsis, ionized, calcium.

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1. Effect of Jigsaw learning Method on Theoretical and Practical Achievement of Technical Nursing Institute Students regarding the Second Stage of Labour

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[2]Obstetrics and Gynecological Nursing, Faculty of Nursing, Benha University, Egypt.

Abstract:

Background: Jigsaw learning Method affects theoretical and practical achievement**. Aim of the study:** Evaluate the effect of Jigsaw learning method on theoretical and practical achievement of technical nursing institute students regarding the second stage of labor. Setting: Technical Nursing Institute, Benha University. **Research design:** A quasi- experimental study was utilized to conduct the study. **Sample:** A systematic random sample included 60 nursing students was selected and divided equally into two groups control and study groups. **Tools of data collection:** three tools were used: **Tool (I)** A structured self- administrated questionnaire: part (1) General characteristics of the nursing students. Part (2): student's knowledge assessment questionnaire. **Tool (II):** Observational checklist. **Tool (III):** Cooperative Jigsaw Opinion Sheet. **Results**: The present study revealed that, after implementation of the Jigsaw learning method the mean scores of theoretical and practical achievements was finally higher in the study group compared to control group ($P \leq 0.05$). Also, the majority of the stud group were satisfied toward Jigsaw learning method. **Conclusion:** The Jigsaw learning method was more effective in improving theoretical and practical achievement of nursing students toward the second stage of labor. **Recommendations:** Integration of Jigsaw learning Method in curriculum development at obstetrics and gynecology field.

***Keywords*:** Jigsaw learning Method, Second Stage of Labor, Theoretical and Practical Achievement. Nursing Students.

2. Effect of Supportive Instructional Guidelines on Quality of Life among Women with Chronic Pelvic Pain

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Abstract:

Background Chronic pelvic pain is one of the most common pain conditions affecting women and can have a significant impact on quality of life and sexual health. The nurses should understand the current evidence and best practices guidance regarding chronic pelvic pain. **Aim**: This study aims to evaluate the effect of supportive instructional guidelines on quality of life among women with chronic pelvic pain. **Study design**: A Quasi-experimental design was used. Setting: the current study was conducted at the outpatient gynecological clinic at Benha University Hospital. **Sample**: Purposive sample included 75 women diagnosed with chronic pelvic pain. Tools of data **collection**: Four tools were utilized for **data collection**: Self-administered questionnaire, Women's self-care practice questionnaire, visual analogical scale for pain severity, world health organization quality of life - BREF (WHOQOL-BREF) and modified female sexual function index. **Results**: the present study revealed a highly statistically significant difference at self-care practices. In addition, pelvic pain severity was satisfactory improved, which subsequently affect improvement of studied women quality of life. Conclusion: after implementation of the instructional guideline there was a marked improvement of self-care practices regarding chronic pelvic pain in women. Recommendation: Women with chronic pelvic pain should perform regular follow-up visits to evaluate health-related quality of life to detect any health problems early.

Keywords: chronic pelvic pain, instructional guideline and quality of life.

3. Effect of Nursing Instructions on Knowledge and Therapeutic Adherence among Leukemic Patients Undergoing Bone Marrow Transplantation

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Abstract:

Leukemia arise from the dysfunctional of developing leukocytes. Bone marrow transplantation used to replace bone marrow cells which damaged by disease or chemotherapy with healthy cells. Therapeutic adherence is the extent to which patients take medication as prescribed by their doctors, failure of therapeutic adherence lead to poor health outcomes**.** Nursing instructions help leukemic patients to take a proactive role in their own care, they need to comprehend their condition, therapeutic and healthy life style adherence. **Aim**: to evaluate the effect of nursing instructions on knowledge and therapeutic adherence among leukemic patients undergoing bone marrow transplantation. **Methods:** Quasi-experimental design was utilized included pre, immediately post, and follow up after six months **Subjects:** A purposive sample of 70 patients with leukemia undergoing BMT and excluded the patients with other associated disorders**, Setting** bone marrow transplantation units at Nasser Institute for Research and Treatment. **Tools:** Three tools were used. Tool (I): Patient`s structured Interview Questionnaire included, patients` personal data, patients` medical history assessment, patients` current complaint and physical symptoms assessment, patients` knowledge about leukemia and BMT and patients knowledge about healthy life style, Tool (II): Patient`s therapeutic adherence include Morisky adherence medication scale and therapeutic adherence barriers questionnaire. Tool (III): patients' adherence to healthy life style. **Results:** the current study indicated that less than one tenth of studied patients had good level of total knowledge about leukemia, bone marrow transplantation and healthy life style at pre implementation nursing of instructions, while the level improved to most of them immediately post implementation, but at follow up period there was slightly decreased in total knowledge score to more than three quarters of them.in addition, the present study portrayed that less than one fifth of studied patients had high level of medication adherence pre-implementation of nursing instruction, while immediately post-implementation the level of medication adherence was high among most of them, but this percentage slightly decreased at follow up period**. Conclusion:** Implementation of nursing instructions have appositive effect in improving studied patient 'knowledge and therapeutic adherence among leukemic patients undergoing BMT. **Recommendation**: The nursing instruction on knowledge and therapeutic adherence among leukemic patients undergoing bone marrow transplantation should be revised periodically and be available in all hospitals in both Arabic and English language. In addition, the educational intervention and patient's psychosocial support should be included in routine nursing care as a protocol before, after bone marrow and stem cell transplantation surgery, and at the time of follow up phase.

***Keywords*:** Bone Marrow Transplantation, Leukemia, Nursing Instructions, Therapeutic Adherence.

4. Mothers' Care for their Children with Cataract

Nabila Shawky Abd-Elmonem, Hanaa Abd El-Gawad Abd El-Megeed and Doaa Mohamed Sobhy Elsayed

Community Health Nursing Department, Faculty of Nursing- Benha University, Egypt.

Abstract:

Background: Cataract is one of the serious eye problems, the second leading cause of visual impairment and the first cause of blindness globally. **This study aimed** to assess mothers' care of their children with cataract. **Research design:** A descriptive research design was utilized in this study. **Setting:** This study was conducted at the Ophthalmological Outpatient Clinics of Benha University Hospital, in Benha City, Qualyobia Governorate, Egypt. **Sample:** A convenience sample of mothers having children with cataract attended to the previous mentioned setting, it included 102 mothers with their children. **Tools: I)** An structured interviewing questionnaire to **a)** assess socio demographic characteristics of the studied mothers, assess personal data of children with cataract, **b)** the past medical history of children with cataract, **C)** assess mothers' knowledge about cataract. **II): a)** An observational checklist to assess the mothers' practices regarding care of children with cataract. **Results**: 3.9% of studied mothers had good total knowledge level about cataract and 89.2% of the studied mothers had un satisfactory total practices regarding care of children with cataract. **Conclusion:** There was highly statistically significant relation between the studied mothers` total knowledge scores and their total practices scores about cataract. **Recommendations:** Health educational program should be developed and implemented for mothers to improve their knowledge and practices regarding care of their children with cataract.

***Keywords*:** Cataract, Children, Mothers' Care.

5. Effect of Educational Program on Head Nurses Meaningful Recognition knowledge and Practice

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Abstract:

Background: Meaningful recognition encompasses the positive acknowledgment of an Individual's existence, identity, rights, and achievements, serving as a crucial element for fostering Self-confidence, self-respect, and self-esteem. Aims: to ascertain how an educational program affects head nurses' meaningful acknowledgement of their practice and expertise.. Design: The study employed a quasi-experimental approach with pretest and posttest evaluation. Setting: This research was carried out in medical, surgical departments and critical units at two hospitals namely Elsahel teaching hospital and Ahmed Maher teaching hospital. Subject: Consisted of all head nurses) 70) who are the available during the time of data collection, take supervision role and working at the setting described above. Tools: Two tools were used to collect the data. Namly Meaningful Recognition Knowledge Questionnaire and Meaningful Recognition Practice Checklist. Results: showed that the majority of head nurses (92.9%) had an adequate level of knowledge during the immediately post-program phase compared to the preprogram (55.7%), and that the program had a positive effect on improvement of knowledge level throughout immediately post-program phases. Additionally, the majority of head nurses (87.1%) had a satisfactory practice level during the immediately post-program period compared to the pre-program (58.6%), indicating that the program had a good impact on improving practice level throughout the immediately post-program stages. Conclusion: At the immediate post-educational program phase, there was a very statistically significant favorable correlation between head nurses' overall knowledge and practice regarding meaningful recognition($p<0.01$). Recommendations: Ongoing educational and training programs are needed for head nurses about meaningful recognition process to enhanced positive work outcomes and establish guidelines about policy and work system for keeping meaningful recognition process among health care team.

Keywords: Educational program, Head nurses, Knowledge, Meaningful recognition, Practice.

6. Nutritional Lifestyle Modification Program for Patients with Multiple Sclerosis

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Abstract:

Background: Nutrition influences the improvement of symptoms of multiple sclerosis which is characterized by a chronic, autoimmune inflammatory process of the central nervous system. **Aim:** was to evaluate the effect of nutritional lifestyle modification program for patients with multiple sclerosis. **Design:** A quasi experimental research design was used. **Setting:** The study was carried-out at Cardiac Outpatient Clinic at Benha University Hospital and at MS Outpatient Clinic affiliated to Health Insurance Hospital in Benha city. **Sample:** A convenience sample included 173 patients attended to previously mentioned settings. **Tools:** Two tools were used: **I)** A structured Interviewing questionnaire to assess demographic characteristics of the studied patients, medical history and their knowledge. **II)** Nutritional lifestyle practices. **Results:** Showed that; 37% of the studied patients aged from 40 to less than50 years with a mean age of 36.06±9.25, 72.8% of them were females. Also; 76.3% and 71.7% of the studied patients had good total knowledge level about multiple sclerosis during post program and follow up phase respectively compared with 6.4% in pre-program phase. In addition; 82.1% and 81.5% of the studied patients had healthy total nutritional practices after implementation of the program and at follow up phase respectively compared with 12.7% pre-program phase **Conclusion:** Nutritional lifestyle modification program succeeded in improving knowledge and nutritional lifestyle practices of the studied patients with multiple sclerosis. **Recommendations:** Dissemination of nutritional lifestyle booklet for other multiple sclerosis patients.

***Keywords*:** Nutrition, lifestyle modification, multiple sclerosis.

7. Effect of Jigsaw Learning Method on Theoretical Achievement of Technical Nursing Institute Students regarding the Second Stage of Labour

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Abstract:

Background: Jigsaw learning Method affects theoretical achievement. **Aim of the study:** was to evaluate the effect of Jigsaw learning method on theoretical achievement of technical nursing institute students regarding the second stage of labour. **Setting:** The study was conducted at Technical Nursing Institute in Benha University. **Research design:** A quasi-experimental study was utilized to conduct the study. **Sample:** A systematic random sample included 60 nursing students was selected and divided equally into two groups control and study groups. **Tools of data collection:** Two tools were used: **Tool (I)** A structured self- administrated questionnaire**: part (1)** General characteristics of the nursing students. **Part (2)**: student's knowledge assessment questionnaire. **Tool (II):** Cooperative Jigsaw Opinion Sheet. **Results:** The present study revealed that, after implementation of the Jigsaw learning method the mean scores of theoretical achievements were finally higher in the study group compared to control group ($P \leq 0.05$). Also, the majority of the stud group were satisfied toward Jigsaw learning method. **Conclusion**: The Jigsaw learning method was greatly more effective in improving theoretical achievement of students toward the second stage of labor. **Recommendations:** Integration of Jigsaw learning method in curriculum development at obstetrics and gynecology field.

Keywords**:** *Jigsaw learning Method, Theoretical Achievement, Second Stage of Labor.*

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1. Innate Immune Response to *Vibrio cholerae* β-Barrel Pore-Forming Hemolysin: Unraveling Cytotoxic, Oxidative, and Inflammatory Pathways

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[2]Department of Clinical Trial Research Unit and Drug Discovery, Egyptian Liver Research Institute and Hospital (ELRIAH), Mansoura, Egypt

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Abstract:

Vibrio cholerae β-barrel pore-forming hemolysin (Vchβ-PFH) is a key virulence factor that disrupts host cell membranes, triggering immune responses. However, the transcriptional landscape of innate immunity in response to Vchβ-PFH remains poorly understood. This study investigates the cytotoxic, oxidative, inflammasome, and immune signaling responses to Vchβ-PFH in macrophage-like THP-1.**Methods** Cells were exposed to varying concentrations of Vchβ-PFH, and cytotoxicity was assessed using MTT and LDH assays. Oxidative stress levels were quantified via intracellular ROS measurements. Inflammasome activation was evaluated by NLRP3 and IL-1β using qRT-PCR. Immune signaling responses were analyzed by measuring the transcriptional expression of TNF-α, IFN-β, IL-10, and CD200. Primer sequences used for qRT-PCR were designed and validated through Primer-BLAST. **Results** Exposure to Vchβ-PFH resulted in significant dose-dependent cytotoxicity, as indicated by reduced cell viability and increased LDH release ($p < 0.01$). ROS levels were markedly elevated, suggesting oxidative stress as a key mechanism of toxin-induced damage. qRT-PCR analysis revealed upregulation of NLRP3, IL-1β, indicating inflammasome activation. Pro-inflammatory cytokines (TNF-α, IFN-β, and IL-1β) were significantly upregulated, while CD200 and IL-10 were also increased, suggesting a potential immune-regulatory feedback mechanism. **Conclusion** Vchβ-PFH induces cellular cytotoxicity, oxidative stress, inflammasome activation, and immune modulation, revealing its potential role in *V. cholerae* pathogenesis. These findings highlight novel molecular targets for therapeutic interventions against pore-forming toxin-mediated infections. Further studies are needed to explore the mechanisms underlying host immune evasion and inflammatory resolution in response to *V. cholerae* hemolysins.

***Keywords*:** *Vibrio cholerae*, β-barrel pore-forming hemolysin, innate immunity, inflammasome activation, oxidative stress and cytokine response.

2. Silica Nanoparticles Biosynthesis from Saccharomyces sp. with Antimicrobial Activity

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Abstract:

The present study focuses on the isolation of Saccharomyces spp. from bakery yeast samples and their potential for biosynthesizing silica nanoparticles (SiNPs) with antibacterial properties. Yeast samples were collected from four different bakeries in Benha to ensure strain diversity, and multiple isolates were successfully obtained. Screening for silica nanoparticle biosynthesis revealed significant variations among the isolates, with DO1S4 and DO4S1 exhibiting the highest biosynthesis potential (+++), indicating strong enzymatic activity and effective interaction with silica precursors. Moderate biosynthesis (++) was observed in isolates DO1S1 and DO2S3, while several isolates showed weak or no biosynthesis activity. The antibacterial activity of SiNPs synthesized from the highly active strain DO1S4 was evaluated against *Escherichia coli* and *Staphylococcus aureus.* The biosynthesized SiNPs demonstrated significant antibacterial effects, with inhibition rates of 77.025% against *E. coli* and 52.02% against *S. aureus*. However, their efficacy was lower than ciprofloxacin (5 µg/mL), which exhibited inhibition rates of 99.05% and 98.25%, respectively. The enhanced effect against *E. coli* compared to *S. aureus* is likely due to differences in bacterial cell wall structures, affecting nanoparticle penetration and antimicrobial efficiency. The antibacterial activity of the biosynthesized SiNPs is attributed to mechanisms such as reactive oxygen species (ROS) generation, membrane disruption, and interference with bacterial cellular functions. These findings highlight the potential of Saccharomyces sp. as a biogenic source for silica nanoparticle synthesis and their application in antimicrobial treatments. Further optimization of biosynthesis conditions, exploration of molecular mechanisms, and evaluation of biocompatibility are necessary for potential clinical and industrial applications. The study underscores the significance of microbial-derived nanomaterials in developing alternative antimicrobial agents, particularly in the context of growing antibiotic resistance.

***Keywords*:** Silica Nanoparticles; *Saccharomyces* sp. And antimicrobial activity.

3. Linear Analysis of Ion Acoustic Waves through Interaction of Solar Wind with Magnetosphere's Earth

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Abstract:

A linear analysis of electrostatic waves "ESW" propagating parallel to the ambient magnetic field of earth after interaction between solar wind with plasma in separatrix dayside region. The plasma is considered homogeneous and collisionless and comprising three fluids of hydrogen ions (solar beam, hot, cold ions) and two groups of electrons following Maxwell distribution. Numerical analysis of the dispersion relation shows six modes: two for solar ion beam, two for hot ions and two for cold ions where each fluid component has one mode of positive phase velocity and the other mode of negative phase velocity. By increasing solar ions beam velocity, the negative mode phase velocity of solar ion beam moves upward and changes to positive phase velocity. The mode of solar ions beam begins to merge with the mode of cold ions and generates ion acoustic waves. The effect of different other parameters has also been studied.

