CONFERENCE PROCEEDINGS

5th ABASYN INTERNATIONAL CONFERENCE ON TECHNOLOGY AND BUSINESS MANAGEMENT

MARCH 5-6, 2024

Organized By:
Abasyn University, Peshawar
Conference Chief Organizer:
Prof. Dr. Waqar Alam

The 5th Abasyn International Conference on Technology and Business Management

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Engaging Minds:

Shaping Entrepreneurship and Sustainability through Emerging Sciences and Technology

Introduction

As society progressed over centuries, it built upon previous knowledge, initially held by philosophers who encompassed a broad range of understanding. In earlier times, the entirety of human knowledge could feasibly reside within a single individual. However, as the 18th century drew to a close, the expansion of knowledge led to the emergence of natural philosophers, eventually giving rise to natural scientists by around 1850, coinciding with the division of universities into arts and sciences.

Today, we find ourselves in an era of rapid knowledge segmentation, where the acquisition of knowledge occurs through the creation of new disciplines. This process continues to foster positive change in knowledge creation and dissemination. The specialization of disciplines has spurred investigations into practical aspects of life, resulting in the formation of new fields such as humanities, arts, natural sciences, life sciences, social and management sciences.

It's crucial to recognize this expansion of technology and knowledge management as an evolutionary process. Professor Chandler, in his book "The Visible Hand," emphasizes the economic function of coordinating knowledge.

Furthermore, regional, national, and international cooperation in academia is still developing. Factors such as an unfavorable research environment and a lack of culture promoting the sharing of academic output through seminars and conferences contribute to a limited output of research papers.

In light of these considerations, Abasyn University Peshawar organized the 5th AiCTBM series international conference on March 5-6, 2024. Under the guidance of Prof. Dr. Umar Farooq, Vice Chancellor of Abasyn University, a committee, led by Prof. Dr. Waqar Alam, was tasked with developing a suitable conference theme and sub-themes.

Thematic Focus

This year's conference theme was "***Engaging Minds: Shaping Entrepreneurship and Sustainability through Emerging Sciences and Technology***". The motivation behind this theme was the understanding that the economies of Asia in general and Pakistan in particular could only compete with the developed world through a firm realization of knowledge power. It is the entrepreneurial spirit that is believed to make countries' economies resilient in averting global financial setbacks. Hence, by gaining and sharing technology and knowledge in various fields of science such as engineering, life sciences and social sciences, countries can build regional cooperation, continuous economic growth and improved standards of living for its citizens. There is a dire need to dig deeper into this and generate a healthy debate on engaging minds to generate the power of knowledge in technology, life sciences and business management. This surely brings a clear understanding of the complexities of issues confronting Pakistan but also opens doors for confronting these enormous challenges.

Sub Themes

Several sub-themes were identified within the broader theme framework. The sub-themes demonstrate the strategically important vistas in technology, life and management sciences through inter-disciplinary approaches.

- ST 01: Business for Society
- ST 02: Corporate Social Responsibility and Corporate Governance
- ST 03: Entrepreneurship
- ST 04: Innovation and management
- ST 05: International Management
- ST 06: Organizational Behavior
- ST 07: Project Planning and Management
- ST 08: Research methods, methodologies and practice
- ST 09: Strategic Management
- ST 10: Concrete Technology
- ST 11: Structural Engineering
- ST 12: Disaster Management
- ST 13: Renewable Energy/ Dams and Reservoirs
- ST 14: Environmental Protection
- ST 15: Transportation Engineering
- ST 16: Communication Technologies
- ST 17: Information Systems
- ST 18: Big Data and Data Sciences
- ST 19: Algorithms, Logic, Semantics and Programming Theory
- ST 20: Computer Vision and Graphics
- ST 21: Intelligent Systems
- ST 22: Internet and Data Security
- ST 23: Software Engineering
- ST 24: e-Business and e-Learning
- ST 25: Bioinformatics
- ST 26: General conference track

Conference Objectives

The objectives of the conference were to:

i. Forge a common research agenda to highlight the power of engaging minds for knowledge attainment and sharing.

ii. Explore modern methodologies, research paradigms and techniques to address the importance of entrepreneurship and sustainability nexus.

iii.   Build capacity of young faculty members and scholars in conducting qualitative and quantitative research.

iv.   Provide opportunities for national and international academicians and professionals for knowledge sharing in their respective fields.

v.   Facilitate networking among regional, national and international scholars in various institutions of Pakistan and abroad.

Significance of the Conference

The conference provided an academic platform for participation in rigorous brainstorming and exploring possibilities of collaboration within regional, national and international forums. The conference proved to be a useful platform for motivating young scholars and academicians in getting involved in research activities. The conference proves useful in receiving valuable feedback for further improvements in conducting similar conferences. Above all, the conference provided a useful opportunity for scholars and academicians to highlight their accomplishments by sharing their research work.

Participants

The conference was attended by research scholars, academicians, university faculty, research students, heads of higher education institutions and other dignitaries from various walks of life. With its unique theme of "***Engaging Minds: Shaping Entrepreneurship and Sustainability through Emerging Sciences and Technology***" the conference provided the right platform to the participants from within the country and abroad to share their scholarly work with the audience.

Worthy Keynote Speaker Dr. Adil Adnan, Dean Faculty of Management, Iqra National University, delivered his keynote speech on "Market dynamics and consumer behavior. Several other authors from UK, Italy, Malaysia, Saudi Arabia and Afghanistan delivered keynote speeches via video link and added international perspectives on knowledge and research. Having received more than 100 scholarly articles from all over the country and abroad, selected papers will be published as per double blind peer reviews. Parallel technical sessions on both days provided ample opportunity to enlighten the panel of experts and research students with their research findings.

Dr. Muhammad Imran Ullah
Chancellor, Abasyn University

We feel greatly privileged and pleased to have an array of luminaries with international standing and global repute as scholars, academicians, and researchers, in our midst on the occasion of the 5th Abasyn International Conference being organized by our university. It is my firm conviction that the event will boost up researchers, academicians, scholars, and students to keep themselves abreast of the latest advancements in the fields of business, technology, engineering and management. I am happy to see that the faculty and students of the University are cognizant of their national and international role as trend setters in creative and inquisitive domains of knowledge.

It is my considered opinion that there is no dearth of talent in Pakistan. By the Grace of Almighty Allah Pakistani scientists have proved that they are second to none in the world and have knowledge, expertise and experience to do what scientists of the most advanced countries can do. In my opinion Pakistan has great potential in the field of Business, science and technology, only if we formulate right policies and exhibit a strong will to execute them. We can only then make our economy more vibrant and self-reliant. No nation can secure for itself a position of strength and honor in the world community with a dependent and loan-afflicted economy. We must have to come out of this mire. One way of taking in hand this challenge is to modernize our economic, trade, and business enterprises. Our entrepreneurs have to be able to timely anticipate and promptly react to external and internal changes. They, thus, require a plan for turning knowledge into actionable intelligence from which strategically important decisions can be made. The use of such knowledge is all the more important in the 21st century.

To the young participants my word of advice is to make learning a life-long passion, only then you will survive in this ruthlessly competitive world. I hope you continue the same dedication in future to maintain the high standards of professional integrity and performance. Distinguished Participants! We are delighted to have you here to participate in and to share the moments of our achievement. Thank you for coming. That many of you have travelled long distances serves to remind us all just how important our work is.

Prof. Dr. Syed Umar Farooq
Vice Chancellor, Abasyn University

I feel honored and privileged to welcome you all to the 5th International Research Conference on Technology and Business Management at Abasyn University.

To begin with I would say that research Conferences are generally an essential part of academic discourse and every research conducted pushes the boundaries of knowledge and contributes to the progress of a nation. I do hope that the diversified research activities in the next 2 days will set the precedent for providing insights to formulation of future policies in the fields of business management, engineering and computing and life sciences.