***Keywords*:** Linear analysis, Fluid model, Magnetospheric separatrix, Ion acoustic waves, Plasma instability.

4. Silver Nanoparticles Synthesized by Bacteria and Their Antimicrobial Activity

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[3] Main laboratories for Egyptian Army

Abstract:

Soil microbial communities play a crucial role in biotechnological applications, particularly in the process of making nanoparticles. Soil samples were obtained for this investigation from two different areas in Benha (SO1 and SO2) to isolate bacterial strains capable of synthesizing silver nanoparticles (AgNPs). There were ten of bacterial isolates collected, with six from SO1 and four from SO2. The ability of these isolates to synthesize AgNPs was assessed based on color change, indicating nanoparticle formation. Among them, SDO6 exhibited the highest biosynthetic activity (+++), suggesting a strong potential for silver ion reduction and nanoparticle stabilization.The antibacterial ability of biosynthesized AgNPs from SDO6 was tested against ***Escherichia coli*** and ***Staphylococcus aureus***, using ciprofloxacin (5 µg/mL) as a standard antibiotic. The results showed significant antibacterial effects, with an inhibition rate of 89.025% against *E. coli*, though slightly lower than ciprofloxacin (99.05%). In contrast, AgNPs exhibited a weaker inhibitory effect against ***S. aures*** (40.12%), compared to ciprofloxacin (98.25%). The higher susceptibility of ***E. coli*** suggests that AgNPs interact more effectively with Gram-negative bacterial membranes, leading to oxidative stress and cell disruption. The lower efficacy against ***S. aureus*** may be attributed to its thick peptidoglycan layer, this layer serves as a barrier against nanoparticle penetration.

***Keywords*:** ilver Nanoparticles; *Staphylococcus aureus, E. coli*. and antimicrobial activity.

5. Cytotoxicity and Antioxidant Potential of Vanillin from Coffee Peel Extract and Sorafenib in human MDAMB-231 Breast Cancer Cells: A Potential Therapeutic strategy

Shimaa Sobhy[1], Mervat G. Hassan[1], Mohamed O. Abdel-Monem[1,] Mahmoud S. A. Shahin[2], Jihan Hassan[3]and Alaa Elmetwalli[4,5]

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Abstract:

Background Breast cancer (BC) is the most prevalent malignancy among women in Egypt, accounting for 34.9% of all female cancer cases. Given the frequent limitations of conventional treatments, the need for alternative therapeutic strategies remains critical. Vanillin, a naturally occurring phenolic compound, has demonstrated multiple bioactive properties, including anti-inflammatory, anticancer, and antioxidant effects. **Objective**: This study aimed to assess the cytotoxic effects of vanillin derived from Coffee Peel Extract and sorafenib (SOR), an anti-hepatocellular carcinoma drug, using the triple-negative breast cancer (TNBC) MDA-MB-321 cell line. Additionally, we investigated their individual and combined impact on lipid peroxidation and antioxidant enzyme activity. **Methods**: MDA-MB-321 cells were treated with varying concentrations of vanillin (50–200 µM) and SOR (6.25–100 µM) for 48 hours, after which cell viability was assessed using the MTT assay. The activity of superoxide dismutase (SOD) and catalase (CAT)—key antioxidant enzymes—was quantified using colorimetric assays, while malondialdehyde (MDA) levels, a biomarker of lipid peroxidation, were also measured. **Results**: Both SOR and vanillin significantly ($P < 0.001$) reduced MDA-MB-321 cell viability. However, SOR exhibited greater cytotoxicity (IC90 = 144.8 ± 5.1 µg/ml) compared to vanillin (IC90 = 255.4 ± 6.5 µg/ml). In comparison to untreated and DMSO-treated control cells, SOR treatment alone resulted in the highest SOD and CAT activity, whereas the combination of SOR and vanillin led to the lowest MDA levels, indicating reduced oxidative stress. **Conclusion**: These findings suggest that SOR and vanillin exert anticancer effects in TNBC cells by modulating lipid peroxidation and antioxidant defense mechanisms. This study provides insight into their potential mechanism of action, supporting further exploration of vanillin-based combination therapies for breast cancer treatment.

***Keywords*:** vanillin, oxidative stress, cytokine, antioxidants.

6. Assessment of Trial to Use Exosomes and Salmon DNA with Minoxidil as Multisource Mixture for Hair Follicle Activation an in Vivo Study

Ahmed M.Abdelaziz[2], Mariam I. El-Gohary[3], Sara A.El-Akkad[1], Rahma H.Hagagy [1], Donia Alaa[1], Malak A. Ahmed[1],and Ali Saadani [1]

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[2]Ahmed Maher Teaching Hospital, Cairo, Egypt
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Abstract:

Hair loss considered the problem affecting on approximately 66% of men aged 35, while approximately 50% of women encounter noticeable hair loss during their lifetime. This study aims to evaluate the use of a mixture of multiple natural sources in addition to a commonly used drug (Minoxidil) and test its effect on modulate hair growth processes *in vivo*. Exosomes were isolated from human cord blood-derived mesenchymal stem cells (MSCs). Exosome characterization was performed using a Zetasizer Nano. Seven groups of C57BL/6 mice were employed as an in vivo model. Experimental groups received the following topical treatments for 10 consecutive days. Histological analysis was conducted using hematoxylin and eosin staining to evaluate hair follicle density, morphology, and distribution. Quantitative analysis of hair follicle number and size was performed using image analysis software. Furthermore, quantitative real-time polymerase chain reaction (qRT-PCR) was employed to assess the relative gene expression levels of Wnt11 and LHX2 genes. Histopathology of skin samples demonstrated a significant increase in hair follicle density and elongation in groups treated with minoxidil, with a further moderate enhancement observed in groups receiving combined treatments of exosomes and DNA polynucleotides. Quantitative qRT-PCR analysis of hair follicle tissue revealed a relative down regulation of Wnt 11 and LHX2 genes associated with hair growth inhibition in the minoxidil-treated group. Conversely, the groups treated with exosomes and DNA polynucleotides exhibited a substantial upregulation of genes associated with hair follicle proliferation and differentiation, indicating a potential mechanism for the observed hair growth stimulation. Topical application of the current type exosomes that used in our research is less effective than when combined with minoxidil and salmon DNA. Activity of exosome depending on isolation method and nano size category it is critical point for application. Minoxidil alone shows higher hair growth efficacy compared to its combination with exosomes and salmon DNA, results in lower molecular-level expression of hair growth-related genes compared to exosomes.

***Keywords*:** minoxidil, exosomes, salmon DNA, cell culture, Wnt 11 and LHX2 genes, hair follicles

7. Contribution to the tectonic setting of the Northern Galala Plateau, Gulf of Suez, Egypt

Mohamed Ibrahim Mahran[1], Wael Dardir Hagag, Gamal M. El Qot[1], Refaat Abdelkarim Osman[1], Mahmoud Khairy Alawy[2] and Zakaria Elsayed Hamimi[1]

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Abstract:

Detailed field investigation of the Northern Galala Plateau (NGP), located between the Cairo-Suez district and Wadi Araba, reveals that the exposed stratigraphic succession in the area are the Abu Darag (oldest), Aheimer, Qiseib, Rieina, Ras El-Abd, Malha, Galala, Thebes and Mokattam (youngest) formations. These formations are traversed by three main trends of extensional faults, which can be arranged from oldest to youngest based on their cross-cutting relations into E-W (to ENE-WSW), NW-SE (to NNW-SSE) and NE-SW (to NNE-SSW). These faulting trends can be affiliated to three main far-field tectonic events, namely the Tethyan rifting, the Clysmic rifting and the Aqaba-Dead Sea transform system, respectively. The objective of the present work is to highlight the main characteristic features of the above-mentioned faulting trends in terms of their geometries and kinematic history. Results obtained from this study will add much more contribution to our knowledge, not only on the tectonic evolution of the GOSR but also to the whole Afro-Arabian Rift System.

***Keywords*:** Gulf of Suez Rift, Cairo-Suez structural province, Tethyan Rifting, transtensional regime, Afro-Arabian Rift.

8. Palaeoenvironments and Palaeobiogeographical Distribution of the Eocene larger benthic forAminifera and Macrofaunal Associations in the Northern Plateau of the Bahariya Depression, Western Desert, Egypt

Nada A. Ayoub[1], Sayed M. Ahmed[1], Rifaat A. Osman[1], Mervat S. Hassan[2], and Emad S. Sallam[1]

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[2] Central Metallurgical Research and Development Institute, Cairo, Egypt

Abstract:

The Eocene rocks exposed in the northern plateau of the Bahariya Depression constitute from base to top, the Naqb, Qazzun and El-Hamra formations, which made up of highly fossiliferous siliciclastic–carbonate rocks deposited essentially in marginal-marine, neritic, tide-dominated environments. These environments correspond, respectively, to peritidal flat, lagoonal–restricted bays, barrier shoal and platform margin reefal zones situated on a gently sloping homoclinal inner to very proximal mid-ramp settings. Four local larger benthic foraminiferal total range zones were identified. These zones correspond to the regional larger benthic foraminiferal zones (SBZ12 through SBZ19) of the Tethyan shallow carbonate platforms that allowed assigning late Ypresian age to the Naqb Formation, early Lutetian to the Qazzun Formation, and middle Lutetian–Priabonian to the El-Hamra Formation. Furthermore five distinctive macrofaunal assemblages were identified and palaeoecologically interpreted. Paleobiogeographically, the identified benthic foraminifera and macrofaunal assemblages show a dominantly Tethyan character and strong affinity to the African, Arabian, Indian and southern Europe marginal-marine carbonate platforms. This study, therefore, contributes to the understanding of the facies architecture and palaeobiogeography of the Eocene carbonate platforms developed along the margins of the circum-Mediterranean domain.

***Keywords*:** Palaeoenvironments, Palaeobiogeography, Eocene, Bahariya Depression.

9. Mountain of the Dead: A Remarkable Geoheritage Site for Sustainable Socio-Economic Development in Siwa Oasis, Egypt

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Abstract:

The geological heritage sites in the Great Sahara in northern Africa have an extreme importance as they offer a lot of socio-economic benefits and employment opportunities to the inhabitants of this desolate desert. Additionally, these heritage sites provide significant scientific, educational, cultural and aesthetic values (e.g., Sallam and Ruban 2017, 2019; Sallam *et al.* 2018c, Al-Dhwadi and Sallam 2019; Abd-Elhakim *et al*. 2021; Ruban *et al.* 2019, 2021; Sallam *et al*. 2020a, b, 2022; Sallam and Abou-Elmagd 2021; Sallam 2022; Mashaal and Sallam 2023; Mousa *et al.* 2023, 2024a, b; Errami *et al*. 2024). Amongst these interesting sites is Siwa Oasis, which is located in the far west of Egypt along the Libyan Desert. The oasis tolerates some forms of life in this hyper-arid desert. Finding new geology-related resources is very necessary for sustainable development of such remote oases in the Sahara. Geologically, Siwa Oasis is a large naturally excavated depression originated primarily through long periods of karstification and severe erosion, which left some residual hills behind. These hills constitute several spectacular geomorphological landforms such as buttes, mesas, inselbergs and mushroom rocks, which are scattered on the floor of the depression (Fig. 1) (e.g., Plyusnina *et al*. 2016; Sallam *et al*. 2018a; Mashaal *et al*. 2020).

***Keywords*:** Dead mountain, Siwa Oasis, geoheritage

10. Study Incidence of Different Bacterial Pathogens and Antimicrobial Susceptibility in Infective Endocarditis Patients and Related Complications

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Abstract:

Infective endocarditis (IE) is a critical and potentially fatal condition, frequently resulting in severe complications and a heightened risk of mortality. So, the current study presented an updated report about bacteriological characteristics, complications, and risk profiles associated with six months of surveillance on ninety patients , mean age = 34.68 ± 8.86 years , including (82.22 %) males and (17.78%) females) suffering from IE. Between February 2023 and September 2024, blood samples were taken from patients who were hospitalized in the cardiac ICUs and cardiothoracic critical care units in two tertiary care centers in the Egyptian Delta region. Findings revealed that IV drug use was the leading predisposing factor for IE (65.56%). *Staphylococcus aureus* was superior to other isolated bacterial species with the prevalence of 55.56%; which was sensitive to linezolid particularly. On the other hand, septic pulmonary embolism was the major IE-complication (40.23%); that caused about 47.78% of mortalities associated with the current examined cases.

***Keywords*:** Infective endocarditis, Intravenous drug use, *Staphylococcus aureus*.

11. Optimization of Laccase Production and Purification from Penicillium Chrysogenum

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Abstract:

Laccase (benzenediol: oxygen oxidoreductase, EC 1.10.3.2) is one of the best-known multicopper enzymes and catalyzes the oxidation of a variety of aromatic compounds, in particular phenolic substrates, coupled to the reduction of molecular oxygen to water. Using molecular oxygen as an electron acceptor, laccase oxidizes its substrates by an electron transfer mechanism that generates unstable free radical intermediates and causes non-enzymatic reactions that break down substrate molecules. The enzyme was isolated from *Penicillium chrysogenum.* The study discovered that laccase production reached its highest value occurred after 72 hours of incubation at 35°C and pH 7.0. Laccase acted on various phenolic compounds including ABTS, 2,6-DMP, syringaldazine, guaiacol, catechol in addition to pyrogallol and BTS was the best substrate. Laccase was purified using ammonium sulfate fractionation, Sephadex G-200 and DEAE-Sepharose with final specific activity of 113.5 units mg^{-1} protein, 103.2-fold of purification and recovery of 26.8%.

***Keywords*:** Laccase, Penicillium chrysogenum, biotechnological processes, Water pollution.

12. Production and purification of phytase from *Staphylococcus sciuri*

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Abstract:

Staphylococcus sciuri was used to identify and purify phytose, which is also known as myo-inositol hexakisphosphate phosphohydrolase (EC.3.1.3.8). When it came to the formation of phytase and growth, glucose was the most effective carbon source. In terms of growth and the synthesis of phytase, the most effective nitrogen source was peptone combined with yeast extract. Seven was the pH level that was ideal for the formation of phytase. The ideal temperature for the synthesis of phytase was 35 degrees Celsius. The ideal amount of time for enzyme synthesis was forty-eight hours of incubation. An eighty percent solution of ammonium sulfate, DEAE-Cellulose, and Sephadex G-200 were used in order to achieve homogeneity in the enzyme. Finally, the specific activity was determined to be 355 Umg-1 protein, respectively. After going through five rounds, the enzyme that was immobilized on carrageenan-maintained 43 percent of its activity.

Keywords: *Staphylococcus sciuri*, Production, Purification, Immobilization.

13. Bioactive Secondary Metabolites from Marine Bacteria

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Abstract:

Marine samples were collected from the Red Sea beach in Hurghada, Egypt, and processed within 24 hours. A total of 20 bacterial isolates were obtained from water samples and coded accordingly. These isolates were cultured in SP2 media for small-scale fermentation, and bioactive compounds were extracted using ethyl acetate. The crude extracts were tested for antimicrobial and antifungal activities against *Escherichia coli*, *Staphylococcus aureus*, *Aspergillus niger*, and *Candida albicans*. Antimicrobial screening revealed that all 20 isolates exhibited inhibitory effects against *E. coli* and *S. aureus*, with H1 demonstrating the highest inhibition (85.34%) against *S. aureus*. The antifungal activity assessment indicated that Es1 was the most potent against *Aspergillus niger* (81.78%), while B3 showed the highest activity against *Candida albicans* (82.7%). These findings highlight the potential of marine bacteria as sources of bioactive compounds with promising antimicrobial and antifungal properties, warranting further characterization and optimization for potential pharmaceutical applications.

***Keywords*:** Bioactive Secondary Metabolites, marine bacteria, E-coli, Staphylococcus aureus, and Candida albicans.

14. Antimicrobial Activity of Cichorium Intybus Leaves Extracts

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Abstract:

Plants have formed the foundation of traditional medicine for hundreds of years, and they still provide humanity with novel answers. The phrase "medical plant" has been defined in the literature as the direct application of different plant parts or the active compounds produced from them in the treatment of illnesses. Because they are a source of therapeutic phytochemicals that will enable the creation of new medications, medicinal plants are extremely important. *Cichorium intybus* extracts (water and ethanolic) were assayed for the evaluation of their antimicrobial activity against four bacterial strains: *Escherichia coli, Listeria monocytogenes, Pseudomonas aeruginosa, and Staphylococcus aureus,* two fungal *Aspergillus niger* and *Fusarium exosporium* and *C. albicans*

***Keywords*:** *Aspergillus niger, C. albicans, Cichorium intybus, Escherichia coli, Fusarium exosporium, Listeria monocytogenes, Pseudomonas aeruginosa, Staphylococcus aureus.*

15. Antimicrobial Activity of Portulaca Oleracea Leaves Extracts

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[1]Botany and Microbiology, Department., Faculty of Science, Benha Univ., Benha, Egypt

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Abstract:

Throughout all medical traditions, folk medicine has utilized plants since ancient times. Oral hygiene folklore uses a variety of herbs and plant-derived antibacterial components. Portulaca oleracea extracts, both water and ethanolic, were evaluated for their antimicrobial activity against a range of microbial strains, including four bacterial species: *Escherichia coli*, *Listeria monocytogenes*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*. Additionally, the extracts were tested against two fungal species, *Aspergillus niger* and *Fusarium exosporium*, as well as *Candida albicans.*

***Keywords*:** *Aspergillus niger, C. albicans, Escherichia coli, Fusarium exosporium, Listeria monocytogenes, Pseudomonas aeruginosa, Portulaca oleracea, Staphylococcus aureus*.

16. Preparation, Characterization, and Applications of Nano Manganese Oxide via Combustion Synthesis for Water Treatment

Mai Mahmoud Gneidy[1], Ayman Ali abdelrazic[1] and Alaa EL-Sayed Amin[1]

Applied Inorganic Chemistry Department, Faculty of Science, Benha Univ., Benha, Egypt

Abstract:

The presence of dyes in water streams poses a significant environmental challenge due to their harmful effects on living organisms and ecosystems. This study aims to evaluate the effectiveness of manganese oxide nanoparticles (Mn_2O_3), synthesized via an optimized urea-assisted combustion method, for the treatment of water contaminated with Sunset Yellow dye. The synthesized nanoparticles were characterized using advanced techniques such as X-Ray Diffractometry (XRD) to determine their crystal structure and Fourier Transform Infrared Spectroscopy (FTIR) to identify the functional groups on their surface, providing a comprehensive understanding of their physicochemical properties.The efficiency of Sunset Yellow dye removal using these nanoparticles was assessed under various conditions, with initial results demonstrating a remarkable removal efficiency of 98.2% at a pH of 2 and within a contact time of 90 minutes. Furthermore, the impact of other factors, including the initial dye concentration and contact time, on the adsorption process was investigated to determine the optimal conditions for effective removal.To elucidate the underlying mechanism of the removal process, the study explored the adsorption kinetics and isotherm models to identify the nature of the interactions between the dye and the nanoscale surface and to determine the maximum adsorption capacity. The obtained results indicate that the manganese oxide nanoparticles synthesized through the urea-assisted combustion method exhibit promising potential as an efficient and cost-effective adsorbent for the removal of Sunset Yellow dye from polluted water, contributing to the development of sustainable solutions for water treatment.t

***Keywords*:** Nano Manganese Oxide, Combustion synthesis, Sunset Dye, Dye Removal, Adsorption.

17. Diversity, Relative Abundance and Preference of Blowflies to Different Food Substrates in Qalyubiya Governorate, Egypt.

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Abstract:

Blowflies and other insects can be used in forensic entomology to provide information for criminal investigations, providing tools to solve criminal cases. Blowflies' preference for corpses, important insect evidence in forensic investigations, was studied by distributing a number of different food substrates in urban and rural areas. The diversity and abundance of blowflies in summer and winter seasons were also studied. A total of 11,508 adults and larvae belonging to sixteen species from 10 families were collected. More insects were collected in rural areas than urban ones. *Chrysomya albiceps*, *Sarcophaga carnaria*, *and Lucilia sericata* made up 16.8%, 14.0%, and 12.5% of all the insects collected, respectively. The majority of adults were attracted to rabbit meat baits, followed by beef steaks and mouse carcasses. *Chrysomya albiceps*, *C. vicina*, *C. megacephala*, and *L. sericata* flies preferred rabbit meat, while *S. carnaria* and *Wohlfahrtia magnifica* flies preferred mouse carcasses. All flies profited from the rural environments except *S. carnaria* (52.80%) and *Drosophila melanogaster* flies (54.79%). The relative abundance, diversity, and seasonality of *Chrysomya*, *Lucilia*, *Sarcophaga*, *Wohlfahrtia*, *Muscina*, *Musca*, *Drosophila*, and *Fannia genera* increased during the summer months, with a total number of 1595, 897, 805, 1173, 1310, 873, 292, 1043, 151, and 531, respectively. The abundance of insects on the rabbit meat baits may simulate conditions similar to human corpses. The present results may be of enormous help for legal investigations in the region and its surroundings.

Keywords: Forensic entomology; blowflies; *Chrysomya albiceps*; food substrates.

18. Facile Synthesis of Novel Phthalazine – Based Derivatives as Antimicrobial Agent Supported by Molecular Docking

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Abstract:

Phthalazine 1-(2H) one (1) coupled with Tosyl-aminoacid (2) in presence (DCC) N,N`dicyclohexyl-carbodiimide as dehydrating agent to furnish the phthalazine derivatives(3) as shown in scheme(I,II). The acetate derivative(4) was allowed to react with hydrazine hydrate to yield acetohydrazide derivative (5) .Due to high functionality of the side chain of acetohydrazide (5) ,so it used as starting molecule to synthesis series of new molecules. The hydrazide (5) was allowed to reacted with different reagents like aromatic aldehydes, glucose ,phenylisothiocyanate, isatin and carbon disulfide to yield phthalazine derivative 6,7,8,11,13 and14 respectively. The synthesized compounds were screened for their antimicrobial activity and some exhibited promising results . we also supported our working by molecular docking studies. A molecular dockding study between the receptor and the target compounds was performed and it was confirmed a good correlation between the strength of receptor binding and anti bacterial activity .The structure of synthesized compounds were confirmed by spectroscopic techniques and elemental analysis.

***Keywords*:** phthalazinione, tosyl amino acid , carbodidimide method, acetate derivative , acetohydrazide, molecular docking .

19. Screening and Characterization of Potential Probiotic Lactic Acid Bacteria Isolated from Traditional Dairy Products

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[2]National Center for Radiation Research and Technology,
Egyptian Atomic Energy Authority, Cairo, Egypt

Abstract:

Lactic acid bacteria (LAB) have been used as probiotic agents due to their ability to produce a variety of beneficial compounds for cultivars and their status as safe microorganisms. Discovering and evaluating new probiotics in dairy products and other normal habitats poses a global economic and health importance. Therefore, in our study, a total of 43 traditional dairy product samples were collected from Menoufia and Qalyubia governorates for isolation of lactic acid bacteria with probiotic characteristics. Seventy-nine bacterial isolates were obtained and identified morphologically and biochemically. Among these isolates, only 23 were found to have LAB characteristics as catalase-negative, gram-positive and non-motile. The most potent five isolates (P18, P19, P28, P41, and P42) were tested for their probiotic characteristics, including low pH tolerance and bile salt stability. They showed high tolerance against pH 3.0 and 0.3 % bile salt concentration. Thus, this research provides a foundation for developing dairy products that can positively affect human health by incorporating probiotic microorganisms.

***Keywords*:** Lactic acid bacteria, Isolation, Screening, Probiotics and Dairy products.

20. Nanocomposite Zinc-oxide-silica-: A Sustainable Route to Antimicrobial and Anticancer Application

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5. Department of Applied Medical Chemistry, Medical Research Institute, Alexandria University, Alexandria, Egypt
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Abstract:

Background:Zinc oxide silica nanoparticles (ZnO NPs) have drawn interest due to their distinct physical, chemical, and biological characteristics, which make them attractive options for antibacterial and anticancer uses. Hazardous materials are frequently used in traditional chemical synthesis techniques, which makes greener, more sustainable alternatives necessary. Using Alteromonas sp., a bacteria known for its metabolic capabilities, this work investigates the synthesis of ZnO NPs and assesses their characterisation, antimicrobial, and anticancer characteristics.. Methods: (ZnO NPs) were synthesized by incubating Alteromonas sp with zinc acetate and sodium silicate under controlled conditions. The resulting nanoparticles were purified and characterized using UV-Vis, TEM, XRD, DLS, and FTIR. Antimicrobial activity was assessed against bacterial pathogens, while anticancer activity was evaluated using cancer cell lines. Results: The synthesized (ZnO NPs) exhibited significant antimicrobial activity against various pathogens and demonstrated promising anticancer effects by inducing oxidative stress and apoptosis in cancer cell lines. Conclusion: Using Alteromonas sp., the study effectively illustrated a green production method for (ZnO NPs). The identified nanoparticles provided a sustainable substitute for traditional synthesis techniques and demonstrated promise for antibacterial and anticancer uses. To fully investigate their therapeutic potential and methods of action, more research is required.

***Keywords*:** Zinc oxide, Silica, Composites, Antibacterial activity.

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1. Effect of Phosphorus Fertilization and Foliar Spraying With Some Growth Stimulants on Vegetative Growth, And Nutritional Status of Potato Plant

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Abstract:

This field experiment was conducted at El Kanater Horticultural Research Station in Kaluobia Governorate, Egypt, during the two winter seasons of 2021/2022 and 2022/2023 to investigate the effect of minerals and bio-phosphorus fertilizers treatment, foliar spraying with salicylic acid, potassium citrate and potassium silicate and their interactions on the vegetative growth and chemical constituents of plant foliage of potato plants cv. Spunta. phosphorus fertilization is phosphoric acid (40 l/fed) + phosphorene as biofertilizer, phosphoric acid 60 l/fed + phosphorene, phosphoric acid 80 l/fed + phosphorene, and control 400kg calcium superphosphate and foliar spraying treatments with potassium silicate at 2 g/l, potassium citrate at 3 g/l, and salicylic acid 0.5 g/l in addition to control. Obtained results showed that the interaction effect of phosphorus (phosphoric acid 80 l/fed+ phosphorene and foliar spraying potassium citrate 3g/l significantly ($P < 0.05$) improved the vegetative growth parameters (plant height, number of main shoots, fresh and dry weight, total carbohydrate and NPK contents on leaves.

***Keywords*:** Potassium silicate, Potassium citrate, Salicylic acid, phosphoric acid.

2. Isolation and Identification of Strawberry Crown Rot Pathogen

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[2]Plant Pathology Research Institute, Agricultural Research Centre, 12619 Giza, Egypt

Abstract:

Strawberry is a high-value crop for economy and animal nutrition. This study was conducted to identify of strawberry crown rot pathogen disease. Five fungal genera were isolated, purified and identified according to the phenotypic criteria studied: *Pestalotiopsis* spp., *F. solani*, *F. oxysporum*, *Rhizoctonia solani*, and *Macrophomina phaseolina*. *Pestalotiopsis* spp. fungus *was* the most common accounting for 42.3% of the total isolates. Moreover, *F. oxysporum* was isolated with a frequency of 23.7%, and *F. solani* with 14.8%. The pathogen isolated from crown root diseased strawberry plants was morphologically similar to the genus Neopestalotiopsis. Phylogenetic tree based on ITS sequences of rDNA of the fungal sample isolated in the present study (*Pestalotiopsis microspora* strain AUMC16335, arrowed) aligned with closely related strains accessed from the GenBank. This strain showed 99.81% identity and 100% coverage with several strains of the same species. A close relationship was also, observed between the current strain sequences and some *Pestalotiopsis haikouensis* strains. *Pestalotiopsis microspora* strain (AUMC16336, arrowed) aligned with closely related strains accessed from the GenBank. This strain showed 99.81% identity and 100% coverage with several strains of the same species. Five strawberry varieties were evaluated for resistance to Pestalotiopsis. Both Sensation and Fortuna cultivars showed a significant increase in the disease incidence rate (DI), which they recorded at 93.33%. The Florida Beauty variety recorded an infection rate of 87.67%. The Winter Star and Festival varieties also, recorded the lowest infection rate, with 80.00% and 73.33%.

***Keywords*:** Strawberry, crown rot, Pestalotiopsis, GenBank, Neopestalotiopsis.

3. The Protective Role of Marjoram in Mitigating the Toxicity of Bromadiolone in Adult Male *Mus Musculus*.

Amr M. Fawzy Gaafer[1] , Gad Hamada Hassan [2], Abdul mawgoud Abdallah[1] , Ghada Refaat yousef[2]and Moamen A. Elbath[2]

[1] Plant Protection Research institute, Dokki, Giza. Egypt.

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Abstract:

Bromadiolone, a coumarin-based anticoagulant rodenticide, is widely used for controlling rodents, raising concerns about its potential to contaminate human and farm animal diets and entering the food chain has raised concerns, leading scientists to investigate its biological impacts Marjoram is a natural herb known for its therapeutic properties and protective effects against cellular damage. This study was aimed to assess the toxicological effects of bromadiolone on chromosomes, liver, and testes of male albino *Mus musculus*, as well as evaluate the protective efficacy of Marjoram aqueous extract to counteract the genotoxic effects and histopathological damage caused by bromadiolone in these organs. The study involved 65 adult male Wistar albino house mouse, divided into 13 groups. The groups included: (a) control, (b) and (c), receiving *Origanum majorana* extract at doses of (1.5%) 150 mg/kg b.w. and (3%) 300 mg/kg b.w. respectively, (d) and (e), administered single doses of rodenticides (1/10 LD 50 and 1/20 LD 50, respectively), (f) to (i), treated with bromadiolone (1/10 LD 50 - 1/20 LD 50) followed by Marjoram extract (150 mg/kg or 300 mg/kg), (j) to (m), given *Origanum majorana* extract (150 mg/kg or 300 mg/kg) followed by bromadiolone (1/10 LD 50 or 1/20 LD 50). Bone marrow cells from all groups were analyzed for chromosomal aberrations, and liver and testis tissues underwent histopathological examination. Bromadiolone significantly increased chromosomal abnormalities, reduced the mitotic index, and caused histopathological damage to internal organs (liver and testes). The findings demonstrated the protective potential of *Origanum majorana* against the genotoxic, cytotoxic, and histopathological effects of bromadiolone, highlighting its antigenotoxic and anticytotoxic properties in mitigating the damage to bone marrow cells, liver, and testes.

Keywords: Bromadiolone, Anticoagulant, Rodenticides, Chromosomal Aberrations.

4. The Role of Zingiber Officinale in Alleviating Brodifacoum-Induced Toxicity in Male *Mus Musculus*

Amr M. Fawzy Gaafer[1] , Gad Hamada Hassan [2], Abdul mawgoud Abdallah[1] , Ghada Refaat yousef[2]and Moamen A. Elbath[2]

[1] Plant Protection Research institute, Dokki, Giza. Egypt.

[2] Plant Protection Department, Faculty of Agriculture, Benha University.

Abstract:

In this study, the focus is on investigating the effects of a specific type of rodenticides on rodents, with an emphasis on chromosomal and histopathological changes. The research also examines the extent of these effects on both the liver and testes of white rats. Additionally, the study explores the role of ginger plant extract as an antioxidant in mitigating these effects. The study was conducted using 65 adult albino mice, which were divided into groups. The first group served as the control group, while groups b and c received ginger extract at doses of 1.5% and 3%. Groups d and e were given a single dose of brodifacoum, with d receiving 1/10 of the lethal dose (LD_{50}) and e receiving 1/20 of the LD_{50}. Groups f - i were treated with brodifacoum followed by ginger extract, while groups j to k received Zingiber officinale extract first, then rodenticidesThen, the mice were sacrificed, and their bone marrow cells were analyzed to study chromosomal changes. Then liver and testis samples were collected for histopathological evaluation. The group treated with rodenticides showed a significant increase in chromosomal abnormalities and a reduction in the mitotic index. Additionally, histological changes were observed in the liver and testis. However, the mice treated with both rodenticides and Zingiber officinale, chromosomal aberrations decreased, the mitotic index increased, and there were slight improvements in liver and testis histology. These findings suggest that rodenticides has mutagenic effects on chromosomes and causes histopathological changes in organs like the liver and testis, while ginger may serve as a protective agent against the toxic effects of rodenticides.

Keywords: Brodifacoum, Anticoagulant Rodenticides, Chromosomal Aberrations.

5. Influence of Different Growing Media on Growth and Chemical Compositions of Schefflera (*Schefflera Arboricola* L.) Plant

Amani, N.M. Gorgui[2] ,Y.A.A. Ghatas[1], Y.F.Y. Mohamed[1] ,

Hanan M.A.Youssef[2]and Mohamed, Safaa M.[1]

[1] Horticulture Department, Faculty of Agriculture, Benha University, Egypt.

[2]Dept. of Ornamental Plant Horticulture research Institute,

Agriculture Research Center, Giza, Egypt

Abstract:

Schefflera arboricola plant is an important ornamental plant used extensively in interior decoration and is native to Australia and belongs to the Araliaceae family. Due to its distinctive umbrella-like leaves and its great ability to adapt to indoor conditions, it has become popular in interior decoration of house plant. A pot experimental trial was carried out during two successive seasons of 2022/2023 and 2023/2024 and at the Horticultural Rresearch Station in Al-Qanater Al-Khairia , Horticultural Research Institute,Agriculture Research Center Qalyubia Governorate, cooperation of faculty of Agriculture Benha University to study the effect of four treatments different growing media, i.e. sand+ clay , sand + clay + peat moss, sand +clay + compost, and sand +clay + vermiculite (1:1:1 by volume. of *Schefflera arboricola* L. plant. The results showed, the tallest and heaviest fresh, dry weights of shoots as well as root parameters Schefflera arboricola L. plant were scored by (sand+ clay + compost) in both seasons. The mixture media (sand + clay + compost) gave the richest % N, P, K and total carbohydratesof this plant. Conclusively, growing media mixture (sand +clay +compost) or (sand +clay +peat moss) for enhancing the growth and the chemical constituents of Schefflera arboricola L. plant.

Keywords: Schefflera arboricola., growing media, , vegetative growth and chemical compositions

6. Response of Schefflera (*Schefflera Arboricola* L.) Plant to Different Water Regimes Treatments

Amani , N.M. Gorgui[2] ,Y.A.A. Ghatas[1], Y.F.Y. Mohamed[1] , Hanan M.A.Youssef [2] and Mohamed, Safaa M.[1]

[1]Horticulture Department, Faculty of Agriculture, Benha University, Egypt.