This conference has been graced with the presence of national and international scholars and this alliance will no doubt result in mobilizing intellectual resources and developing research culture.

The management of Abasyn University considers it a responsibility to make all out efforts to create an academic and congenial environment for the faculty and research scholars in order to enable them to get their intellectual faculties flourished and contribute positively towards the uplift of the society.

To give you a brief glimpse about the recent achievements of Abasyn University, I would like to mention that:

1. The University has drastically upgraded its infra-structure facilities.
2. New academic programs at all levels have been launched.
3. All the accreditation proceedings have been successfully completed.
4. Abasyn Journal of Social Sciences (AJSS) has been awarded Top Ranking in Pakistan by HEC in the Business Management domain.
5. Five (5) International Research Conferences have been conducted in 2016-18 with the collaboration of National and International Universities (three with UTM, one with Riphah University, and one with IM/Sciences) along with 126 Research Publications by Faculty of Abasyn University in HEC abstracted Research Journals.
6. Woman Campus Building has been completed and operations have commenced since Fall 2018.

Today, possessing knowledge and having the ability to use knowledge worldwide is critical to personal and social progress. Abasyn University is engaged in the process of fostering an environment that attracts, sustains and retains creative, imaginative and globally resourceful individuals. We are aware of the role of higher education as universities are the primary suppliers of human resources.

I would take this opportunity to renew our pledge for upholding the cause of higher education in this great country and we assure all the stakeholders that we are well aware of our responsibility to sustain and preserve the legacy of excellence in education.

Thank you very much and Allah bless you all.

Dr. Waqar Alam
Chief Organizer
CONFERENCE REPORT

The 5th Abasyn International Conference on Technology and Business Management was held from March 5-6, 2024 at Abasyn University Peshawar. The conference was themed "***Engaging Minds: Shaping Entrepreneurship and Sustainability through Emerging Sciences and Technology***". The conference addresses a variety of topics/issues pertinent to the main theme including peculiar questions about the research system at large such as research assessments, and research outputs.

The conference garnered immense support from sponsors and contributors from different nooks and corners of Pakistan and certain parts of the world. There was a considerable support and cooperation from several banks, media houses and many other public and private institutions.

The present state of the conference is stretched over a labor of strenuous efforts of several months in which the organizing committee exhausted every available resource to execute the conference agenda. I am personally very thankful to my organizing team for their consistent support, riveting motivation and industrious team work throughout the entire conference. The call for papers was announced in December 2023. A total of 85 papers were received for all participating disciplines. After a process of thorough desk reviews and by taking into account the recommendations of the reviewers, only selected papers made their way into the conference acceptance list.

With respect to the participation of the conference, 80 people registered and more than 150 delegates attended the conference. The conference opening was attended by the Chief Guest Prof. Dr. Khan Bahadur, a renowned academician and mentor in KP., and Keynote speaker Dr. Mumtaz Hussain Shah in person and international speakers via video link, as Keynote Speakers from the Faculty of Business, Engineering, Life Sciences and Law and Politics, from national and international universities. The conference was attended by a number of dignitaries from renowned universities and institutions including Vice Chancellors of Peshawar University, Agricultural University, CECOS University, KUST University Kohat and Chancellors of City University and CECOS University. Besides, numerous Professors from the leading universities of Peshawar, Kohat, Mardan, Charsadda and Islamabad attended the technical sessions as Conference Chairs, Co-Chairs and Reviewers.

The Conference Chair, Prof. Dr. Syed Umar Farooq in his opening address highlighted that AiCTBM has earned the reputation by offering the platform for all the stakeholders to

deliberate ideas, interact, and envision solutions that benefit scholarly communication. The Conference Patron in his opening speech emphasized that. In the concluding moments of the inaugural session, the Chief Guest, distributed the shields among the conference chair, conference patron, media partners and sponsors.

The 5th AiCTBM 2024, addresses contemporary questions about the reliability of scientific literature, reproducibility initiatives and their relationship with publication ethics. Speakers and delegates broadened the scope of the best practices among the researchers. The schedule of the conference remained quite busy with an extensive program having the pre-conference preparatory activities commenced well in advance of the formal commencement of the conference. On the first day of the conference, 60 scholars presented their respective scholarly work. Aiming to provide a fraternal, supportive and conducive environment for researchers to exchange ideas and deliberate openly about their research works, attendance to these sessions were confined to accepted papers from different disciplines. The second day started at its scheduled time immediately after the registration of the delegates along with running of parallel technical sessions. The technical sessions took place in different locations. Two Keynote Speakers from University of Hull, UK delivered their keynote speeches via videoconferencing.

Last but not the least I am profoundly grateful to all for expressing their genuine interest in dedicating time and energies to participate in the 5th AiCTBM. My thanks go to the organizers who demonstrated a remarkable spirit of support and teamwork. I further extend my gratitude to the Conference Chair, Vice Chancellor Abasyn University, Dr. Syed Umar Farooq for his continuous support and cooperation through the execution of this seminar. I am sure that the participants would have enjoyed their time during their presence at the 5th AiCTBM. I further hope that our paths would cross sometime soon in future on similar platforms. I wish you all a very best of luck in your future research endeavors. I would like to conclude my conference report in the words of Henry David Thoreau, "if at first you don't succeed, search, and search again. That is why we call it research".

Thank you all very much.

Sustainability of Human Resource Management Information System (HRMIS) of Malaysian Government: A Case Study of Technological Innovation.

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Abstract

In the fast-changing world, Malaysian organizations are using e-Human Resource Management Information Systems (e-HRMIS) to optimize their business operations and stay competitive. This paper highlights how HRMIS has become a cornerstone for efficient and strategic human resource management in Malaysia. Its adoption is a necessity for organisations striving to stay competitive in the dynamic business environment. The system has implemented global best practices and stays abreast with industry trends. The HR professionals can deal with the complexities of human resource management (HRM) with confidence and success. It is an application system that covers all the aspects of HRM from the appointment of civil servants until their end of service. This paper uses in-depth review method to analyse efficiency, sustainability and advances (from desktop to mobile application installation) of this software system. The core findings comprised a cohesive and streamlined platform, automation of HR processes like payroll, attendance tracking and user friendlier system. More studies may be carried out to compare it with other developed countries.

Keywords: HRMIS, Human Resource Management, Malaysia, efficiency, technology, software, sustainability.

Impact of Macroeconomic Variables on Foreign Capital Inflows: A Dilemma of Current Account Deficit in Pakistan

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Abstract

The purpose of this study is to focus on the impact of macroeconomic variables. The researcher has taken this variables/lens to calculate and analyze the foreign capital inflow of Pakistan for the limited period from 1980 to 2019. Our country, Pakistan is facing twin deficit in current/capital accounts due to high imports and limited exports of their goods to the markets of other countries. It is the dire need of the day to have more access to international market to reduce this current account deficit. It is evident that since the last two decades our economy faces twin deficits in the current accounts and as a result there is inflation, unemployment and low per capita income existed at large scale. For this purpose, the researcher has excelled "Time Series Data" and run "Unit Root Test" through "Augmented Ducky Fuller" test. The results found stationary at first level difference and then by applying the "Auto Regressive Distributed Lag" model was analyzed. Domestic investment was found insignificant and other variables like consumer price index, interest rate, exchange rate, domestic savings, money supply and gross domestic product was found significant. Results also revealed that no sign of autocorrelation and heteroscedastic was detected. The Current deficit account of Pakistan has been measured and the resulting phenomenon indicates that during the study period, current account deficit of Pakistan remains unsuitable which means that the country is destined to face extremely challenging situation of current account deficit. Proper measures are needed likewise introducing the culture of simplicity, reduction of unnecessary expenditures, provision of cheap resources at domestic level and advancement of technology to promote and enhance the strength of local industry. This will result to reduce the debt burden and also will accelerate the economic growth of Pakistan. In future, other variables can also be researched in the study which can promote the Foreign Capital inflow of a country.