[2] Ornamental Plant Department Horticulture research Institute,

Agriculture Research Center, Giza, Egypt

Abstract:

Schefflera arboricola plant is an important ornamental plant used extensively in interior decoration and is native to Australia and belongs to the Araliaceae family. A pot experimental trial was carried out during 1st and 2nd seasons of 2022/2023 and 2023/2024 and at the Horticultural Rresearch Station in Al-Qanater Al-Khairia, Horticultural Research Institute, Agriculture Research Center Qalyubia Governorate, cooperation with faculty of Agriculture Benha University to study the effect of four treatments water regimes treatments, i.e 100, 70, 50 and 30 % of the field capacity (FC) of *Schefflera arboricola* L. plant. The results showed, plant height, shoots fresh and dry weights and root parameters of *Schefflera arboricola* L. plant were significantly affected by using deficient irrigation treatments. As the field capacity level decreased, the above mention parameters decreased., and the lowest value was scored by 30 % FC. Furthermore, the richest percentage of N, P, K and total carbohydrates (%) were significantly increased by the high level of irrigation and was recorded at (100%FC) treatment, followed in descendingly by(70%FC). Conclusively, it is preferable to the treatment 100 % FC followed descendingly by 70 % FC register the maximum values of the growth and the chemical constituents of *Schefflera arboricola* L. plant.

Keywords: *Schefflera arboricola*., water regimes, vegetative growth and chemical compositions.

7. Assessment of Magnetization Treatment Effect on Some Physical and Biological Characteristics of Saline Irrigation Water

Heba Abdelsalam[1], Harby Mostafa[1], Mohamed El-Ansary[1], Montaser Awad[1] and Wael Sultan[2]

[1]Agric. and Biosys. Eng. Dept., Faculty of Agriculture, Benha University, Moshtohor, Qalyobia, Egypt.

[2]Senior Researcher of Agric. Eng., Institute, Agricultural Research Center, Egypt

Abstract:

The salinity of irrigation water and soil are the major challenge factors for expansion of agricultural area in Egypt. Moreover, salt concentrations cause a lot of problems for soil and plants especially under pressurized irrigation systems. However, the usage of magnetic water treatment may help in solve the problem. Therefore, this investigation was conducted to descript the effect of magnetic field on the properties of irrigation water. Magnetic devices with two intensities (1600 and 14500 Gauss "G") were used to treat three saline water levels (tap water with 219 ppm, 1000 ppm and 2000 ppm). It was found that magnetization affects dynamic viscosity, dissolved oxygen, surface tension and pH. Also, found a positive effect of magnetization on the total number of microorganisms. On the other hand, There is a slight increase on electrical conductivity due to magnetism, and it increases more over time. The viscosity of water was decreased under magnetic treatment. The surface tension dropped by 1.5% and 3% when the salinity increased from 219 to 1000 and 2000 ppm respectively. The total number of microorganisms decreased by 17.1% and 57.3% at 219 ppm, by 38.6% and 57.5% at 1000 ppm and by 32.5% and 55.5% at 2000 ppm comparing to non-magnetic water under 1600 and 14500 G, respectively.

Keywords: Magnetization; Salinity and Water properties.

8. Molecular Identification of Dominant Microorganisms Associated with the Spoilage of Strawberries and Oranges Using Ribosomal RNA Gene Sequencing

Samar G. El-Badawy, Ashraf Sharoba and Mohamed K. Morsy
Food Technology Department, Faculty of Agriculture, Benha University, Egypt.

Abstract:

This study aimed at the molecular identification of dominant microorganisms associated with the spoilage of strawberries and oranges using ribosomal RNA genes (16S rRNA and 18S rRNA) and the nuclear ribosomal internal transcribed spacer (ITS) region. Samples of strawberries exhibiting grey mold and oranges exhibiting green mold were collected from Al-Obour market. Microbial total counts were determined, and three bacterial isolates (coded Sab-01, Sab-02, and Sab-03) and two fungal isolates (Sa02 (F1) and Sa04 (F2)) were selected from the spoiled fruits. The isolates were purified and morphologically identified as Gram-positive bacilli (Sab-01), Gram-negative short rods (Sab-02 and Sab-03), *Botrytis* sp. (Sa02 (F1)), and *Penicillium* sp. (Sa04 (F2)). Molecular identification using the 16S rRNA gene sequence identified the bacterial isolates as *Bacillus subtilis* (Sab-01-RSDS), *Stenotrophomonas maltophilia* (Sab-02-RSDS), and *Pseudomonas putida* (Sab-03-RSDS), while the 18S rRNA and ITS region identified the fungal isolates as *Penicillium digitatum* (Sa04-RODS) and *Botrytis cinerea* (Sa02-RSDS). These strains were deposited in GenBank under accession numbers LC784320.1, LC784321.1, LC784322.1, LC784323.1, and LC784324.1, respectively. Sequence alignments of the 16S rRNA, 18S rRNA genes, and ITS region showed identities close to 100% with the most similar strains in GenBank. Phylogenetic analysis confirmed the genetic relationships between the isolates and their corresponding species, supporting the use of ribosomal RNA genes and the ITS region for accurate microbial identification.

Keywords: Strawberries, Oranges, 16S rRNA, 18S rRNA, ITS region.

9. Effect of Spraying GA3 with Different Concentrations on Productivity and Some Fruit Physical Properties of Barhee Date Palm Fruits

Ahmed M. El-Masry, Hamed E. El-Badawy and Sherif Fathy El-Gioushy
Horticulture Department, Faculty of Agriculture, Benha University, Egypt

Abstract:

The experiment was conducted to investigate the effects of foliar application of gibberellic acid on productivity and fruit quality in 'Barhee' date palm was carried out during the 2023 and 2024 seasons in at El-Mansoria district (Egypt - Alexandria Desert Road), El-Giza Governorate, Egypt. GA3 (5, 10, 15, 20, 25 ppm) was applied to the Date palms and Fruit under control were sprayed with tap water only. Investigate were recorded on fruit properties (productivity and some fruit physical properties) like fruit retention (%), Bunch weight (kg), yield/palm (kg), fruit weight (kg); seed (%) and flesh (%), fruit length (cm), Fruit diameter (cm), Fruit shape index, Firmness (g/cm2), Moisture (%), marketable fruits, unmarketable fruits. Results indicated that GA3 (10 ppm) spray favorably influenced productivity and fruit quality of 'Barhee' date palm over control during both seasons. Similarly, the fruit set was increased. Although, individual fruit weight was reduced slightly, while fruit number as well as marketable yield was increased tremendously over control with no adverse effect on fruit quality characteristics. In all, spraying GA3 during both seasons was much more effective in achieving the desirable results.

Keywords: "'Barhee' Date palm, GA3, Foliar spray, Productivity and Fruit quality.

10. The Impact of Spraying GA3 with Various Concentrations on Fruit Chemical Characteristics of Barhee Dates Palm Fruits, Under Conditions of Humid or Semi-Dry Areas

Ahmed M. El-Masry, Hamed E. El-Badawy and Sherif Fathy El-Gioushy
Horticulture Department, Faculty of Agriculture, Benha University, Egypt

Abstract:

Experiment were conducted to investigate the effects of foliar application of gibberellic acid on fruit chemical characters in 'Barhee' date palm carried out during the 2023 and 2024 seasons in at El-Mansoria district (Egypt - Alexandria Desert Road), El-Giza Governorate, Egypt. GA3 (5, 10, 15, 20, 25 ppm) was applied to the Date palms during both seasons. Fruit under control were sprayed with tap water only. Investigate were recorded on fruit chemical characters like TSS (%), Titratable acidity (%), TSS/acid ratio, total sugars, reducing sugars, non-reducing sugars, tannins (%), Phenols (mg g-1 Fw), total chlorophyll (mg/100 g Fw), Total Carotenoids (mg/100g Fw) and Rutab (%). Results indicated that, GA3 concentrations spray either during 2023 and 2024 seasons. Favorably influenced all fruit chemical characters of 'Barhee' date palm over control. Finally, to investigate the effects of foliar application spraying GA3 during both seasons was very much more effective in achieving the desirable results.

Keywords: Barhee' Date palm, GA3, Foliar spray, chemical characters.

11. Effect of Soil Type and IBA Concentrations on Some Vegetative Growth Traits of Phoenix Dactylifera L. CV. Siwi Date Palm Offshoots

Kamel. M. H., Abd El-Latif F. M. and EL-Gioushy S. F.

Horticulture Department, Faculty of Agriculture, Benha University, Egypt.

Abstract:

This study was conducted to determine the effect of soil type and the treatments with different concentrations of IBA on stimulating the rooting of ground offshoots of the Siwi date palm cultivar after its separation from the mother plant and its cultivation in pots. The experiment was conducted on the private orchard in Al Wadi al Jadid, Egypt. for the experimental seasons 2022 and 2023. A factorial experiment (3 × 4 × 3), was conducted according to Randomized Complete Block Design (RCBD) with three replicates and 12 treatments; different forms of mixed soil with 1- sand : silt as 1:1 ratio; 2- Sand : Silt : Peat moss as 1 : 0.5 : 0.5 ratio ; 3- Sand : Silt : Peat moss as 1 : 1 : 1 ratio; and treatment with the growth regulator IBA, four concentrates 1- at concentration 0.0 ppm IBA, 2- at concentration 250 ppm IBA, 3- at concentration 500 ppm IBA and 4-at concentration of 750 ppm IBA by soaking. The results showed that all different concentrations of IBA with different forms of soil induced a remarked promotion in the Length of the first new leaf (cm), No. of the new leaves/ offshoots, Trunk length, trunk circumference at the base (cm), F.W. the first new leaf (g) and D.W. the first new leaf (g) compared with water-sprayed palms (control). The best results with regards to using a form of Sand: Silt : Peat moss as 1 : 1 : 1 ratio combined with the concentration of IBA 250 ppm which is significantly superior in this concern compared with control (water spray) and other treatments, thus it could be recommended that to get quality date palms offshoots with soaked offshoots on IBA 250 ppm with cultured in Sand : Silt : Peat moss as 1 : 1 : 1 ratio.

***Keywords*:** ‘Siwi’ Date palm, Offshoots, IBA, Different Soil.

12. Comparative Computational Analysis of Key Drought-Responsive Proteins across Plant Species: Insights into Molecular Adaptations for Stress Tolerance

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Abstract:

Several key proteins, including transcription factors, chaperones, and kinases, regulate drought stress responses. This study presents a comparative computational analysis of the physicochemical properties of five drought-responsive proteins (bZIP1, AP2-EREBP, COX1, HSP20 and PKDP) across multiple plant species, including *Oryza sativa*, *Zea mays*, *Triticum aestivum*, *Sorghum bicolor*, Arabidopsis thaliana and Hordeum vulgare. The amino acid composition, molecular weight (MW), isoelectric point (pI), and instability index were analyzed using the ProtParam tool to elucidate the structural adaptations of these proteins under drought conditions.The results indicate that bZIP1 and AP2-EREBP exhibit serine and glycine content variations, respectively, suggesting distinct phosphorylation-mediated regulatory mechanisms for drought adaptation. COX1, a mitochondrial enzyme, displays high leucine and glycine levels, reinforcing its conserved role in energy metabolism during drought-induced oxidative stress. HSP20 is characterized by high valine content and a complete absence of cysteine, enhancing its chaperone activity and structural flexibility for protein stabilization under osmotic stress. PKDP, a kinase involved in drought-responsive signaling, exhibits species-specific differences in lysine content and instability index, indicating variations in phosphorylation-dependent regulatory functions. Overall, this comparative study highlights key biochemical adaptations that enhance protein stability, flexibility, and function under drought stress. These findings provide molecular insights into plant drought resilience and lay the groundwork for targeted genetic improvement strategies in crop breeding programs. Further experimental validation, including structural modeling and functional assays, is recommended to confirm the computational predictions and explore their potential applications in enhancing plant stress tolerance.

Keywords: Transcription factors, heat shock proteins, cytochrome c oxidase, protein kinases and computational analysis.

13. Physical, Mechanical and Chemical Properties of Pomegranate Fruits

Wesal M. Abd El-Aziz, El-Sayed G. Khater, Adel H. Bahnasawy

and Mohamed M. El-kholy

Agriculuter Engineering Department, Faculty of Agriculture, Benha University, Egypt.

Abstract:

This work focuses on studying the physical, mechanical and chemical characteristics of pomegranate fruits (Manfaloty and Wonderful varieties), to be used in the design and development of specific machine and their operations. The length, width and thickness of pomegranate fruits were 7.31 and 7.53, 6.85 and 7.20 and 6.67 and 6.20 cm, respectively, for Manfaloty and Wonderful varieties. The geometric mean diameter and arithmetic mean diameter of the pomegranate fruits were 6.92 and 6.94 and 7.21 and 7.22 cm, respectively, for Manfaloty and Wonderful varieties. The pomegranate fruits mass was 279.55 and 306.01 g for Manfaloty and Wonderful varieties, respectively. The volume of fruits was 276.12 and 288.51 cm^3 for Manfaloty and Wonderful varieties, respectively. The true and bulk densities of the pomegranate fruits were 1012.42 and 921.51 and 1060.66 and 927.08 kg m^{-3} for Manfaloty and Wonderful varieties, respectively. The moisture content of pomegranate fruit was 84.37 and 86.01 % for Manfaloty and Wonderful varieties, respectively. The repose angle of pomegranate fruits was 41.33 and 43.07 for Manfaloty and Wonderful varieties, respectively. The cutting force and crushing force of pomegranate fruits were 23.72 and 27.26 and 25.80 and 26.64 kg for Manfaloty and Wonderful varieties, respectively. The firmness of pomegranate fruits was 46.45 and 47.99% for Manfaloty and Wonderful varieties, respectively. The total soluble solids (TSS) of pomegranate fruits were 15.17 and 16.09 % for Manfaloty and Wonderful varieties, respectively.

Keywords: Pomegranate, physical characteristics, mechanical characteristics, dimensions, surface area, volume, density, TSS.

14. Impact of Drying Temperature, System and Product Thickness on the Pomegranate Quality, Energy Consumption and Drying Cost

Wesal M. Abd El-Aziz, El-Sayed G. Khater, Adel H. Bahnasawy

and Mohamed M. El-kholy

Agricultural and Biosystems Engineering Department, Faculty of Agriculture,

Benha University, Egypt.

Abstract:

This work focuses on studying the influence of drying temperatures and system on the quality of pomegranate and energy requirements. The effect of peels thickness was also studied. Drying costs were determined. Drying temperatures that used were 50, 60 and 70 °C for hybrid solar and artificial drying systems. The peels layer thicknesses were 1. 2 and 3 cm. weight loss, moisture loss, drying rate, energy consumption and costs were determined. The results revealed that the drying pomegranate in artificially (oven) recorded the highest weight losses (77.72%) at 70 °C compared to the other system and temperatures. The moisture content of pomegranate peels ranged from 215.10 to 258.68 and 218.88 to 263.75 % d.b. for both solar and artificially drying systems, respectively. The drying rate of pomegranate peels ranged from 60.89 to 135.75 and 61.44 to 136.50 gwater kg^{-1} h^{-1} for both hybrid solar and oven drying systems, respectively. Using the oven drying system recorded the highest energy consumption at the lower type, where, it recorded 2.12 kW kg^{-1} dried, which inturn recorded the highest cost of 1 kg dried product, where it recorded 13.62 LE kg^{-1} at the same conditions.

Keywords: Pomegranate, Hybrid Solar, Oven drying, moisture level, drying rate, Energy, Cost

15. Enhancing Pepper Plant Resistance to Root Rot Disease by Encapsulating Roots with Biological and Chemical Inducers

Nermeen A. El-Dairy, Faten M. Abdellatif, Ibrahim A. I. EL-Fiki, and Mohamed H. El-habbak

Plant Pathology Department, Faculty of Agriculture, Benha University, Egypt.

Abstract:

Pepper (*Capsicum annuum*) is an important global crop but is highly vulnerable to root rot diseases caused by *Rhizoctonia solani*, *Fusarium solani*, and *Pythium debaryanum*, resulting in substantial yield losses. This study investigated the effectiveness of root encapsulation with biological and chemical inducers in controlling root rot and enhancing plant resistance. Conducted under glasshouse conditions, the experiment compared encapsulated and non-encapsulated root treatments. Encapsulated roots were coated with an alginate-based biopolymer containing *Trichoderma asperellum*, *Bacillus subtilis*, clove oil, ascorbic acid, or potassium sorbate, while non-encapsulated roots received direct treatments. Disease incidence, defense enzyme activities (peroxidase, polyphenol oxidase, and chitinase), and biochemical constituents (total phenolics) were evaluated. The findings revealed that root encapsulation significantly enhanced disease suppression, boosted defense enzyme activity, and increased key biochemical compounds. Among treatments, encapsulated clove oil application provided the highest disease resistance. These results highlight root encapsulation as a promising strategy for sustainable disease management and improved pepper cultivation.

Keywords: Pepper (*Capsicum annuum*), Root rot disease, Rhizoctonia solani, Root encapsulation, biological control, Chemical inducers, *Trichoderma asperellum, Bacillus subtilis,* Clove oil, Ascorbic acid, Potassium sorbate, Alginate-based biopolymer.

16. Studying the Effect of Some Abiotic Factors on Managing Root and Crown Rot Diseases of Strawberries

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Abstract:

Crown and root rot in strawberries (Fragaria × ananassa), instigated by the fungal pathogen *Macrophomina phaseolina*, poses a formidable challenge to global strawberry agriculture. This investigation scrutinizes the effectiveness of various chemical and natural inducers against M. phaseolina (PP178224), a soilborne menace to strawberry vitality. Among the treatments assessed, oxalic acid and Rizolex-T exhibited remarkable efficacy, achieving complete inhibition of mycelial growth at concentrations of 8 mM and 3 g/L, respectively. Oxalic acid compromised fungal cell membranes and chelated vital metal ions, while Rizolex-T impeded lipid biosynthesis, thereby undermining cell membrane integrity. Conversely, chitosan, despite its recognized antifungal attributes, proved ineffective at concentrations ranging from 1 to 3 g/L, potentially due to inadequate molecular weight or deacetylation levels. Zinc oxide nanoparticles (ZnO NPs) demonstrated promising results, achieving 88.1% efficacy at 3%, by generating reactive oxygen species that inflicted damage on fungal cells. Camphor oil, a natural terpenoid, displayed moderate efficacy with 59.6% inhibition at 3%, disrupting fungal membranes and mitochondrial functions. Rizolex-T50% emerged as the most potent treatment, significantly curtailing disease incidence and severity, although its chemical nature raises environmental and resistance concerns. Natural inducers like oxalic acid, chitosan, ZnO NPs, and camphor oil exhibited moderate effectiveness, underscoring their potential as sustainable alternatives. These treatments not only bolstered plant growth but also enhanced phenolic content and defense enzyme activities, aligning with their roles in systemic resistance and oxidative defense. This study offers critical insights into sustainable strategies for managing *M. phaseolina* in strawberry cultivation.

Keywords: Zinc oxide nanoparticles, oxalic acid, camphor oil, Chitosan, Rizolex-T, *Macrophomina phaseolina*, crown, root, rot and strawberry.

17. Effect of Alkaline Water Level and Electrode Surface Area on the Hydrogen Production Rate as Renewable Energy Source Using Electrolysis System

Mohamed Hany, Adel H. Bahnasawy and Elsayed.Khater
Agricultural and Biosystems Engineering Department, Faculty of Agriculture,
Benha University, Egypt.

Abstract:

The main aim of this study was to increase the rate of hydrogen production from water by electrolysis as renewable source of energy. To achieve that, a simplified unit of water electrolysis was developed and evaluated. Five types of water (0, 2, 6, 10 and 14%wt KOH) were used, three Surface area of the electrodes namely (200,300 and 400 cm^2) and number of stainless steel in unit (9, 11 and 13) slice were also, investigated. The obtained results indicate that, the accumulated produced energy of water increases with increasing the numbers of stainless steel and operating time. The results also indicate that, the accumulated produced energy of water increases with increasing potassium hydroxide concentration until it reached the peak with 10 %wt KOH potassium hydroxide concentration and then decreased during the experimental period. The highest value of the accumulated produced energy of water (448.73 kW h) was found with the 1 0%wt KOH potassium hydroxide concentration after 150 min for 300 cm^2 of surface area of the electrodes. The lowest value of the accumulated produced energy of water (51.45 kW h) was found with the 0 %wt KOH potassium hydroxide concentration after 210 min for 400 cm^2 of surface area of the electrodes. The highest value of the operating time required to analyze one liter of water to produce hydrogen (240 min) was found with the 0%wt KOH potassium hydroxide concentration for 200 cm^2 of the surface area of the electrodes.

Keywords: Hydrogen, Electrolysis, Energy, Operating time, Potassium hydroxide.

18. Development of Water Electrolysis System for Hydrogen Production as a Renewable Source of Energy

Mohamed Hany, Adel H. Bahnasawy and Elsayed Khater
Agricultural and Biosystems Engineering Department, Faculty of Agriculture,
Benha University, Egypt.

Abstract:

Hydrogen is an environmental-friendly energy carrier that is separated from water through electrolysis. Therefore, it has become necessary to improve hydrogen productivity at the lowest costs. To achieve that, a simplified unit of water electrolysis was developed and evaluated. Three type of water, (tap water add 10%wt KOH, sea water, sea water add 10%wt KOH) were used, three Surface area of the electrodes (250, 350 and 450 cm2) and distance between electrode (1, 2 and 3mm) were also investigated. Energy requirement, produced energy and costs were determined. The obtained results indicate that the produced energy for hydrogen production increases with increasing operating time and increases with an increase in the surface area of the electrodes, reaching the highest value at water type of (10%wt KOH). The total costs of hydrogen production unit decreases with an increase in the Surface area of the electrodes. The energy produced increases with an increase in the surface area of the electrodes, to be 188W h and the total costs of hydrogen production unit 0.3 L. E L^{-1}. The results show that several improved electrolyzer operating strategies can be identified with the developed system simulation model. The modelling outcomes of this system were performed using MATLAB code. The proposed model can predict the performance of hydrogen production system by electrolysis and calculating costs, energy consumed, energy produced, and system operating efficiency.

Keywords: Hydrogen, Electrolysis, Energy, Operating time, Potassium hydroxide.

19. Simulation Model for Predicting Soil Forces of Simple Tillage Tools Using Finite Element Method

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Benha University, Egypt.

Abstract:

With the development of computer science, numerical methods such as FEM, DEM and ANN have been used to study the interaction between soil and tillage tools. Finite element method (FEM) one of these approaches that supposed the soil as continuous materials with different behaviour models. The initial research papers in this field was treated the problem in two dimensions. Then it was used for the problems with three dimensions for more complicated shares of tillage tools. Thus, the main objective of this work is to develop a simulation model for predicting soil forces and consequently power requirements affecting on tillage tools as a function of soil, tool and operational conditions parameters using finite element method. In order to study the interaction between soil and tool, a three-dimensional model was performed using Abaqus Explicit Software. The soil was molded with linear forms of Drucker-Pager model, while the tool was considered as a rigid body. The effect of soil properties (moisture content and bulk density), tool parameters (width and rake angle) and operational conditions (depth and speed) on the draft and vertical forces were investigated. Triaxial tests were carried out using clay loam soil to determine the shear strength parameters such as soil cohesion and internal friction angle. Results indicated that finite element method allows researchers to optimize tool designs to reduce energy consumption and improve soil handling. The results found that, the highest draft force values were recorded with high tillage depths and high tool speeds. In addition, vertical force increased as tillage depth and tool speed increased.

Keywords: FEM, ABAQUS Explicit, draft force, vertical force, rigid body and Drucker-Pager model.

20. Effect of Cooling Water Temperature on Nutrient Solution Cooling Efficiency and Lettuce Growth in Hydroponic Systems

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Benha University, Egypt.

Abstract:

Efficient temperature regulation in hydroponic systems is critical for optimizing crop productivity, especially in arid regions where high ambient temperatures pose significant challenges (McCartney and Lefsrud, 2018). This study investigates the effects of cooling water temperature on nutrient solution dynamics and lettuce (*Lactuca sativa*) growth under varying thermal conditions. A mathematical model was developed to predict cooling water temperature based on key environmental factors, including ambient temperature, relative humidity, and wind speed, using empirical correlations. The model was rigorously validated against experimental data, demonstrating high accuracy ($*R*^2 > 0.93$) and reliability across different climatic conditions. Controlled experiments evaluated three nutrient solution temperatures (17.4 °C, 20.8°C, and 26.8°C), revealing those moderate temperatures (20–22°C) maximized shoot and root biomass, enhanced nutrient uptake efficiency, and maintained optimal dissolved oxygen levels. Suboptimal temperatures adversely affected plant growth, with excessive heat causing thermal stress and cooler conditions limiting metabolic activity. These findings provide actionable insights for improving hydroponic management in warm climates.

Keywords: Hydroponic, Cooling systems, Root zone temperature, Lettuce growth.

21. Effect of Eco-Engineering Systems on Growth and Productivity of Basil (*Ocimum Basilicum L.*)

Marwa A. Mohamed[1], El-Sayed G. Khater[1], Adel H. Bahnasawy [1]and Nahed K. Ismail[2]

[1] Agricultural and Biosystems Engineering Department, Faculty of Agriculture, Benha University

[2] Head of researches of Bio-Eng. systems, Agric. Eng. Res. Inst. (AEnRI), Agric. Res. Center, Egypt

Abstract:

The main aim of this study was to determine the favourable cultivation system and irrigation levels for cultivate basil plants at soilless technique. To achieve that, the effect of three different soilless cultivation systems (aeroponics, hydroponics, and greenhouse cultivation) and three different water discharges (3, 4, and 5 L h^{-1} plant-1) on shoot and root lengths, stem diameter, and chlorophyll content during different growth periods (10, 20, 30, 40, and 50 days), also, fresh and dry mass, and fertilizer consumption rate (nitrogen, phosphorus, potassium, calcium, and magnesium) at the end of the growth phase (50 days) were studied. The experiments concluded that the best soilless cultivation system was the aeroponic system at a water flow rate of 4 L h^{-1} $plant^{-1}$, which achieved the longest vegetative group of 67.45 cm, the root group of 48.21 cm, the stem diameter of 3.7 mm, the chlorophyll in the leaves of 39.43 SPAD, the fresh mass of the vegetative group of 483.25 g, the dry mass of the vegetative group of 118.93 g, the fresh mass of the root group of 379.3 g, the dry mass of the root group of 103.45 g, and the consumption rate of fertilizer elements (nitrogen 723.64 mg, phosphorus 251.2 mg, potassium 754.29 mg, calcium 519.73 mg, and magnesium 223.66 mg).

Keywords: Aeroponic, Hydroponic, Substrate, plant properties, Nutrients uptake

22. Effect of Eco-Engineering Systems on Growth and Productivity of Mint

Marwa A. Mohamed[1], El-Sayed G. Khater[1], Adel H. Bahnasawy [1]and Nahed K. Ismail[2]

[1] Agricultural and Biosystems Engineering Department, Faculty of Agriculture, Benha University

[2] Head of researches of Bio-Eng. systems, Agric. Eng. Res. Inst. (AEnRI), Agric. Res. Center, Egypt

Abstract:

The main aim of this study was to investigate the possibility of growing mint under three soilless systems. To achieve that, the effect of different soilless systems (aeroponic, hydroponic and substrate systems) and different flow rates (1,1.5 and 2 L h^{-1} $plant^{-1}$) on root length, shoot length, stem diameter, fresh and dry weight and nutrients uptake. The results indicated that, the root and shoot length of mint plants grown in aeroponic system were taller than those of hydroponic system and substrate systems. The highest values of root and shoot length (32.06 and 49.02 cm) were found for aeroponic system. The stem diameter of mint plant increases with increasing water flow rate and plant age for all soilless culture. The chlorophyll of mint plants were ranged from 23.07 to 32.48, 24.72 to 33.70 and 24.73 to 34.56, for aeroponic, hydroponic and substrate systems, respectively. The highest value of fresh and dry weight of shoot of mint plants (167.54 and 31.16 g $plant^{-1}$) were found at aeroponic system and 1.5 L h^{-1} $plant^{-1}$, while, the lowest values of fresh and dry weight of shoot of mint plants (130.26 and 22.13 g $plant^{-1}$) were found at substrate system and 2 L h^{-1} $plant^{-1}$. The highest values of the N, P, K, Ca and Mg uptakes were 457.22, 213.76, 463.60, 307.56 and 203.62 mg $plant^{-1}$, respectively, were found at aeroponic system and 1.5 L h^{-1} $plant^{-1}$.

Keywords: Aeroponic, Hydroponic, Substrate, Mint plant, Shoot, Root, Nutrients uptake

23. Impact of Certain Furfural Derivatives on the Root-Knot Nematode, Meloidogyne Incognita and the Citrus Nematode, Tylenchulus Semipenetran

Ghada Ashraf [1], Gad Rady[1], Hazem Abdelnabby [1], Nevin Ahmed[1], Dina S.S. Ibrahim[2].

[1] Plant Protection Department, Faculty of Agriculture, Benha University, Egypt.

[2]Nematology Department, Plant Pathology Institute, Agricultural Research Center (ARC), Giza, Egypt.

Abstract:

Nematicides are used in controlling plant parasitic nematode for many years. The harmful effect of nematicides was threaten the environment so that there was a high need to find alternatives. Furfural derivatives are one of the promising alternatives to fill this need. In this study 6 furfural derivatives were Synthesised and applied against *Meloidogyne incognita* and *Tylenchulus semipenetran* . In vitro tests showed gradual mortality rates in the second stage juvenile (J2) of *M. incognita* and *T.semipenetran* when immersed in concentrations of furfural derivatives. These results indicated that furfural derivatives can affect juvenile viability of *M. incognita* and *T. semipenetran* . Furfural derivatives may therefore be one of the considerable potentials as an appropriate alternative for class I nematicides. Furfural derivatives were toxic to both tested nematode species. The toxic effect was more pronounced by increasing furfural concentration and exposure time (especially at 2h exposure). After 12 h, no viable J2 were detected at high concentrations (1.5%).

***Keywords*:** Furfural, furfural derivatives, *Meloidogyne* spp., *Tylenchulus semipenetran*,

24. Molecular Genetic Assessment of Some Potao (*Solanum Tuberosum*) Cultivars

Elsadany Osam A., Bekhit, M.M.M., Hoda A. Elgarhy and T. M. Salim

Genetics and Genetic Engineering Department, Faculty of Agriculture, Banha University

Abstract:

This study performed in the Department of Genetic, Faculty of Agriculture Banha University, Egypt. Five pomegranate cultivars grown in Egypt were collected from Dakahlia Agriculture Development Company to be assessment the molecular genetic variability among *five cultivars of* Potato Solanum Tuberosum using SCoT and ISSR analysis. Six SCoT and five ISSR primers were tested under this study. Eighteen bands as a total number with molecular sizes ranged from 200 to 930 bp were generated from six primers of SCoT. The results obtained 9 total polymorphic bands with polymorphic percentage of (50%). While, five ISSR primers were illustrated *22* bands with molecular sizes ranged from 230 to 1340 bp. The results obtained 10 total polymorphic bands were generated from five ISSR *primers* with polymorphic percentage of (45.45%). On the other hand, combination data of SCoT and ISSR primers revealed a sum of 40 band. These bands were identified as 21 monomorphic and 19 polymorphic ones with polymorphic % (47.5%) and fourteen unique markers.

The genetic similarity among tested cultivars based on combined data of SCoT and ISSR were ranged from a minimum 0.784 between Diamant and Spunta cultivars to a maximum 0.909 between Lady Rositta and Santana cultivars. On the other hand, Combined ScoT and ISSR data dendrogram was divided the five cultivars of Potato *Solanum Tuberosum* into two main groups, The first main group was Spunta cultivar alone and the second main group was divided into two sub main groups: the first sub main group included cultivar Caruso alone and the second sub main group was included each of Diamant, Lady Rositta and Spunta cultivars. Outcomes of these findings demonstrate the effectiveness of this markers to assess the genetic variation among potato cultivar under research and will provide helpful and potential information for more studies in genetic diversity, population genetics and genetic improvements in breeding programs of between these cultivars.

Keywords: Potato (*Solanum Tuberosum*) cultivars, SCoT and ISSR markers, Molecular Genetic assessment.

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1. Enhancing the Chilling Stability of Chicken Fillets : The Role of Capsulated vs. Nanoparticle forms of Propolis-Infused Pectin Edible Coating

MennatAllah H. Elsheshtawy, Saad M. Saad, Abu Bakr M. Idris and Hemmat M. Ibrahim

Food Hygiene and Control Department, Faculty of Veterinary Medicine, Benha University

Abstract:

The study investigates the impact of propolis-infused pectin edible coating on the chilling stability of chicken fillets. Given the perishable nature of poultry, innovative preservation techniques are essential to prolong shelf life and maintain quality. This research explores the application of propolis in different forms, ethanolic extract, capsulated, and nanoparticles, within pectin-based edible coatings. Chicken fillets were coated, stored under refrigeration, and evaluated for chemical, microbiological, and sensory properties over 18 days. Results demonstrated that all propolis-coated samples exhibited significant reductions in TVMN, TBARS, pH, and microbial growth fluctuations compared to uncoated controls. The coatings effectively suppressed total aerobic plate count, Enterobacteriaceae, mold, and yeast with the nanoparticle formulation achieving the highest antimicrobial efficacy. Sensory evaluations revealed superior color, texture, and odor stability in treated samples, with the PN group (2%) retaining the best organoleptic properties. Cooking loss analysis further supported the protective role of propolis coatings in moisture retention. Among the treatments, the nanoparticle form (PN2%) showed the most potent preservation effects, maintaining acceptable sensory attributes and microbial safety for up to 18 days, outperforming capsulated (PC5%) and extract (PEE10%) formulations. These findings underscore the potential of propolis-infused edible coatings, particularly in nanoparticle form, as an eco-friendly, bioactive intervention for enhancing poultry preservation.