Keywords: consumer price index, exchange rate, interest rate, domestic saving, money supply, gross domestic product, domestic investment.

Empirical Analysis of Bilateral Trade Between Pakistan and Gulf Cooperation Council Countries: Gravity Model Approach.

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Abstract

Gulf Cooperation council countries are the key trade partners of Pakistan. Pakistan heavily relies on this market for fresh vegetable, fruits, textiles, meat and other items. The objective of this study is to determine the factors that contribute to trade between Pakistan and GCC countries. Furthermore, the study has immense policy implications as it will enable the policy makers to focus on the determining factors this study will unfold for the expansion of exports and overall increase of Trade. The study analyzed Gravity model using quantitative data for six countries of GCC and Pakistan from 2003 to 2020. The data is taken from different authentic sources like World Bank and World Integrated Trade Solutions. Gretl and Eviews software were used for data analysis. It is concluded that all the explanatory variables taken are significant except population of host country. The findings of the study confirmed that GDP and Population affects bilateral trade positively while geographic distance carries negative impact on bilateral trade. The study suggests that trade barriers must be eradicated and ease of doing business should be achieved in Pakistan as well as destination countries to facilitate trade. The study has practical implications. It encourages partner countries to sign bilateral free trade agreements and to further the current study and include product specific research.

Keywords: Qatar, GDP Per Capita, Gretl, GCC, FTA, UAE, Saudi Arabia.

Determinants of Energy Transition: A Comparative Study of South Asia and G20 Countries.

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Abstract

Transition towards renewable and low carbon energy is now a days the core objective of energy policy of all countries striving for achievement of sustainable development goals which necessitates the understanding of accelerating factors of energy transition. Therefore, this study empirically analyzed the factors influencing energy transition in G20 countries and South Asian countries by using data from the time period of 2000 to 2022. Furthermore, this study carried out a comparative study between these sets of countries to compare the determinants of energy transition. The data estimation starts with cross-sectional dependence and unit root test and both these tests suggest the use of feasible generalized least square method as main estimation technique. The findings of feasible generalized least square show that technological diffusion has a positive and significant effect on energy transition in South Asia and G20 countries. The results also demonstrate that the effect of technological diffusion on energy transition is stronger in G20 countries than the South Asia. Findings furthers show that globalization and governance accelerate energy transition but the effect of governance on energy transition in South Asia is statistically insignificant whereas income per capita has inverted U-shaped relationship with energy transition in both sets of countries. Finally, this study makes some recommendations for further enhancing energy transition in the light of the findings of this study.

Keywords: Energy transition, Technological diffusion, FGLS, South Asia, G20

The Impact of Fiscal Pressure on Financial Performance of Banking Sector listed on the Pakistan Stock Exchange: The Moderating role of Financial Leverage and Capital Adequacy Ratio

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Abstract

This proposal investigates the impact of fiscal pressure on the financial performance of the banking sector listed on the Pakistan Stock Exchange, with a focus on the moderating roles of financial leverage and research and development (R&D). Fiscal pressure, defined as the financial strain imposed by government taxes and policies, is examined in relation to firm financial performance using data spanning from 2013 to 2022. The study aims to explore the relationships between fiscal pressure and financial performance indicators such as return on assets, return on equity, and return on investment, considering the moderating effects of financial leverage and R&D investment. The significance of this research lies in its contribution to understanding the effects of fiscal pressure on business operations, providing insights for investors, policymakers, and practitioners in navigating challenging fiscal environments. Data analysis will involve secondary sources including Pakistan Stock Exchange data, annual reports from the State Bank of Pakistan and Federal Board of Revenue, as well as global databases. Statistical techniques such as multiple regression analysis will be employed to analyze the relationships between variables. The study's findings are expected to offer valuable implications for decision-making, policy formulation, and future research in the realm of fiscal pressure and financial performance within the Pakistani banking sector.

Keywords: fiscal pressure, financial performance, banking sector, Pakistan Stock Exchange, moderating role.

Greenhouse Gas Emissions and Industry Growth in Pakistan: The Moderating Role of Renewable Energy

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Abstract

This study investigates the relationship between industrial growth and greenhouse gas (GHG) emissions in Pakistan, with a focus on the moderating role of renewable energy. Utilizing data from 1998 to 2020 sourced from Our World in Data, World Bank WDI indicators, and other databases, the research employs an ARDL model and a nonlinear ARDL model to analyze the dynamics. Findings reveal a significant positive impact of industrial growth on GHG emissions, consistent with prior literature. Moreover, renewable energy demonstrates a significant moderating effect, with its increase leading to a reduction in GHG emissions. Diagnostic tests ensure the robustness of the models, affirming the stability and efficiency of the estimated relationships. The study underscores the importance of transitioning Pakistan's industry to renewable energy to mitigate GHG emissions, offering valuable insights for policymakers, environmentalists, and industrial stakeholders.

Keywords: industrial growth, greenhouse gas emissions, renewable energy, ARDL model, Pakistan.

Corporate Governance and Financial Distress in Cement Sector: Moderating Role of Audit Quality

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Abstract

Financial distress has been considered as the major issue that needs to be addressed by the management. Therefore, the existing study evaluated the association between corporate governance on financial distress. The study was conducted in the secondary market of Pakistan (PSX). The study was conducted in the Cement Sector of Pakistan. The listed firms in the cement sector were taken as the sample of the study. The data for the sample firms were collected from 2014 to 2020. The data for the variables were collected through secondary sources which included the audited published annual reports from the official websites. The data time frame will be from 2014 to 2020. The results of diagnostic tests have recommended the fixed effect model as the data analysis model. The result of fixed effect model without moderating shows independent director, audit committee independence, chairman of the firm, firm size having significant effect while risk management committee, board diversity, leverage and growth have insignificant effect on financial distress. The results of moderating effects show that independent director, audit committee independence, chairman of the firm, firm size have significant effect while risk management committee, board diversity, leverage, growth and audit quality have insignificant effect on the financial distress. The overall findings for the moderating and without moderating show the 20 percent change in the R2 which shows a significant contribution of audit quality between independent and dependent variables. Independent director is having negative relationship with financial distress; it has been recommended that when the independent directors are increasing in the board then the financial distress will be lower. The management of the firm should allocate balance number of board of director which can significant for running the daily operations and also controlling the financial matters and other financial activities.

Keywords: Financial distress, corporate governance, PSX, Cement sector, Z-score, fixed effect etc.

The Impact of Financial Inclusion on Firm Performance with the mediating role of Working Capital: A case of small enterprises of KPK

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Abstract

This study investigates the impact of financial inclusion on firm performance with a focus on small enterprises in the Khyber Pakhtunkhwa (KPK) province of Pakistan, considering the mediating role of working capital management. Firm performance, a multidimensional concept encompassing financial success and operational efficiency, is evaluated alongside financial inclusion, which aims to provide affordable and sustainable financial services to individuals and businesses. Working capital, crucial for daily operational activities, represents short-term funds essential for sustaining business operations. Drawing on the United Nations' goals of financial inclusion, this research examines how access to financial services influences firm performance in the context of small enterprises in KPK. It addresses a gap in the literature by specifically focusing on firm-level financial inclusion and its effects on small businesses. The study formulates two research questions: How does financial inclusion impact firm performance? What is the mediating role of working capital management in the relationship between financial inclusion and firm performance? Through applied, descriptive, and quantitative research design, the study utilizes secondary data collected from annual reports of food and personal care product companies listed on the Pakistan Stock Exchange from 2019 to 2023. The population comprises financial sectors, with food and personal care product companies selected as the sample through purposive sampling techniques based on data availability. Statistical analyses, including descriptive statistics, ANOVA, and mediation analysis, are conducted using the Statistical Package for Social Science (SPSS). The independent variable, financial inclusion, is measured by the amount of bank borrowings, while firm performance is assessed using Tobin's Q. Working capital, the mediator variable, is calculated from a company's current assets and liabilities. The findings of this study are expected to contribute to policymakers' and financial institutions' understanding of how financial inclusion impacts small enterprises in KPK. By elucidating the mediating role of working capital management, the research aims to provide insights that can inform targeted interventions to promote financial inclusion and support the growth of small businesses in the region.

Keywords: Financial Inclusion Firm Performance Working Capital Small Enterprises KPK

Impact of Teamwork, Employee, Empowerment and Training of Employee Performance

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Abstract

Employee performance is considered as the main and most important HR practice in every organization as it is the key through which organizations achieve their ultimate goals and they can only achieve productivity and efficiency through higher performance of employees. The thesis focuses to study the direct effects of teamwork, employee empowerment and training on employee performance in telecom sector Islamabad, Pakistan. Based on previous research studies, it is clear that only few researches were carried out on employee performance and its relationship with teamwork, employee empowerment and training, especially in telecom sector. Hence, 150 questionnaires were distributed among employees of three cellular companies such as Ufone, Telenor and Mobilink Islamabad, Pakistan to collect data for the study. To analyse the collected data, multiple linear regression was used on SPSS. The results of the findings showed that teamwork has significant positive effect on employee performance. The study also disclosed that employee empowerment has significant positive effect on employee performance. At last, the study concluded that training has significant positive effect on employee performance. Therefore, it is recommended for every organization to implement such practices in their organizations to improve the overall productivity of the organization and gain competitive advantage.

Keywords: Employee Performance, Teamwork, Employee Empowerment, Training

Nexus of Servant Leadership and Organization Performance Modeling the Mediating Role of Perceived Organizational Support

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Abstract

Servant leadership, a comprehensive leadership approach, engages followers on multiple levels—relational, ethical, emotional, and spiritual—to foster their full potential. This research traverses three stages: conceptual evolution, measuring phase, and model development. Initially centered on the seminal works of Greenleaf (1977) and Spears (1996), the conceptual evolution explored servant leadership's foundational principles. Subsequently, the measuring phase focused on defining servant leadership measures and examining its associations with outcomes. Presently, in the model development phase, advanced research designs aim to unravel servant leadership's antecedents, mediating mechanisms, and boundary conditions. This surge in research activity marks the third phase, epitomizing a deeper understanding of servant leadership's impact. Two primary research objectives were pursued in this study: (1) To investigate the effect of servant leadership on organizational performance at NTDC, and (2) To explore the mediating role of perceived organizational support (POS) in the relationship between servant leadership and organizational performance. Employing a quantitative approach, data was collected through Likert scale questionnaires from NTDC employees in the region/circle. The findings revealed a positive association between servant leadership and perceived organizational support, serving as indicators for organizational performance. Regression analysis demonstrated a significant and positive influence of servant leadership on organizational performance, with perceived organizational support mediating this relationship. Both alternative hypotheses were supported, underscoring the importance of servant leadership and perceived organizational support in enhancing organizational performance. The study provides valuable insights for NTDC and suggests implications and recommendations based on the research findings.

Keyword: Servant leadership Organizational performance Perceived organizational support (POS) NTDC Regression analysis.

Impact of CSR, innovation, and green investment on sales growth of Pakistan and India

Saima Qudrat
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Abstract

This study investigates the impact of Corporate Social Responsibility (CSR), innovation, and green investment on sales growth in the context of Pakistan's manufacturing sector. Over the past decade, organizations have increasingly focused on enhancing sales growth through innovative capabilities, customer responsiveness, CSR initiatives, and environmental compliance. However, there remains a literature gap in understanding the collective influence of these factors, particularly in emerging economies like Pakistan. Leveraging firm-level panel data from 2016 to 2020, this research examines the relationship between economic innovation, CSR, green credit, green investment, and sales growth in Pakistan's top 20 trading manufacturing companies. Using quantitative methods, including panel fixed effect and random effects models, the study finds significant positive associations between economic innovation, CSR, green investment, green credit, and sales growth. The findings underscore the importance of sustainable business practices, innovation, and CSR in driving long-term sales growth in Pakistan's manufacturing sector. While offering valuable insights, the study acknowledges limitations and suggests avenues for future research to explore more nuanced outcomes.

Keywords: Corporate Social Responsibility (CSR), innovation, green investment, sales growth, Pakistan.

The Impact of Financial Literacy, Parental Socialization and Self Control on Savings Behaviour Among University Students in Pakistan

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Abstract

In developing countries like Pakistan, saving behavior plays a crucial role in household welfare, particularly among university students transitioning to financial independence. Despite its significance, there's a dearth of research on the saving behavior of Pakistani students. This study aims to investigate the impact of financial literacy, self-control, and parental socialization on students' saving habits. Using an explanatory research design and employing quantitative methods, data will be collected through primary sources via survey questionnaires distributed among university students. A convenience sampling method will be utilized across four private universities, targeting a sample size of 250 students. The findings of this research are expected to shed light on the factors influencing students' saving behavior, thereby informing policy-making and educational interventions to promote financial awareness and responsible money management among students in Pakistan.

Keywords: saving behavior, financial literacy, self-control, parental socialization, university students.

Estimation of Muscles Force from EMG Signals Using Gaussian Process Regression Model

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Abstract

In the human body muscle fibres are a source of force. The accurate measurement of muscle force plays a role, in areas such as rehabilitation, prosthesis control and human machine interfaces. The approach proposed in this paper utilizes Gaussian Process Regression (GPR) to capture the relationship between EMG signals and muscle force. Through experiments conducted on a dataset of muscle contractions the effectiveness of this approach, in estimating muscle force from EMG signals has been demonstrated. Different performance metrics including Mean Square Error (MSE), Root Mean Square Error (RMSE), Mean Absolute Error (MAE) and Coefficient of Determination (R2) are used to find the performance of the model on the basis of actual and predicted force. The result of the proposed GPR model (MSE =0.230, RMSE=0.480, MAE =0.102 and R2 =0.924).

Enhancing Outliers Identification in Underwater Sensor Networks Using Deep Learning

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Abstract

Underwater Wireless Sensor Networks (UWSNs) have emerged as a significant technological challenge in recent years, offering vital capabilities for information exchange beneath the water's surface and enabling predictions about underwater environments. This study focuses on detecting anomalies within UWSNs to improve the integrity and reliability of data transmission. It explores the intricacies of UWSNs, covering the motion of sensor nodes, communication delays, and the negative impacts of anomalies on the accuracy of data. One of the primary challenges in UWSNs is the detection and management of data outliers, crucial for maintaining the integrity and accuracy of collected data among the unique underwater environment's constraints. The objectives of this research include designing a robust outlier detection model LSTM tailored to the distinctive characteristics of UWSNs, enhancing the trustworthiness of sensor data, and minimizing anomalies' impact on data integrity. The significance of this study lies in its potential to substantially enhance the reliability and quality of data within UWSNs, benefiting fields such as marine science, environmental monitoring, and underwater exploration. The research design entails a systematic methodology for anomaly detection using LSTM Neural Network model, comprising dataset selection, preprocessing, feature extraction, training, testing, and evaluation stages. By developing specialized solutions for anomaly detection in UWSNs, this research contributes to advancing technology for a better understanding and preservation of the underwater environment, with implications extending to both the scientific community and broader society.