***Keywords*:** Propolis, Capsulated, Nanoparticles, Pectin and Edible coating.

2. Comparative Analysis of Milk-Based Marinades for E. coli Reduction in Refrigerated Meat Samples

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[2] Egyptian National Food Safety Authority

[3] Food Control Department, Animal Health Research institute, Tanta Branch, Egypt

Abstract:

This study investigated the antimicrobial effects of camel, buffalo, and goat milk marinades on *Escherichia coli* (*E. coli*) in experimentally inoculated raw ribeye meat samples stored at 4°C for 48 h. Forty ribeye meat cuts were categorized into four groups, inoculated with *E. coli* and marinated with different milk types, with distilled water serving as a control. Microbiological analyses and pH measurements were performed at 0, 6, 12, 18, 24, and 48 h. Results showed that all milk marinades effectively reduced *E. coli* counts over time, with goat milk exhibiting the strongest antimicrobial properties, followed by buffalo and camel milk. After 48 h, goat milk marination achieved a 40% reduction in *E. coli*, whereas buffalo and camel milk treatments resulted in a 25-30% reduction. The pH of milk-marinated samples decreased over time, with goat milk having the lowest pH at 48 h. In contrast, the control group showed a steady increase in both *E. coli* count and pH. These findings highlight the potential of milk-based marinades, particularly goat milk, as natural preservatives to enhance meat safety and prolong shelf life, likely owing to the presence of bioactive compounds such as antimicrobial peptides and organic acids.

***Keywords*:** Food Safety, Antimicrobial Effects, Milk marinades, Bioactive Compounds, Food Preservation, *E. coli*.

3. Antimicrobial Effects of Beetroot Extract in Meat Preservation: A Comparative Study in Different Storage Conditions

Reham Ashraf, Saad M. Saad, Islam I. Sabike

Food Hygiene and Control Department, Faculty of Veterinary Medicine, Benha University

Abstract:

Beef is one of the most desirable and palatable meats for high-quality proteins and essential nutrients. Therefore, maintenance and enhancement of its bacteriological quality is essential. On the other hand, several trials seeking the replacement of chemical meat additives with herbal and natural additives are in progress. Therefore, the current study aimed to evaluate the antibacterial effects of aqueous beetroot extracts (1.0 and 1.5% vol. mg/w) on the bacteriological quality of beef meat during aerobic and anaerobic refrigeration storage conditions. The results showed that the treatment with beetroot extract significantly inhibited bacterial growth in comparison to the control untreated group, and the anaerobic storage conditions during the experimental period showed a stress factor that caused a significant ($P \leq 0.05$) lower total bacterial count (TBC) and coliform count, while higher counts of lactic acid bacteria (LAB) were recorded in the anaerobically stored samples in comparison with the aerobically stored samples. The results also indicated a direct relationship between beetroot extract concentration and antibacterial potency, where the higher concentration had a higher antibacterial effect. Based on these results, beetroot extract can be recommended as a potential meat preservative with potent antibacterial effects that can extend the shelf life of meat and improve bacterial quality.

***Keywords*:** Beetroot extract, Meat quality, Modified-storage conditions**.**

4. Impact of Cold Pressed Cardamom Oil on the Sensory Characterization and Color of Frozen Chicken Burger

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[1]Department of Food Hygiene and Control, Faculty of Veterinary Medicine, Benha University, Egypt.

[2] Researcher at the Scientific Center for Research and Training, National Company for Animal Production, National Service Project Organization.

Abstract:

This study investigated cold-pressed cardamom essential oil's (CEO) impact on color stability and sensory attributes of frozen chicken burgers during three-month storage. Burgers were prepared with CEO concentrations (50, 25, and 12.5 ppm), compared to a control and butylated hydroxytoluene (BHT) treated group. Instrumental color analysis using CIE L*a*b* color space showed significant changes in lightness (L*), redness (a*), and yellowness (b*) values over time, with CEO-treated samples exhibiting better color stability than the control. Hue angle and total color variation (ΔE) indicated CEO, particularly at higher concentrations, maintained color better than BHT and the control. Sensory evaluation by a trained panel assessed odor, color, texture, taste, and overall acceptability using a nine-point hedonic scale. CEO-treated samples, especially at 50 ppm, showed superior sensory stability compared to control and BHT samples, with slower declines in attributes over storage. These findings highlight CEO's potential as a natural preservative in frozen chicken burgers, offering an alternative to synthetic additives while meeting consumer demands for clean-label products. Further research on microbial stability and physicochemical changes could provide deeper insights into preservation mechanisms of cardamom essential oils in meat products.

***Keywords*:** Food Quality, Essential Oil, Elettaria cardamomum, Sensory Evaluation.

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1. Experimental Implementation of Using PCM-Carbon Foam Composite for Enhancing Integrated Photovoltaic Panels Performance

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[2] Mechatronics and Automation Engineering Program, Faculty of Engineering, Benha National University, Al Obour, Egypt
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[4] Mechanical Engineering Department, Shoubra Faculty of Engineering, Benha University

Abstract:

Building-integrated photovoltaics modules offer sustainable energy solutions but face challenges like suboptimal electric conversion efficiency and high operating temperatures, which negatively affect performance and reliability. This study explores the integration of phase change materials and optimizes the addition of parafilm/carbon foam composite to regulate temperature effectively while minimizing phase change material usage. Four passive cooling configurations of the photovoltaic system are examined: free cooling photovoltaic, photovoltaic integrated with a wall, photovoltaic integrated module combined with phase change material, and photovoltaic integrated module partially integrated with carbon foam saturated with phase change material. The novelty of this study lies in the partial integration of (carbon foam/paraffin wax) composite to enhance heat transfer of phase change material and regulate building integrated modules' temperature. The experimental investigations, conducted both indoors and outdoors, highlighted the significant potential of incorporating carbon foam/paraffin wax composite on the rear side of building integrated photovoltaic modules in reducing its temperature by 40%, improving output power and efficiency by 10.24% and 22.19%, respectively.

***Keywords*:** Passive cooling; carbon foam Composite; BIPV; Thermal management; Light weight carbon foam heat sinks.

2. Novel Simulation Method for TFET-Based ISFET pH Sensor

Eman A. Hassan, Mina D. Asham, Walid Soliman, Tarek M. Abdolkader

Basic Engineering Science Department, Benha Faculty of Engineering, Benha, Egypt.

Abstract:

Ion-Sensitive Field-Effect Transistor (ISFET), which were initially proposed a little more than 50 years ago, are currently among the most widely used electrochemical biosensors. In this work we propose a numerical simulation methodology for nanoscale ISFET that is based on band-to-band tunnelling conduction mechanism. The proposed method is based on the combination of the analytical equations of single gate Tunnelling Field-Effect Transistor (TFET) with the Gouy–Chapman–Stern model equations of ISFET resulting in a system of equations that can be solved iteratively to produce output current and sensor sensitivity. The simulation is implemented using MATLAB software tool. The simulation results were verified by comparing the results of the developed code with Silvaco TCAD simulation software. The simulation code is then used for the optimization of the sensitivity and linearity of nanoscale ISFETs by the investigation of the effect of various parameters such as drain current level, reference voltage, gate-insulator thickness, substrate thickness, and temperature on the sensor performance. Additionally, the effect of using different gate-insulator materials is inspected by comparing three different insulator types: SiO2, Al2O3, and HfO2. The simulation method can be applied to both single-gate and double-gate devices and serves as a guide for the design and optimization of nanoscale ISFETs.

***Keywords*:** pH sensor, ISTFET, TFET, Sensitivity, numerical modelling.

3.Developments in Dye-Sensitized Solar Cells to Increase Efficiency

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Abstract:

Due to their affordability and eco-friendliness, dye sensitized solar cells are becoming more widely used as a yet strongly evolving strain of solar cells. We have examined the performance of dye-sensitized solar cells in this research through SCAPS-1D simulation. This model consisted of five layers fluorine-doped tin oxide (FTO)/electron transport layer TiO2 (ETL)/Rhamnus tinctoria dye is active layer/ liquid electrolyte is hole transport layer (HTL)/platinum (Pt) is the back contact. The effect of ETL, HTL, and active layer thicknesses, working temperature, the affinity of ETL, and the interface between TiO2 and active layer on different parameters of the dye sensitized solar cell (DSSC) are studied. Experimental data was used to determine some of the study's input parameters. The density functional theory (DFT) computations were used to analyze the electronic characteristics. Each state's open circuit voltage (VOC), short circuit current density (JSC), fill factor (FF), and power conversion efficiency (PCE) are investigated. The obtained results are contrasted with those of experiments. An optimization process has been done on the configuration increasing the efficiency from 0.49 % to 0.81 %.

***Keywords*:** SCAPS-1D; Dye-sensitized solar cells; Rhamnus tinctoria; Soxhlet (emodin dye); Photovoltaic performance; DFT.

4. Evaluation of Runoff and Morphometric Analysis in Wadi Ked, Sinai, Egypt

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Abstract:

Sinai is a formidable territory and one of the most significant strategic areas in Egypt due to its historical significance, geographical location, touristic value, and natural riches. The scarcity of water sources in Sinai is the primary factor hindering its development. The project seeks to estimate the runoff in Wadi Ked, situated in South Sinai, to facilitate various applications and mitigate hazards associated with flooding by designing protective structures based on the runoff volume. This study seeks to assess runoff, morphometric characteristics, and delineate the watersheds in Wadi Ked using the Soil Conservation Service Curve Number (SCS-CN) method alongside the Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS) model. This hydrological model estimates runoff and generates hydrographs for storms with return periods of 5, 10, 20, 50, 100, and 200 years, and is also employed for watershed delineation in the study area. ArcGIS is employed for hydrological and topographical analysis, serving to illustrate the characteristics of the case study using maps. The rainfall data utilized pertained to the Dahab, Sharm Sheikh, and Saint Catherine rainfall stations. The frequency analysis was conducted using Microsoft Excel, yielding storm depths of 27.63, 38.78, 49.94, 64.68, 75.83, and 86.99 mm for return periods of 5, 10, 20, 50, 100, and 200 years, respectively. The runoff volumes are 4.93, 11.06, 18.53, 29.72, 38.87, and 48.45 Mm^3, and the corresponding depths are 4.74, 10.63, 17.82, 28.58, 37.37, and 46.58 mm for their respective return times.

***Keywords*:** Wadi Ked, GIS, SCS-CN, HEC-HMS, Runoff.

5. Study Reinforcement Patterns for Hardness and Impact of 3D Printed Carbon/Glass Fiber- Nylon

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Abstract:

The purpose of this paper was to investigate the hardness and impact properties of 3D printed Carbon/Glass fiber hybrid composites. Automative and aircraft industrial are usually used composites. Mixing of two composite materials was improving mechanical properties and reduce ongoing costs. This study also illustrates the method of samples that needs to be prepared for experimental, samples made of polymer-based materials reinforced by carbon and glass fiber hybrid composites at various building angles. The idea behind the study was to investigate the effects of various orientation angles in sections {45°, 30°, and 180°} on the hardness and impact properties of the parts. The aim was to assess the results of changes in the orientation angle of the building relative to hardness and impact properties of the hybrid composite characterization process. The experimental work found that; The best effect of building orientation angle in Hardness at 45° and in Impact at 180°.

***Keywords*:** Additive Manufacturing (AM), Hybrid Composites, Building Orientation Angles, Mechanical Properties.

6. Behavior of Hybrid Reinforced Concrete Beams Under Influence of Seawater

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Abstract:

When concrete structures are exposed directly or indirectly to marine environments, this results in corrosion of steel reinforcement and degradation of the concrete due to the chloride attack of chloride on concrete. Therefore, this research will study the behavior of hybrid reinforced concrete beams made of rebar's steel and Glass fiber-reinforced polymers (GFFRP) under the influence of seawater by simulating the marine environment using an accelerated corrosion test according to ASTM G31. The study was conducted on nine concrete beams with dimensions 150×250×1300 mm, in which six beams were exposed to corrosion, and three beams were exposed to air. The nine concrete beams were subjected to flexural strength testing after the completion of the accelerated corrosion test, after an immersion period of 45 days. the experimental results showed, that the electrochemical corrosion method did not corrode the GFRP bars in comparison to concrete beams with steel reinforcement that affected by the corrosion process, which in turn led to a decrease in ductility for beams with steel reinforcement. Despite the existence of silica fume and corrosion inhibitor (MCI 2005) in some specimens. The hybrid beams have a lower capacity than non-corroded beams due to concrete cracking in the tensile zone resulting from rebar corrosion.

***Keywords*:** accelerated Corrosion; flexural behavior; hybrid bar; load-deflection curve.

7. Evaluation the performance of flexible pavement modified with High density polyethylene and Crumb rubber powder: A review

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Abstract:

Bitumen is always used as binder road construction material, and it is extracted from petroleum purification processes. the increased in traffic density on roads, overloading of commercial vehicles and temperature variance in pavements leads to formation of different distresses like rutting, bleeding and bituminous surfacing cracking. Thus, the researchers applied various techniques to enhance the overall performance of asphalt pavement by using different types of additives. This study aims to discuss the application of high density polyethylene (PE100) and crumb rubber powder in asphalt concrete mixtures. The use of polymers offers improved drainage control and presents a better cost because of avoiding fibrous materials using in bituminous mixtures. Previous results demonstrated that the asphalt mixture modified with polymer (HDPE) enhanced rutting resistance while also improving rigidity and tensile strength. Moreover, the best concentration of HDPE in the concrete asphalt mixture was from 2% to 6% by weight of bitumen. Crumb rubber powder positively influences on rutting resistance, tensile strength, and fatigue resistance in asphalt pavement. The recommended concentration for adding Crumb rubber powder is 5-15% by weight of bitumen. Finally, adding single additives to asphalt pavement is not enough to enhance the bituminous pavement performance. Previously, some researches have been performed for improving PE flexibility using normal rubber, recovered rubber and Styrene-butadiene rubber. Therefore, it is recommended to use the admixture of HDPE and CRP in flexible pavement.

***Keywords*:** Flexible pavement, HDPE, CRP, Rutting resistance and Tensile strength

8. The Influence of FDM Process Parameters on the Tensile Strength in an Open-Hole Test

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Abstract:

The advantages of additive manufacturing technology have a big influence on various industrial applications. The use of 3D printing technology facilitates the creation of complex, lightweight geometric designs with increased robustness. This study focuses on the effect of recommended parameters of printing like raster angle (45°/-45°, 0°/90°), layer thickness (0.2, 0.15, and 0.1 mm), and infill pattern (cross 3D and gyroid) on the tensile strength and other mechanical properties of the open-hole test. The specimens were fabricated utilizing Fused Filament Fabrication (FFF) technology using Polylactic Acid (PLA) thermoplastic material by a 3D printer machine in a standard dimension. According to the test results, the tensile strength and other mechanical properties were strongly impacted by the parameters. The best results were obtained with a 45/-45 raster angle, 0.1 mm layer thickness, and a gyroid infill pattern, and the tensile strength as a result was 27.6 MPa, strain was 8.24%, and elongation was 12.35 mm.

***Keywords*:** FDM, Raster Angle, Layer Thickness, Infill Pattern, Tensile Strength, and Open-Hole Test.

9. Math application in smart contracts

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Abstract:

Smart contracts are blockchain-based algorithms that activate when specific conditions are fulfilled. They streamline the execution of agreements, allowing both parties to trust the outcome instantly without needing intermediaries or experiencing delays. To ensure secure and verified contract execution, cryptographic methods such as hash functions and digital signatures are used. Additionally, mathematical approaches like mathematical proofs and finite state machines are applied in designing and assessing smart contracts to guarantee their proper functionality. This paper explores the mathematical foundations of smart contracts, highlighting how they rely on mathematics to ensure immutability, security, and enforceability. A key technique behind their encryption methods is the pseudo-random number generator, which is based on chaotic maps. These chaotic maps generate highly random patterns depending on the initial seed value through complex mathematical operations. This work provides an overview of how chaotic maps are implemented in smart contracts. Additionally, the results obtained from these chaotic maps are presented showing that these maps achieve a high performance in digital signature algorithms.

***Keywords*:** Smart contracts; Chaotic maps; Digital signatures; Block chain; Encryption.

10. PID Controller Design and Implementation for Multibody Mechatronic Systems

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Abstract

The multibody dynamics (MBDs) approach is mainly used for modelling and simulating mechanical systems, especially if they have complex dynamic analysis. Stabilization controllers are added to provide constraint stability during validation of the multibody equations. For controller design, model linearization should be addressed to obtain the state-space formulation. On the other side, field-programmable gate arrays are widely used for the fast development of control systems and embedded applications. Thus, they are suitable for the stabilization of underactuated mechatronic applications. Thus, MATLAB software is used to build the symbolic model and the computational simulation of an inverted wheeled robot. Following that, the PID controller is designed and simulated for this application. Simulation results show the effectiveness of the multibody dynamics approach in the formulation of the state space model-based controllers of mechatronic applications. The LabVIEW FPGA module is used to implement the controller on the sbRIO 9631 single RIO board. The results show that the settling time is 2 seconds, and the steady-state error is ±0.5 degrees at the zero-tilt angle set point.

***Keywords*:** Mulltibody Modelling, MBDs, Self-balancing Robot, FPGAs, real-time PID

11. Impact of Parameters Process on Mechanical Characteristics in Friction Stir Welding of Aluminum Alloys : A Review

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Abstract:

The primary objective of this research is to conduct an extensive examination of friction stir welding (FSW) on aluminum alloys, as investigated by various researchers. This study examines the impact of process parameters on welding responses, material flow, and microstructure. The research demonstrates that FSW variables, such as rotational speed of welding, shoulder diameter, pin, and pin profile, significantly affect the microhardness, tensile strength, and strain rate of aluminum alloys undergoing FSW.