Enhancing Fraud Detection System: A Study of Techniques for Imbalanced Datasets

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Abstract

The widespread adoption of credit card systems has led to a surge in fraudulent activities globally, resulting in substantial financial losses for banks, businesses, and individuals. The COVID-19 pandemic has further exacerbated this trend, accelerating the shift towards online shopping and amplifying the need to enhance fraud detection mechanisms, especially in e-commerce. This study addresses the issue of imbalanced datasets in fraud detection by employing the Synthetic Minority Over-sampling Technique (SMOTE) alongside various machine learning algorithms. Specifically, Logistic Regression, Support Vector Classifier, Decision Tree Classifier, Random Forest Classifier, and K-Nearest Neighbors are utilized to classify fraudulent transactions. By incorporating SMOTE and evaluating multiple classifiers, this research aims to improve the efficacy of fraud detection systems. The study evaluates these techniques on real-world datasets, providing insights into their effectiveness and applicability. Results demonstrate the potential of SMOTE-enhanced classifiers in mitigating imbalanced dataset challenges and enhancing fraud detection capabilities in credit card systems, particularly within the context of e-commerce transactions.

Comprehensive Analysis of Nature-Inspired Algorithms with Benchmark Functions

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Abstract

This research is established on the swarm intelligence which is motivated from the mutual behavior of communal insects and other animals. The word swarm refers to group of fish, birds, ants, bees etc. In this swarm of animal's agents are used to optimize the problem. Optimization procedures have been industrialized to reach to close-optimum answers to extensive optimization issues, for which old-style mathematical methods may fail. Optimization algorithms are used for minimizing or maximizing an objective function. All the agents in the swarm perform separately without any centralized information sharing their experience with one another and moving forward. Many of the optimization algorithms are used for engineering problems, medical purposes and many other real-world problems but some of them are better in one property (exploration, exploitation, optimum solution, standard deviation, Mean) while other in another property. For this purpose, we have studied swarm optimization algorithms (PSO, GSO, DSO, ACO, HBC, and ABC). The aims of the paper are to deliver the concept that how each algorithm performs, and to provide means in which achievement might be enhanced by integrating features from one algorithm into the other.

Anomaly Detection for Critical Data in Flying Ad-Hoc Networks Using Deep Learning

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Abstract

This research paper approach for anomaly detection in Flying Ad-Hoc Networks (FANETs) using deep learning techniques, specifically Long Short-Term Memory (LSTM) models. The study focuses on detecting GPS spoofing, jamming, and flooding attacks in FANETs to enhance security and reliability in unmanned aerial vehicle (UAV) communication scenarios. The methodology involves loading and preprocessing the FANET dataset, scaling features, designing the LSTM model architecture, training the model, and evaluating its performance using metrics such as accuracy, precision, recall, F1 score, and ROC AUC. The results demonstrate the effectiveness of the LSTM-based anomaly detection model in identifying anomalies with high accuracy and robustness, providing valuable insights for practitioners in deploying anomaly detection solutions in UAV communication systems.

IoT Driven Climate Monitoring and Leaf Disease Classification System

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Abstract

Agriculture is vital for Pakistan's economy, but plant diseases threaten farmers' livelihoods. In this paper, we present our proposed solution to this problem, which is the" IoT-Driven Climate Monitoring and Leaf Disease Classification System." The goal of this system is to empower farmers with an accessible tool that is gathering real time climate data to monitor plant health and growth and in case of any disease, it is capable of classifying it so that necessary action can be taken on time. This will enable us to lessen the loss caused by delayed detection of diseases in our homeland. By combining IoT technology and advanced deep learning, our system has the potential to enhance food security, boost crop productivity, and promote sustainable farming practices. It is also a promising option to improve economic stability and foster innovation in the agricultural sector. We have adapted the VGG16 model and have obtained the accuracy of 96% for disease classification.

Classification of X-rays to Detect Pneumonia Using CNN and Deep Learning

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Abstract

Pneumonia, a severe respiratory infection, poses substantial global health risks. Timely identification through medical imaging is vital for intervention and patient outcomes. This study employs Convolutional Neural Networks (CNNs) to boost pneumonia detection in chest X-rays. CNNs, adept at learning image features, form the core. A dataset of chest X-rays, including normal and pneumonia cases, was compiled. The CNN model underwent rigorous training, validation, and testing. It excelled in differentiating between normal and pneumonia X-rays, with evaluated metrics like accuracy and sensitivity outperforming traditional methods. Techniques, such as data preprocessing and data augmentation, enhanced the model's efficiency. Our research advances automated pneumonia detection, aiding medical decisions, reducing diagnosis time, and enhancing patient care.

Enhancement of Precision Diagnosis of Mental Stress and Depression in Psychiatric Care Through Adaptive Neuro Fuzzy Inference System

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Abstract

Undiagnosed and untreated depression poses significant health risks, affecting millions of individuals around the world. Existing methods for depression detection often lack efficiency, leading to undiagnosed cases. Advanced computational methods, such as Adaptive Neuro-Fuzzy Inference Systems (ANFIS), hold promise in overcoming these challenges. This research explores the development of an ANFIS-based model to automate detection, on the lookout for to improve accessibility and precision in categorizing depression. The learning also considers the benefits, and limitations of executing advanced computational procedures in mental health care. Furthermore, it engenders strategic recommendations to facilitate the incorporation of computational methods, thereby enlightening depression detection in mental health care. The expected outcomes include a robust ANFIS-based model, critical insights into the utilization of computational methods in mental health care, and practical recommendations for promoting the adoption of effective methods. This research has far-reaching consequences for mental health care, contributive to the ongoing efforts to grow ground-breaking approaches for the detection and management of depression.

Physiotherapy Exercise Classification for Stroke Patients using GoogleNet

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Abstract

Stroke is considered to be one of the major causes of disability throughout the world, leaving millions of people in need of healthcare. One of the most important components of stroke rehabilitation is physiotherapy, which leads to the restoration of motor function and assures a better quality of life of the patient. This paper proposes a new technique of classifying physiotherapy exercises of stroke patients through the GoogleNet deep learning architecture. With the developed classification classifier the individualized training recommendations and monitoring will be offered, thus improving the effectiveness of stroke rehabilitation programs. The system obtained encouraging results, proving its capability to be an assistant in the task of caring for individuals with stroke by health care providers. The proposed approach will be able to precisely classify exercises, and thus it will be able to revolutionize stroke rehabilitation and improve patient outcomes.

Petrol Price Prediction in Pakistan Using LSMT and BILSTM Model

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Abstract

This research concentrates on the vital object of predicting petrol prices in Pakistan, the essential to a country that derives its economic development, stability, and energy needs from oil. Prediction accuracy is therefore a fundamental need for policy makers, enterprises, and consumers in the complex and volatile oil market. It is accomplished by utilizing the advanced deep learning techniques, in particular, an up-to-date LSTM and BILSTM models, and the research proved the model's ability to predict the petrol prices in Pakistan. The dataset we are using contains historical petrol price and factors including dollar exchange rate, political stability and international petrol prices. The model has undergone extensive training and evaluation and has learned to quickly spot temporal patterns and relationships in the data. Our models robustly outperform other models on the 10th day of forecasting and achieve RMSE for LSTM is 3.5176 and BILSTM is 3.6175, respectively. The present study marks a significant step in the attempt to predict oil prices within the oil economy of Pakistan and opens room for utilization to benefit policymakers and economic strategists.

Profit Maximization in the Stock Market Using Three-Way Decisions

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Abstract

This research project aims to explore the application of three-way decisions in stock market prediction using Support Vector Machines (SVM) to enhance decision-making processes and improve investment outcomes. The research methodology involves an exhaustive analysis of existing literature, theories, and practices related to three-way decisions, specifically focusing on the buy, hold, and sell strategies. The primary objective is to identify key challenges and opportunities in stock market prediction and develop a structured framework for integrating three-way decisions into investment strategies.

Neural Network-based Route Optimization for Random Mobility Models in FANETs

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Abstract

The dynamic nature of Flying Ad Hoc Networks (FANET) poses challenges for efficient route optimization, demanding innovative solutions. In response, this paper introduces a novel approach by integrating Long Short-Term Memory (LSTM) and Random Forest (RF) neural network models for route optimization in FANETs with random mobility models. FANETs, characterized by unpredictable mobility patterns, require adaptive routing strategies for optimal performance. The proposed methodology involves leveraging LSTM to model temporal dependencies in historical mobility data, enhancing predictions of node movements within the FANET environment, specifically considering the random mobility model. Additionally, RF is employed for ensemble learning, contributing to enhanced robustness and generalization. The trained neural network model is seamlessly integrated into a routing algorithm, allowing for real-time adaptation and dynamic route optimization based on predicted mobility scenarios. Through comprehensive simulations, our results demonstrate substantial improvements in packet delivery ratio, end-to-end delay, and overall network efficiency. This research contributes to the advancement of FANET routing strategies, showcasing the effectiveness of combining LSTM and RF for adaptive and intelligent routing protocols, particularly in the context of random mobility models. The findings hold promise for future developments in autonomous systems and unmanned aerial vehicle (UAV) communication technologies.

Once You Stop Learning, You Start Dying: Artificial Intelligence In Pharmacy

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Abstract

Artificial Intelligence (AI) revolutionized the World dynamics in almost every field of the present world. The field of healthcare specifically took advantage by utilizing the already present data, analyzing it, and either approving or nullifying the proposed hypothesis. The research in the subdivisions of pharmacy like pharmacology, pharmacological chemistry, pharmaceutics, and pharmacy practice hold complex processes involving drug discovery, dosage form preparation, and evidence based clinical decisions. The advancement in the AI-driven tools not only provided the easy means for predicting the activity of ligands over the target proteins but also evolved in providing the information related to the dosage form preparation and the behavior of molecules within the human body. These advancements also opened new chapters in the diagnostic accuracy, upgraded clinical operation efficiency, disease, and therapeutic monitoring, precise procedures leading to the better patient outcomes. In a nutshell, AI-driven softwares has converted laborious and time consuming experiments of the field of medicine into a logical predictive paradigms suggestive of the possible activity of the lead compounds.

Keywords: Artificial Intelligence, pharmacology, target proteins, lead compounds

Drug Nanocrystals from Bench top Towards Commercialization: Advancement, Challenges and Novel Strategies.

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Abstract

Nanocrystals and their composites can exhibit markedly different properties with respect to bulk phases and hence offer new opportunities. For pharmaceuticals, nanocrystals promise to resolve the issue of poor bioavailability of poorly soluble drugs. The immense surface area enables these crystals to dissolve much quicker, resulting in higher bioavailability. The difficulty in exploiting this technology, particularly for organics, is the technical challenge of generating and stabilizing nanocrystals, which is severely limited by the lack of a theoretical framework. Going down the length scales gives rise to some new physics. As a crystal decreases in size, its surface or interfacial free energy (the choice depends on whether the crystal is stand alone or surrounded by some medium) becomes significant relative to its bulk free energy and the thermodynamics of the crystal are now determined by the interplay of these two energies. Depending on the crystal size, the surface (interfacial) energy can favour a particular phase that otherwise may be unstable in the bulk or even an entirely new phase, hence enabling phase stability to be modulated. There are also other fundamental issues: how does the phase diagram for a system exhibiting multiples phases vary as we go down the length scale? At what length scale do the macroscopic ideas of bulk free energy (periodic structure) and surface (interfacial) free energy break down? How are the kinetic barriers to phase transformation influenced by length scale? Furthermore, it is extremely difficult to uncover the interaction of the polymer and drug nanocrystals using experimental approaches. In this regards this is very imperative to employ computational approaches including MD simulations to underpin the molecular level understanding of the nanocrystals formation and their interaction with the polymers in polymeric medium. Furthermore, biological barriers for nanocrystals to treat different challenging diseases have also got a noticeable attraction for the drug delivery scientists. In summary, how the key challenges for engineering smart drug nanocrystals leading to the successful pharmaceutical products has become an imperative issue to be effectively addressed.

Keywords: Nanocrystals, Pharmaceuticals, computational, Drug

Traumatic Brain Injury and Role of Tau

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Abstract

Our research focuses on how the brain cell responds to the traumatic brain injury. How the primary changes happens as acute event and what comes next to primary events as secondary or post trauma. The brain cells contain many components including tau, which is also called microtubule associated protein tau (MAPT), in other words tau is brain-specific, axon-enriched microtubule-associated protein. It was discovered during the purification of tubulin from bovine brains. In normal circumstances the role of tau is to maintain and stabilize the microtubules while the basic function of microtubule is to help guide nutrients and molecules from the cell body to the axon and dendrites. Tau pathologies are widely studied in a number of diseases conditions such as Alzheimer's disease; the basic hallmark of which are amyloid plaque which happens extracellularly and the formation of neurofibrilary tangles intracellularly. Our research group first found the tau mislocalization in a FTDP-17 model which is also known as frontotemporal dementia and Parkinsonism linked to chromosome-17th. The familial forms of FTDP are often caused by the mutation in the tau genes. Dendritic spines are post-synaptic structures of excitatory glutamatergic synapses, which are important for learning and memory. Miniature excitatory postsynaptic currents (mEPSCs) are postsynaptic responses in a spine to a single presynaptic vesicle. The expression of P301L tau proteins impairs the function of dendritic spines. When we performed the traumatic brain injuries in the wild mice, surprisingly we did not noticed any taupathologies. We developed a new model of tau gene replacement with mechanical injuries. The total mouse tau gene is replaced with human tau gene. In mechanical brain injuries that are often faced by the football players when their heads hits the earth or the army in battle field faces a blast, stretching of the depth of sulcus happen leading to the sulcal tau pathologies. We striched the transfacted brain cells invitro and observed that mechanical stretching impaired both pre- and post-synaptic functions, the later is mediated by mislocalized tau. After knowing that mechanical stretching induces tau abnormalities, we moved to an in vivo model (tau replacement + mechanical stretching). Our TBI protocol (3X over three days) induced loss of tau polarity and tau hyperphosphorylation. Similarly, temporal dynamics of the disruption of brain connectivity is consistent with tau pathologies. We also found that blockade of GSK3b and CDK5 prevent tau pathologies caused by TBI. The mislocalized tau is primarily accumulated in

the dendrites and dendritic spines leading to the silence of synapses, majorly decreasing the post-synaptic activities.

Keywords: Traumatic Brain injury, Tau, GSK3b, CDK5

Stimuli-Sensitive Biomimetic Nanoparticles for the Inhibition of Breast Cancer Recurrence and Pulmonary Metastasis

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Abstract

Biomimetic nanoparticles represent a promising avenue for mitigating rapid clearance by the reticuloendothelial system (RES); however, current challenges include insufficient tumour targeting, suboptimal adhesion, and inadequate localized drug release within tumour regions. These shortcomings contribute to persistent contests, such as recurrence and pulmonary metastasis, even with advanced breast cancer therapies. Stimuli-sensitive drug release can furbish the membrane coated nanoparticles for their efficiency against the stated problems. To enhance the efficacy of biomimetic nanoparticles in addressing these issues, we proposed a versatile, stimuli-responsive drug delivery system by encapsulating doxorubicin (Dox) and perfluorohexane (PFH) within poly (lactic-co-glycolic acid) (PLGA) nanoparticles, subsequently coated with macrophage-derived cell membranes. Within this framework, PFH serves as the mediator for ultrasonic (US)-irradiation-triggered drug release specifically within tumour microenvironment, while the macrophage-derived cell membrane coating enhances cell adhesion, enables immune evasion, and natural tumour-homing ability. The characterization assays and in vitro evaluations yielded encouraging results, indicating enhanced targeting and release efficiencies. In vivo studies demonstrated marked inhibitory effects on both breast cancer recurrence and pulmonary metastasis. The resulting data indicate that these engineered nanoparticles have notable potential for targeted delivery and controlled release upon US irradiation, thereby offering significant therapeutic efficacy against primary breast cancer, pulmonary metastasis, and recurrent malignancies. Our findings lay the groundwork for a novel clinical approach, representing an intriguing direction for ongoing investigation by oncologists.