A series of experiments was conducted to investigate the effect of process parameters on welding responses. The results showed a strong correlation between FSW variables and welding responses. Additionally, it was found that optimizing FSW variables can lead to improved weld quality.This research contributes to a better understanding of the impact of process parameters on welding responses in FSW, and can serve as a valuable reference for engineers and researchers working in this field. The findings of this study can be applied to optimize FSW parameters and improve the overall efficiency of the welding process.

***Keywords*:** FSW, MIG, TIG.

12. Effect of Fibers and Nanomaterials Individually or in Combination on the Enhancement of Asphalt Mixes' Performance: A Review

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Abstract:

Typical damage to asphalt mixtures includes fatigue cracking, moisture damage, high-temperature rutting, and low-temperature cracking. Modifying asphalt mix using a single modifier can contribute to road life extension, but it may also have drawbacks. To address these issues, research is being done on the impact of single and compound additives on asphalt and asphalt mix. Adding fibers to asphalt mix has been discovered in past investigations to promote increased longevity and enhanced functionality of roads. The performance of flexible pavements is improved by nanomaterials' extraordinary qualities, which include high functional density, remarkable sensitivity, distinct surface effects, large surface area, considerable strain resistance, and catalytic activity. In this sense, fibers and nanoparticles can both enhance hot mix asphalt's qualities (HMA).

This article aims to offer a thorough understanding of the use of fibers, nanomaterials, and their combinations with other additives in asphalt binders and mixtures, drawing from an extensive review of the literature. When compared to the use of individual additives, it was determined that the application of composite technology in pavement construction can greatly extend the service life and overall performance of asphalt mixes.

***Keywords*:** Asphalt mix, Fibers, Nanomaterials, single, and combined modification.

13. Aerodynamics Performance Evaluation of S834 Airfoil Using Different Slot Configuration as a Passive Flow Control Method

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Abstract

The global energy crisis has prompted a shift toward renewable energy to reduce emissions and ensure a sustainable future. Wind energy, in particular, has received a lot of attention because it is so widely available. Wind turbines, which convert wind kinetic energy into mechanical energy, are divided into two types: horizontal-axis and vertical-axis turbines. Nevertheless, one of the most significant challenges to wind turbine performance and sustainability is flow separation, which reduces aerodynamic efficiency. This study utilizes Computational Fluid Dynamics (CFD) to examine six slot design configurations for the S834 airfoil at a wind speed of 6 m/s. The goal is to assess their effectiveness in reducing flow separation and to compare the performance of the top-performing slot to that of the unslotted airfoil. The findings show that slot performance is heavily influenced by its configuration and dimensions. The appropriate slot design increases the maximum lift-to-drag ratio by 5% while significantly reducing vortex formation on the airfoil's suction side as shown by velocity contour and streamlines. Static pressure coefficient (CPs) distributions support these findings by demonstrating increased aerodynamic efficiency. These findings highlight the effectiveness of slot implementation in improving wind turbine performance. Slotted airfoils have the potential to advance wind energy technology by reducing flow separation and increasing efficiency, thereby supporting global sustainability initiatives and future renewable energy solutions.

***Keywords*:** passive flow control, slot, S834, Horizontal axis wind turbines, CFD.

14. Biodiesel Production from Castor Oil via Transesterification and its Combustion Features Blended With Diesel in a Diesel Engine

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Abstract

Population growth and lifestyle changes have increased energy demand, while the availability of fossil fuels has decreased. This has led to the development of alternative energy sources, such as biodiesel fuel. Castor biodiesel is capable of being decomposed by biological processes, harmless, beneficial, and replenishable. The transesterification process can be utilized to generate biodiesel from castor oil, yield of production was 92% for the Transesterification. Mixing biodiesel castor with diesel positively affects its physical and chemical properties and also the running, exhaust pollutants, and combustion features, for performance (BTE and BSFC). The biodiesel blend has higher BTE and lower BSFC than D100(pure diesel); it is D80TR20(80 vol% pure diesel+20% transesterification biodiesel), which gives an enhancement of 14.69% and 10%, respectively. And for emissions (CO, NOx, and soot), the D80TR20 emits lower emissions than the D100 by factors of 57%, 25%, and 28%, respectively. Also, the EGT is lower than D100, D80TR20 is lower than D100 than with a percentage equal to 9.76%, all of these values are with respect to D100 and at a load of 100%. It is recommended that the biodiesel blend is better than diesel and may be increasing of its ratio slightly, improving performance and emissions features more and more.

***Keywords*:** Biodiesel castor; Biodiesel production; Transesterification, Engine performance; Emissions Aspects.

15. A Novel Hybrid Architecture Integrating Battery Energy Storage and Solid Oxide Fuel Cell for Standalone Renewable Energy Systems

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Abstract:

This paper presents an innovative hybrid energy system topology including a solid oxide fuel cell (SOFC) and a battery energy storage system (BESS) to improve the operation of solar photovoltaic (PV) and wind turbine generator-based renewable energy systems. A lithium-ion BESS was specifically chosen due to its high energy density and quick response time for short-term power support, which counteracts transient disturbance, and allows the grid to stay stable during the rapid fluctuations of renewable power generation. Thus, the SOFC is able to operate in steady-state mode to offset the longer-term intermittency of wind and solar resources. The excess energy produced by the PV panels is stored internally inside the BESS to be dispatched later. A complete system model was designed and simulated based on Simulink software to examine the performance characteristics of the proposed hybrid system. Simulation results validate significant improvements in overall system stability, reliability, and power quality, thus mitigating the negative impacts of renewable energy intermittency. Furthermore, a thorough economic examination demonstrates that the proposed SOFC-BESS hybrid system achieves considerable cost reductions compared to other renewable energy configurations. Most importantly, the system depicts a reduction in mean primary cost of almost 24% as compared to an average PV system made up of an inverter and a battery. Once more, a cut in cost of almost 30% is observable when compared with an average stand-alone standard wind turbine system.

***Keywords*:** Lithium ion, power, stability, fuel cell, and renewables.

16. A Comprehensive Review of the Impact of Nanomaterials and Fibers on Asphalt Mixtures and Their Performance

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Abstract:

The increase in traffic volumes and the rising cost of bitumen make it necessary to enhance the performance of asphalt binders through bitumen modification. Various types of nanomaterials have been used as additives to bitumen to improve the properties of asphalt mixtures, particularly in terms of resistance to aging, cracks caused by stress and temperature changes, moisture-induced damage, and permanent deformation. Several relevant studies have been reviewed, focusing on nanomaterials such as Nano Calcium carbonate, nano-silica, and carbon nanotubes. Additionally, the effect of fiber additives in asphalt mixtures has been examined, highlighting the different types of fibers used, their properties, testing methods, and mix design tests for fiber-reinforced asphalt mixtures. A wide variety of fiber types have been used in asphalt mixtures, including natural fibres and synthetic fibres. Recycled fiber materials, such as newsprint fibers, carpet fibers, and recycled tire fibers, have also been utilized. This review summarizes the performance of nanoparticles and fibers as asphalt modifiers. Several relevant studies have been reviewed, addressing nanomaterials and fibers.

***Keywords*:** Asphalt mixes, Experimental tests, Nanoparticles Modifiers, Fibers Modifiers.

17. Investigate the Availability of Incorporation Phase Change Material in a New Design Under Floor Heating Panels

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Abstract:

The global challenge of depleting nonrenewable natural energy resources, coupled with rising energy demands, is pressing. The building sector, consuming over a third of global energy production, underscores the need to enhance internal thermal comfort in buildings with minimal energy use. One effective method is integrating phase change material (PCM) into underfloor radiant heating systems. A novel design of underfloor heating panels (UFHP) with integrated free PCM has been introduced, investigating the availability of this design and its impact on surface temperature. The UFHP, made of extruded polystyrene foam (XPS) with four circular grooves for hydronic pipes, features PCM within a rectangular groove. A comparable reference panel lacks PCM cavities. Testing involved a fully controlled electrically heated hydronic system with varying inlet water temperatures and flow rates. Surface temperature distribution and uniformity were evaluated under heating and non-heating conditions to assess thermal comfort and panel performance. Results demonstrate significant improvement in surface temperature uniformity and, particularly during non-heating periods. This integration offers maximal benefits during times when heating is not in operation.

***Keywords*:** Under floor heating system, Phase change material and Energy storage.

18. Performance and Emissions Analysis of a Single-Cylinder CI Engine Operated with Diesel and HHO Gas Produced by a Dry Cell Electrolyzer

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Abstract:

Research and investment in renewable energy are vital for a sustainable future to meet the growing global energy demand driven by worldwide population growth. Dependence on fossil fuels contributes to environmental degradation and resource depletion. Renewable energy sources, such as hydrogen, have been proven to offer a sustainable alternative that reduces emissions and enhances energy security. However, hydrogen gas faces storage challenges and potential hazards. Oxyhydrogen gas (HHO), produced onboard without storage, provides a viable alternative. HHO, a mixture of hydrogen and oxygen generated via water electrolysis, was utilized in this study. The research aimed to design and implement a dry cell HHO generator to supply a steady 0.25 LPM flow rate into a single-cylinder CI engine. HHO gas was introduced through a drilled port at the intake manifold. The performance and emissions of the dual-fuel engine, powered by Diesel and HHO, were analyzed. Results showed improved brake thermal efficiency and reduced brake-specific fuel consumption with HHO integration. Emission data revealed significant reductions in carbon monoxide (CO), nitrogen oxides (NOx), and unburned hydrocarbons (UHC), particularly at higher engine loads. Higher HHO flow rates were recommended to be tested to determine the optimal enrichment ratio for the engine's volume.

***Keywords*:** HHO, Diesel, Dry cell, Performance, and Emissions.

19. Comparative Study of Using R32 and R410A in Heat Pump in Residential Application

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Abstract:

Split air conditioning (AC) systems are the predominant choice for both commercial and residential applications. The primary refrigerant used in modern split AC systems is R410A, a hydrofluorocarbon (HFC) with a high global warming potential (GWP) of 2088. Additionally, due to its zeotropic nature, R410A cannot be recharged into a system with a leak, leading to increased maintenance costs. This research examines the feasibility of replacing R410A with R32 in split AC systems. R32 was selected due to its significantly lower GWP of 675 and higher latent heat of evaporation at a constant temperature. The study evaluates cooling capacity, energy consumption at different ambient temperatures, heating capacity, and the seasonal energy efficiency ratio (SEER) in the Egyptian market before and after retrofitting. The experimental process involved conceptualization, installation, data collection, and quantitative analysis. Results showed a 6% increase in cooling capacity at 35°C and a 9% increase at 43°C, with improved capacity retention at high ambient temperatures post-retrofit. Additionally, SEER improved by 15% after switching to R32. These findings confirm that converting an R410A-based system to R32 is both viable and effective.

***Keywords*:** R32, R410A, Heat pump.

20. Gut Microbiome profile prediction for Nonalcoholic Fatty Liver disease patients based on Artificial Intelligence Techniques

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Abstract:

The present conclusions and hypotheses on the roles of the Gut Microbiome (Gut micro) in the Pathophysiological knowledge of different phenotypes of Nonalcoholic Fatty Liver Diseases (NAFLD) patients have greatly attracted research in multiple academic and research institutes. In this study, the gut microbiome profiles of different families and genetic categories that live in NAFLD patients were combined and saved in one dataset as a result of fecal and blood sample analysis. There were different gut microbiome patterns in the fecal and blood samples of obese individuals with NAFLD versus lean individuals. Another important feature used in the dataset is body Mass Index (BMI), which is classified into lean (BMI <25 kg/m^2) and obese (BMI >25 kg/m^2). One of the important branches of Artificial Intelligence (AI) is Machine Learning (ML).ML techniques have a great contribution to real-world applications. This approach implements Rules between Gut-Micro profiles for NAFLD (Lean obese). Besides the ML prediction model, Random Forest (RF) was deployed to predict the Gut-Micro profile for both lean and obese individuals in the case of NAFLD patients. The testing accuracy in the proposed model is more than 99%, which is considered an excellent performance parameter in gut microbiome investigation.

***Keywords*:** Bioinformatics, Body Mass Index (BMI), Gut Microbiome, Machine Learning (ML).

21. Sampling Frequency Offset Estimation in OFDM Systems : A comparative study

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Abstract:

Sampling Frequency Offset (SFO) is a significant challenge in Orthogonal Frequency Division Multiplexing (OFDM) systems, caused by mismatches between the transmitter and receiver sampling rates. This offset disrupts subcarrier orthogonality, leading to Inter-Carrier Interference (ICI), phase distortion, and increased Bit Error Rate (BER), making accurate SFO estimation and correction crucial for reliable communication.This paper evaluates four benchmark SFO estimation methods—PD, CB, PD-WSI, and H-EST—while introducing an enhanced estimation technique aimed at improving synchronization accuracy. A comparative analysis reveals that the proposed approach outperforms existing methods by achieving lower Root Mean Square Error (RMSE). The results confirm the effectiveness of the proposed method in enhancing SFO estimation.

***Keywords*:** Orthogonal Frequency-Division Multiplexing (OFDM), frequency synchronization, Sampling Frequency Offset (SFO) estimation, Data-Aided (DA) techniques, Phase Difference-based SFO estimation, Correlation-based SFO estimation.

22. Parametric Study of the Impact of Incorporated PCM Inside a Lightweight Wall on Indoor Temperature Fluctuations

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Abstract:

The utilization of phase change materials (PCM) in the building structure for thermal regulation has attracted considerable interest from researchers. The PCM can be integrated at various locations inside the building's outside walls, resulting in a unique thermal behavior of the structure. Nevertheless, the prevailing research predominantly The focus of this study is on an experimental test rig in a certain climate, and phase change materials (PCM) are not effective enough at controlling temperature in lightweight structures in those conditions. Consequently, two experimental test rigs (one with PCM and one without) of identical dimensions were constructed and analyzed in this study to examine the variations in interior temperature across different ambient conditions without mechanical systems. The findings reveal a significant seasonal influence of phase change materials (PCMs) on the thermal efficiency of lightweight structures, with varying contributions across different ambient temperatures. and the rate of internal surface temperature attenuation in the summer season can be diminished by 7 % compared to the reference wall. In addition to PCMs, they can effectively mitigate indoor temperature fluctuations, reducing the maximum indoor temperature. The research findings can offer a theoretical foundation and empirical evidence for the effective utilization of PCMs in lightweight structures.

***Keywords*:** Lightweight walls; Extruded polystyrene XPS; Indoor temperature fluctuations.

23. Frequency Diversity MIMO- OFDM System using GNU Radio

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Abstract:

In this work, a frequency-diversity scheme is used with an orthogonal-frequency-division-multiplexing (OFDM) system to improve bit-error-rate (BER) performance without increasing the signal bandwidth or decreasing the transmission rate. In this scheme, the same OFDM symbol is transmitted on multiple carrier frequencies, each with a different gain. The number of transmitted symbols is equal to the diversity order (N), and as a result, the transmission rate is reduced by a factor of N. This means that the system sacrifices some transmission rate to gain the benefits of diversity. To further improve the spectral efficiency of the transmitted signal, a multiple-input-multiple-output (MIMO) transmitter is used in spatial multiplexing mode. The number of antennas, known as the spatial multiplexing order, is equal to the diversity order. By employing multiple antennas, the system can transmit multiple independent data streams simultaneously, thereby increasing the overall data rate. The proposed system assumes operation in a frequency-selective channel, which means that the channel introduces different frequency-dependent effects on the transmitted signal. In the receiver, a maximal-ratio-combiner (MRC) is utilized to combine the received signals from the different carrier frequencies and antennas. The MRC combines the signals in a way that maximizes the signal-to-noise ratio (SNR) and improves the overall system performance. To evaluate the performance of the proposed system, the system is implemented using GNU Radio, a free and open-source software development toolkit for building software-defined radios.

***Keywords*:** Frequency-diversity, Orthogonal-Frequency-Division-Multiplexing system (OFDM), Maximal ratio combiner (MRC), Multiple-Input-Multiple-Output system (MIMO), GNU Radio.

24. Numerical Analysis of Cold-Formed Steel Built-Up Closed Sections Subjected to Axial Load

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Abstract:

Cold-formed steel (CFS) is frequently utilized in construction owing to its lightweight, ease of production, straightness, and durability. These properties make CFS an ideal choice for various structural applications, including framing, roofing, cladding systems, straightforward quality control, and cost-efficient transportation compared to traditional materials. It also allows for the flexible design of cross-sectional profiles and is fully recyclable. This study presents a numerical analysis of built-up columns fabricated from cold-formed steel. Six built-up steel columns were tested, differing in thickness (2 mm and 2.5 mm) and length (1200 mm and 2400 mm), under pin-ended boundary conditions. The cross-sections were connected using M5.5 self-drilling metal screws. The specimens were modeled using ABAQUS software, which incorporated both material properties and geometric imperfections into the finite element (FE) models. The results of the numerical simulations closely matched previous experimental findings for built-up closed columns subjected to compressive loads, thus validating the FE model. The study revealed that axially loaded columns with varying slenderness ratios exhibited different failure modes, including local buckling, local-flexural buckling, and flexural-distortional buckling. Furthermore, it was found that the ultimate capacity of the cross-section was largely unaffected by the connector spacing within the tested range of spacings.