Chemical Characterization, Antioxidants, Antimicrobial Potential and Molecular Docking Studies of Essential Oil of *Festuca Glauca*

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Abstract

Plant essential oils have been proved to be safe as natural antioxidants, and in the prevention of a variety of ailments, including fungal and bacterial infections.. This study was designed to isolate essential oil (EO) from Festuca glauca (F. glauca) plant and evaluated for antioxidant and antimicrobial potentials. In the present study, F. glauca essential oil was analyzed by gas chromatography-mass spectrometry (GC-MS). In-vitro antioxidant experiments utilising 2,2-diphenyl-2-picryl-hydrazyl free radical (DPPH.) scavenging and 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) radical scavenging were used to determine the antioxidant activity of EO. Molecular docking study was carried out to determine the sensitivity of major constituents of EO with the target proteins. The GC-MS analysis of the EO revealed the presence of thirty three compounds, the major compounds were piperitone, beta cymene, 2- careen, p-cymol, p-cymene-8-ol, verbenone, elemol, and craophylene. The EO obtained from the plant exhibited dose dependent savaging effects against DPPH and ABTS radicals. The EO showed promising antibacterial effects against klebsiella pneumoniae, E. coli, staphylococcus aureus, pseudomonas auroginasa. The plant showed significant antifungal activity against Aspergillus green, T.Harzemoius,Trichochoderma wild, Aspergillus paraticus strains. In the molecular docking study the major constituents of EO showed good interaction with active site of target enzyme. We can conclude that the EO of F. glauca has a significant potential as natural antioxidant and for the treatment of microbial infections.

Keywords: Essential Oils, Festuca, Gas Chromatography, Mass spectrometry, DPPH

Efficacy Of Poncirin Against the Endotoxin-Induced Acute Lung Injuries

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Abstract

The acute respiratory distress syndrome in the clinical manifestation of septic shock and the higher rate of mortality is related with ARDS. The endotoxic shock is the leading cause of death among patients admitted in the intensive care units (ICU) after the cardiovascular problems such as ischemic heart diseases (IHD), heart failure etc. The endotoxin is an integral part of the outer layer of the Gram-negative bacteria and only liberated when the bacteria is dead. The bacterial entry into the body is considered ad bacteremia when it did not produce any symptoms of disease, however, when the bacteria produce the symptoms of the disease than it is called as the septicemia. When the bacterial concentration in the body is very high and the patient use antibiotics to kill the bacteria, the higher concentration of the endotoxin/lipopolysaccharide (LPS) is released, which is associated with all symptoms of the septic shock and multiorgan failure. In the present study, the effect of natural product i.e., Poncirin isolated from the Poncirus trifoliata was investigated against the LPS-induced acute lung injury (ALI) in mice. Currently, there is no effective treatment available which deals with the septic shock associated ALI, which is not only effective but also associated with negligible side effects. Thus, the need for the development of effective drugs and natural products in this regard is very feasible option because it is cheap source of new drug development. The LPS was administered intraperitoneally (IP) at the dose of 10 mg/kg 30 minutes before the treatment with various drugs such as Poncirin. Before the administration of the LPS, the animals were weighted, and their body temperature was assessed. The Poncirin was administered at three different doses such as 5 mg/kg, 15 mg/kg, and 30 mg/kg intraperitoneally (IP). Similarly, the positive control groups received the dexamethasone 10 mg/kg IP. The animal temperature was noted with the thermometer intrarectally (IR) after every 6 hours for 24 hours. Furthermore, the number of animals death were noted in each group for 24 hours and any death in the study was noted along with their time. The body weigh changes were determined at the end of the experiment in all the treated animals. The lung tissue was removed and stored in the formalin for the histological analysis i.e., hematoxylin and eosin (H and E) staining. The Disease control group treated with LPS only showed marked changes in the body temperature i.e., high fever. However, the Poncirin treated groups showed dose dependent decrease in the body temperature compared to

the Disease control group (p<0.05). Similarly, the Kaplan-Maier survival analysis showed higher death ratio and less survival was observed in the Disease control group. However, the Poncirin treated group showed marked reduction in the mortality rate and high survival rate was observed compared to the Disease control group (p<0.05). The wet to dry ratio provides an important pre-clinical scenario about the extent of inflammation and the high ratio indicates severe inflammation. The Disease control group showed a high wet to dry ratio and hence, increased inflammation. However, the Poncirin treatment reduced the wet to dry ratio and inflammation in lungs. Similarly, the H and E staining was performed to assess the effect of the Poncirin on the histological architecture of the lungs following LPS-induced ALI. The Disease control group showed significant deterioration of the lung histology in terms of edema, infiltration, and vascular congestion. However, the Poncirin showed preserved histology compared to the Disease control (p<0.05). In conclusion, the Poncirin treatment improved the behavioral, biochemical, and histological parameters in the treated animals and improved the overall condition. Furthermore, Poncirin was associated with less side effects as evident from physical observation. However, additional investigation will be helpful to dig out the exact molecular mechanism involved in the protection of the Poncirin against the endotoxin-induced pulmonary onslaught.

Keywords: Inflammation, ALI, Cytokines, Oxidative stress, Poncirin, LPS.

Assessment of Potential Drug-Drug Interaction Among Hospitalized Coronary Artery Disease Patients in DHQ Teaching Hospital Kohat

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Abstract

Drug-drug interactions (DDIs), which can result in severe and incapacitating drug-induced adverse effects, are more likely to occur in patients who take many medications. Drug-drug interactions (DDIs) have become a significant concern in the field of healthcare, particularly among hospitalized patients. The study main goal was to identify pDDIs in divisional headquarter hospital, a tertiary care hospital's cardiology ward in Khyber Pakhtunkhwa. Out of 250 patients profiles 162 fulfilled the inclusion criteria were evaluated for pDDIs in this study from September 2022 to May 2023. Patient profiles were screen by using Micromedex Drug-Reax programming (Thomson Reuters Healthcare Inc., Greenwood Village, Colorado, United States). In 162 patient profiles, 251 interactions were found. The interactions ranged from large to moderate in severity. A total of 48.6% of pharmaceutical interactions were somewhat significant, 33.5% were substantial, and 15.3 percent were minor; additionally, 2.6% of medication interactions were contraindicated. Similarly, interactions had different onset levels, such as delayed, quick, and unknown. In our analysis, we discovered that 38.1 percent of pharmaceutical interactions were Not Specified, 34.9 percent were Delayed, and 27 percent were Rapid. The current investigation revealed a significant prevalence of DDIs in a tertiary care healthclinic's medical ward. In the future, a multi-focused study with a large sample size will be required to confirm our findings and add more data to such investigations were directed in various areas of Pakistan.