***Keywords*:** Cold-formed steel, four C- channels, built-up section, Buckling, Axial Load, Finite element.

25. Numerical Investigation of Natural Convection of Hybrid Nanofluid in a Γ-Shaped Enclosure Under the Effect of Magnetic Field and Thermal Radiation

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Abstract:

Over the last few years, hybrid nanofluids have gained significant interest from researchers due to their enhanced heat transfer properties. In this study, numerical investigation of natural convection heat transfer of hybrid nanofluid inside a Γ -shaped enclosure is studied. An external uniform magnetic field is applied on a plane inclined to the axis of the duct. Furthermore, the conduit is experiencing thermal radiation. The upper right vertical wall is kept at T_c .As for the lower right vertical and horizontal wall, they are kept at T_h. The top and bottom walls are adiabatic. Finally, the left vertical wall is kept at T_c. The base fluid in this paper is taken to be water (H_2O) and the nanoparticles are Alumina (Al_2O_3) and Copper (Cu). Governing partial differential equations are solved numerically using finite difference method. The effects of the governing parameters on the streamlines and isotherms are illustrated graphically. The results of streamlines and isotherms are also obtained for several values of the parameters involved.

***Keywords*:** Natural Convection, Magnetohydrodynamics, Hybrid nanofluid and Finite difference method.

26. Stress-Strength Reliability Estimation For Quasi Lindley Distribution Based on Type II Censored Sample

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[2] Mathematics Department, Faculty of Science, Al-Azhar University, Egypt.

Abstract:

This paper discussed the problem of stress-strength reliability model R = Pr (Y < X). It is assumed that the strength of a system X, and the environmental stress applied on it Y, based on type II Censored sample from the Quasi Lindley Distribution (QLD). Stress-strength reliability is studied using the maximum likelihood, and Bayes estimations. Bayesian estimations were proposed using Importance Sampling technique, under symmetric loss function (squared error) and asymmetric loss functions (linex and general entropy. In addition, the approximate and credible confidence intervals (CIs) of the estimators are constructed. The behaviors of the maximum likelihood and Bayes estimator of stress-strength reliability have been studied through the Monte Carlo simulation study.

***Keywords*:** Quasi lindley distribution; Stress-strength reliability; Cen sored Samples; Maximum likelihood estimation; Bayesian estimation; Importance sampling technique; Asymptotic confidence interval; credible confidence interval.

27. SEC-MAC: A Secure Wireless Sensor Network Based on Cooperative Communication

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[2]Electrical Engineering Department, Faculty of Engineering, Benha University, Benha, Egypt.

Abstract:

This paper aims to discuss hybrid encryption methods which used in secure wireless sensor network based on co-operative communication. Hybrid encryption combining both symmetric and asymmetric methods of encryption using hybrid encryption offering balance between security and efficiency. Also has a lot of advantages such as enhanced security by using asymmetric key technique and symmetric block cipher such as Advanced Encryption Standard. For data transmission, hybrid type faster for encryption large amount of data, it supports secure communications between multiple parties without share all of Asymmetric Keys.

***Keywords*:** AES, block cipher, symmetric encryption, asymmetric encryption and RSA.

28. Investigating the Load-Bearing Behavior of Composite Cold-Formed Steel Decking

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Abstract:

Many countries face challenges in renovating historical houses and residences, particularly those with wooden roofs that have deteriorated over time. I have designed a decking system that effectively addresses this issue, offering a modern solution to reinforce and replace aging structures while preserving their historical value.

This Paper outlines the evolution of decking system construction utilizing steel and timber. The proposed system integrates cold-formed sigma cross sections with wood-based boards, benefiting from the excellent load-bearing properties of steel and the aesthetic and thermal advantages of wood. This synergy results in a versatile solution particularly well-suited for the renovation of historical buildings, museums, warehouses, and factories. The lightweight nature of the system allows for substantial structural upgrades without compromising the integrity of existing structures.

To assess and compare the performance of various composite cold-formed steel (CFS) decking systems, ABAQUS finite element software was employed, focusing on factors such as span variations, steel thickness, section height, and steel plates. The findings indicate that incorporating solid plates at the system supports significantly enhances the load-carrying capacity. This lightweight construction method offers a modern solution that respects architectural integrity while improving structural performance.

***Keywords*:** Decking, CFS, Structure, Analysis, Timber, capacity.

29. Evaluation of Very High-Resolution Remote Sensing Images Segmentation Techniques

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Abstract:

Extraction of urban information like linear features (roads), structured features (buildings, dams, man-made structures), boundaries of water bodies from satellite images has now become an important area in remote sensing studies. The whole part of a digital image is not useful for a particular purpose hence the image needs to be segmented. Various techniques of image segmentation have been proposed but the choice of a particular method depends upon some requirement. Hence it is necessary to have a basic insight of different methods of segmentation techniques. The purpose of segmentation has been changed from helping pixel labeling to object identification. The final feature extraction and classification in OBIA is highly dependent on the quality of image segmentation. As a step prior to classification the quality assessment of the segmentation result is of fundamental significance for the recognition process as well as for choosing the appropriate approach and parameters for a given segmentation task. Thus, this research is related to the topic of object-based accuracy assessment. In this paper, there are four types of segmentation techniques, these are chessboard, quadtree, contrast split and multiresolution segmentation. Each type of segmentation has their own parameters. Four types of segmentation techniques were carried out utilizing the Worldview-3 image with different Parameters values for each type of segmentation techniques to define the best algorithm and parameters of segmentation values or near the best algorithm and values for the parameters of image segmentation. used to extracting building from high resolution remote sensing images.

***Keywords*:** Image segmentation; segmentation parameters; segmentation techniques

30. Enhancing Efficiency and Sustainability of Domestic Split Air Conditioning units using R32 in both Microchannel and Finned tube condensers: Comparative and Experimental study

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[3] Graduate school of science and engineering, Institute of Science Tokyo, Tokyo, Japan

Abstract:

The objective of this study is to assess the performance characteristics of the HFC-32, a refrigerant with low global warming potential (GWP=675) and zero ozone depletion potential (ODP=0) in a split-type household air conditioner (STHAC). While keeping the finned tube heat exchanger (FTHE) evaporator design constant, the analysis contrasts two condenser configurations: a microchannel heat exchanger (MCHE) and FTHE. The ISO 5151:2017/Amd.1:2020 standard conditions for moderate and hot climates was used for the testing. The Air Enthalpy Test Method was used to test the input power, cooling capacity, and coefficient of performance (COP). The results show that the MCHE arrangement performs better than the FTHE design. In particular, for climate class T1, the cooling impact of the MCHE is 0.65% greater than that of the FTHE. The MCHE improves the coefficient of performance (COP) by 3.19% and lowers total input power by 2.82% in terms of energy efficiency. While for climate class T3, the cooling impact of the MCHE is 1.96 % greater than that of the FTHE. The MCHE improves the coefficient of performance (COP) by 3.78% and lowers total input power by 1.88% in terms of energy efficiency. The MCHE also has cost and environmental benefits: it lowers refrigerant charge volume by 36.6% and has a substantially reduced production cost. These findings imply that by reducing refrigerant use and related environmental effects, the adoption of microchannel heat exchangers in split-type home air conditioner STHAC systems could improve energy efficiency, reduce operating costs, and promote sustainability goals.

***Keywords*:** R-32, microchannel heat exchanger, finned tube heat exchanger, air conditioner.

31. Mitigating Sampling Frequency Offset in OFDM: A Comparative and Machine Learning-Based Approach

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Abstract:

This paper addresses the critical issue of Sampling Frequency Offset (SFO) in Orthogonal Frequency Division Multiplexing (OFDM) systems, which arises from mismatches between the sampling rates of the transmitter and receiver. Such discrepancies disrupt subcarrier orthogonality, leading to significant performance degradation, including Inter-Carrier Interference (ICI), phase distortion, and increased Bit Error Rate (BER). To ensure reliable data transmission, accurate SFO estimation and compensation are essential. The study examines four widely used SFO estimation techniques: the Phase Difference (PD) method, the Correlation-Based (CB) method, the Phase Difference Weighted by Subcarrier Index (PD-WSI) method, and the Hybrid Estimation (H-EST) method. Additionally, it introduces novel machine learning-based approaches—Linear Discriminant Analysis (LDA)-based, Kernel Support Vector Machine (KSVM)-based, and Artificial Neural Network (ANN)-based SFO estimators—designed to enhance synchronization accuracy. Comparative evaluations demonstrate that these proposed methods significantly outperform conventional and hybrid techniques by achieving lower Root Mean Square Error (RMSE), thereby effectively mitigating SFO-induced impairments and improving overall OFDM system performance.

***Keywords*:** SFO estimation, Data-Aided (DA) techniques, LDA-based SFO Estimator, KSVM-based SFO Estimator, ANN-based SFO Estimator.

32. A Wideband circularly polarized MIMO Antenna for 5G Millimeter Wave Applications

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Abstract:

This study presents a broadband, circularly polarized millimeter-wave four-port multiple-input–multiple-output (MIMO) antenna design featuring enhanced performance attributes. The MIMO antenna structure comprises four monopole elements with a common ground. Simulated on a Rogers RT5880 substrate with dimensions 25 mm × 31 mm and a thickness of 1.575 mm, the antenna demonstrates excellent characteristics. The MIMO achieves a high impedance bandwidth of 21.5 to 45 GHz, a wide 3-dB axial ratio bandwidth (ARBW) of 23.5 to 30.7 GHz, covering critical frequencies such as 28 GHz, and exhibits high isolation with S21 < -20 dBi. The axial ratio bandwidth (ARBW) and peak gain (8.5 dBi) are enhanced, and the MIMO performance is greatly improved by adding parasitic elements in between the MIMO elements. Massive MIMO can be constructed using an eight-port from the same monopole antenna. The compact size and simplified fabrication process make this antenna design a promising solution for demanding ultra-wideband communication scenarios and 5G millimeter-wave applications.

***Keywords*:** Wideband, Circularly Polarized (CP), MIMO, Gain, and 5G Millimeter Wave Applications.

33. Review on Chaos Image Encryption and its Challenges

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Abstract:

Since chaos started out being used in image-encryption methods, it has proven to be one of the strongest cryptographic sources. The evolution of chaos-based image encryption algorithms is carefully investigated in this research from a number of perspectives, including symmetric and asymmetric algorithms, block ciphers and stream ciphers, and interaction with other technologies. A system that is chaotic is one that is intricate and extremely dynamic, and it is defined by aperiodicity, nonlinearity, sensitivity to beginning circumstances, etc. Because of its complexity, the study of chaotic systems has grown in importance within the discipline of nonlinear dynamics. Conduct that is hard to regulate and predict. Chaotic properties including pseudo-randomness, topological transitivity, and sensitivity to beginning factors make it useful for enhancing image-encryption techniques and cross-referencing with other fields. Furthermore, this paper discusses current issues with chaotic picture encryption giving us a better view for the points needed development in chaos-based image encryption techniques.

***Keywords*:** Chaos, image encryption, Chaotic map and cryptography.

34. Experimental Investigation of Ambient Temperature Effects on Domestic Refrigerator Performance and Running Ratio

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Abstract:

The domestic refrigerator is one of the most widely used household appliances, and improving its performance can significantly contribute to energy savings and environmental sustainability. Maintaining low and uniform temperatures is essential to prevent food spoilage and inhibit microbial growth. This study experimentally investigates the impact of varying ambient temperatures (15°C, 30°C, and 43°C) on refrigerator performance and running ratio. Three refrigerator samples were tested in a controlled laboratory setting to evaluate their efficiency under different thermal conditions. The results provide insights into how external temperature fluctuations affect operational performance, offering a potential increase in running ratio by 16% when testing the samples in 30 °C compared with testing in 15 °C to matin the performance, slightly change in running ratio for the tested samples around 2% in 43 °C compared with its result in 30 °C.

***Keywords*:** Refrigerator, Cooling Performance, Ambient temperature.

35. Multi-Class Gastrointestinal Diseases Improved Diagnosis Based on Ensemble and Transfer Learning

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Abstract:

The digestive system is a lengthy tube composed of several hollow organs that extends from the mouth to the anus. To recover, patients with gastrointestinal disorders need to receive the right care and be diagnosed as soon as possible. Research on using endoscopic image classification to identify gastrointestinal tract diseases has recently increased in biomedical applications. However, prior studies indicated that more research is required since it is challenging to distinguish some gastrointestinal disease classifications from others. Deep learning algorithms can diagnose major gastrointestinal conditions such as ulcerative colitis, polyps, and esophagitis. Convolutional neural networks are a computer-aided diagnosis technique's most famous deep learning branch. Multiple approaches are utilized to enhance the performance of the diagnosis system. So, to achieve this goal, in this proposed work, there are four different experiments, the first two experiments were based on two different Convolution Neural Network models, in which the accuracy obtained is 0.75125, and 0.99875 respectively, then in the third experiment Ensemble Learning was applied, in which total accuracy obtained is 0.995, at last fourth experiment Transfer Learning was applied, by utilizing the famous pretrained model (vgg16), in this experiment, the accuracy obtained is 0.9800. According to these 4 experimental approaches, results have better performance evaluation parameters in accuracy than other recent approaches for gastrointestinal disease multi-class diagnosis. Also, these techniques can be applied to other multi-class diseases.

***Keywords*:** Convolution Neural Network (CNN), Deep Learning (DL), Ensemble Learning (EL), Gastrointestinal Diseases (GIDs), and Transfer Learning (TL).

36. The Bitcoin Wallets: How to be Anonymous?

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Abstract:

Bitcoin, widely known as the first decentralized cryptocurrency, offers pseudonymous transactions recorded on a public blockchain. However, the transparency of its blockchain creates significant privacy risks, as transactions can be traced and linked, potentially compromising user anonymity. Bitcoin wallets play a pivotal role in determining the level of anonymity available to users. This research explores the anonymity techniques employed by Bitcoin wallets, with a focus on strategies used to enhance user anonymity. We examine the privacy features of various Bitcoin wallets, such as electrum and wasabi wallets. The Bitcoin Testnet is used for experimental purposes. The paper assesses the effectiveness of these techniques in reducing risks such as address reuse, transaction linkage. Additionally, it talks about the challenges faced by wallet developers in balancing anonymity with usability. Our research shows even though the current ways to stay anonymous make things more private, they're not perfect. It's necessary for further innovations in wallet design to achieve robust anonymity in Bitcoin transactions.

***Keywords*:** Bitcoin, Cryptocurrency, Anonymity, blockchain.

37. The Impact of Blockchain Technology on Product Supply Chains in the Field of Industrial Design

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Abstract:

The integration of blockchain technology into supply chain management presents a paradigm shift with the potential to revolutionize industrial product design. This research explores the capacity of blockchain to address inherent supply chain challenges, including lack of traceability, stakeholder distrust, limited transparency, outdated data sharing methods, and compliance issues. Blockchain's decentralized structure, immutability, and smart contract capabilities offer solutions by enhancing transparency, ensuring data integrity, automating processes, and fostering trust among stakeholders. The study investigates how blockchain implementation can optimize various facets of the industrial design product lifecycle, from raw material sourcing and design to production, distribution, and end-of-life management. Furthermore, it examines the implications of blockchain for promoting sustainability, ethical practices, and consumer trust, highlighting its role in creating more resilient, efficient, and transparent supply chain ecosystems. To understand the integration of blockchain technology into the supply chain of industrial design products, this paper systematically summarizes the status of blockchain technology, its main characteristics, and its potential applications in the field of industrial design. The analysis concludes that while challenges such as energy consumption and the need for standardization remain, the strategic adoption of blockchain technology can significantly redefine industrial design product supply chains, fostering innovation and sustainable growth.

***Keywords*:** Blockchain Technology, Supply Chains (SCs), Industrial Design Products, Transparency, and Digitalization.

38. Intellectual Property Protection for 3D Printing Products Using Blockchain Technology in the Field of Industrial Design

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Abstract:

This research examines the application of blockchain technology as a mechanism to augment intellectual property (IP) protection for three-dimensional (3D) printed products within the domain of industrial design. The escalating accessibility and decentralized nature of 3D printing technologies have intensified concerns regarding the unauthorized replication and dissemination of design files, thereby posing a considerable risk to the IP rights of designers and manufacturers. This study explores the potential of blockchain's intrinsic attributes—immutability, transparency, and decentralized architecture—to establish a secure and auditable framework for the management and protection of digital design assets. It investigates how blockchain-based solutions can provide verifiable provenance for 3D printable files, monitor their utilization and transfer, and automate licensing agreements through the implementation of smart contracts. Furthermore, the research analyzes the advantages of blockchain in deterring counterfeiting, streamlining the administration of IP rights, and fostering trust among designers, manufacturers, and consumers. By addressing the challenges of IP infringement within the context of 3D printing, this study contributes to the development of robust strategies for safeguarding innovation and promoting a secure ecosystem for the design and production of 3D printed products. The findings aim to provide insights into the feasibility and efficacy of blockchain technology in redefining IP protection mechanisms within the evolving landscape of digital manufacturing.

***Keywords*:** Blockchain technology, 3D printing, Additive Manufacturing, Intellectual Property, Industrial Design.

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