Keywords: Drug-Drug Interaction, Adverse effects, Coronary disease, Assessment

Investigation of Insulinotropic Mechanism of Paracetamol: *In-Silico* Followed by *In-Vivo* Approaches for Repurposing

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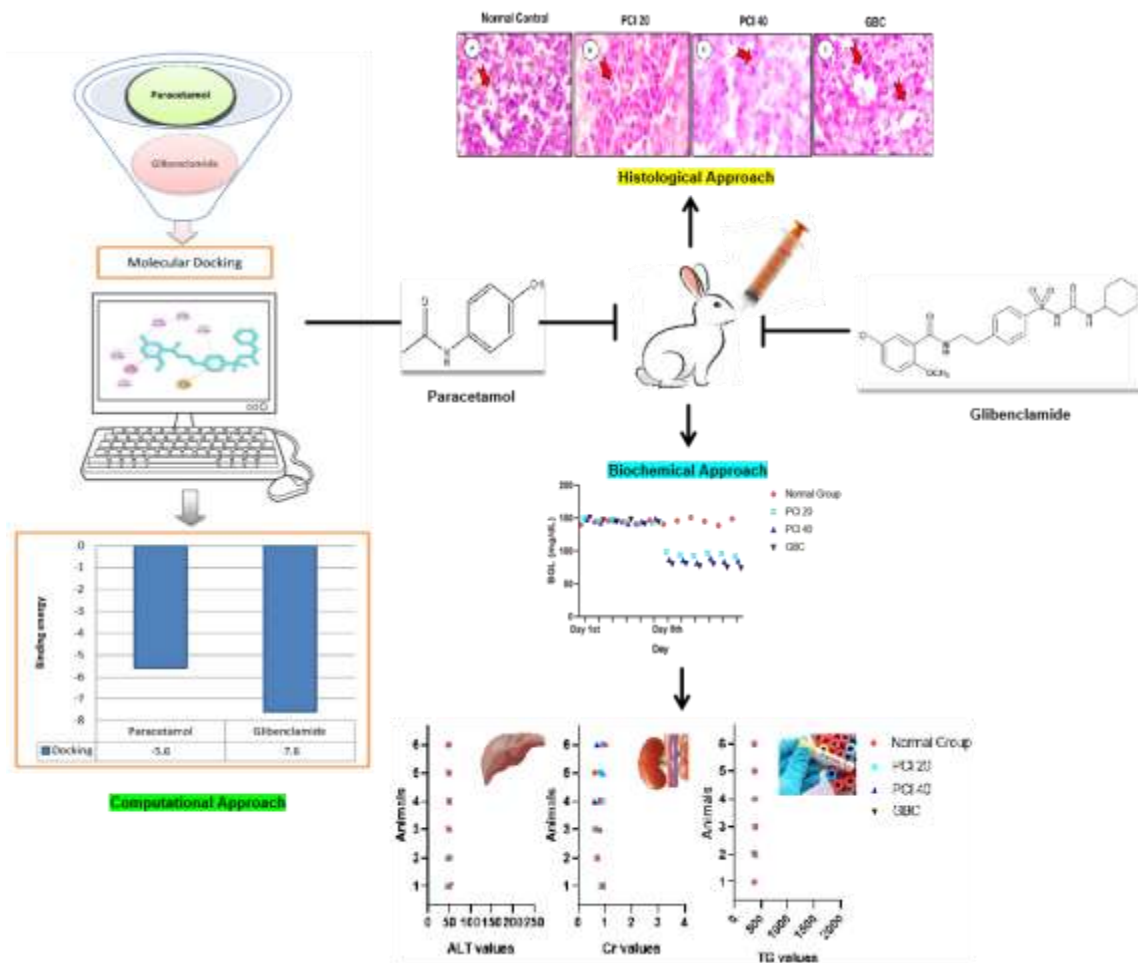
Graphical abstract

Fig: A Blueprint of the study

Estimating the Need of Parental Nutrition Based on Selected Biomarkers in Promoting Recovery in Severe Cases of Covid-19

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Abstract

The COVID was declared a pandemic and caused havoc throughout the world. This pandemic affected more than 80 million peoples across the globe and more than two million peoples died from the pandemic. The mortality and morbidity rate were higher in those patients who have co-morbidities such as suffering from diabetes mellites, aged peoples and ethnic has also impact on the overall outcome of the disease. The present study was aimed to put in the proper perspective the role of different metabolomics and their influence on the patient survival and mortality and morbidity. This was a retrospective study that will look into the existing clinical diagnosis of patients admitted to ICU with COVID and required Total Parenteral Support. The study was split into different cohorts of patients each with COVID-19 infections requiring ICU admission Estimating the Need of Parental Nutrition Based on Selected Biomarkers in Promoting Recovery in Severe COVID-19. The clinical and lab parameters of these patients along with their demographic characteristics were required through MRC that is available in the hospital records CERNER. The data was then analyzed with R-programming to carry our regression-based correlation analysis to identify different metabolite's role on patient's outcome to the Need of Parental Nutrition Based on Selected Biomarkers in Promoting Recovery in Severe Corona (duration of hospitalization, recovery, or death) in addition to improvement in clinical laboratory parameters. This study enrolled more than 163 adult COVID-19 patients from Hamad Medical Corporation in Doha, Qatar, to investigate the needs and Estimating the Need of Parental Nutrition Based on Selecting Biomarkers in Promoting Recovery in Severe Cases of COVID-19 in patients admitted in intensive care unit who are categorized as severely infected. In this study patients were categorized based on severity and age. Severe will be characterized as overall oxygen saturation at room air is less than 94%, depending to the WHO classification of clinical presentation. Blood samples was taken at the time of diagnosis and continued through the duration of hospitalization following informed consent. The data regarding the demographics and PN duration was obtained from the electronic database along with blood indices for analysis.The participants were characterized into different age group such as less than 25, less than 45, less than 65 and more than 65. Based on the age group, the regression analysis was

performed comparing the metabolic marker with the age group. Similarly, the gender demographic analysis revealed that total of 133 male patient and 30 female patients were recruited. Similarly, the analysis showed based on the severity, total 56 patient were suffering from mild pneumonia, total of 57 patient were critical and 50 participants were severe. Similarly, the heatmap analysis was done to explore the expression of various metabolic genes and their association with the different factors such as Age, mortality, diabetes, and different ethnicity. Furthermore, the regression analysis was performed for the genes and compared with the age category to assess any relation between age the disease severity and value of significance was p<0.05 was chosen. The regression analysis showed multiple metabolic genes statistical relation with the age category.

Keywords: COVID-19, Metabolomics, TPN, Cytokines, Inflammation.

Ethnopharmacological Treatment of Cough in Piran, Malakand, Pakistan: A Bioprospecting Prospective

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Abstract

The current study was designed to investigate the traditional recipes used to treat cough in Piran, Malakand, Pakistan. These recipes were explored and quantitatively analyzed for the first time. A total of 30 species of the plants, 6 animal products and one salt were reported to be used by the community to treat cough. Punica granatum L. and Olea ferruginea Royle dominated with Use value (UV) of 0.84 and Origanum vulgare L. with least use value of 0.1. The frequency citation (FC) of the Papaver somniferum L. is higher (98) while the lowest one is Verbascum thapsus L. (0.13). The large number of traditional recipes used for cough in this area shows that primary health care is still amalgamated in this culture. In future studies, these recipes may be further exploited as a base for modern medicine.This study was conducted for the first time in Piran community (Malakand) about the use of traditional recipes to treat cough. The current documentation will not only preserve significant traditional knowledge to treat cough but will also provide a firm base for future studies. The use of plants by the inhabitants in the management of cough is supported by literature. Apart from in depth investigations of other species P. granatum and O. ferruginea based standardized formulation may be developed in the management of cough. In the study region, it is evident that the residents depend on medicinal plants to manage health problems. The significant biodiversity preservation is therefore essential. Probable solutions may be the maintenance of biodiversity and ethnomedicinal vegetation of the study zone with the collaboration of government, non-government associations, and resident community. Future studies and community awareness programs must be carried out/initiated to secure harmless and safe use of medicinal plants or traditional recipes.

Keywords: Ethnopharmacology, Medicinal plants, Animal and mineral products, Cough, Malakand

Protective Activities of Puerarin Against LPS-Induced Kidney Failure in Mice

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Abstract

The current project was commenced to determine the useful effect of Puerarin against the LPS-induced renal injury in mice. The LPS or endotoxin is an integral part of the outer layer of the Gram-stained negative bacteria, which is the outermost layer of the bacteria surrounding the cell wall made up of peptidoglycan molecule. LPS is only released when the bacteria die due to antibiotic therapy or any reason, which leads to the release of the LPS into the systemic circulation. When the LPS is released in the systemic circulation, it binds with the TLR-4 receptor to induce multiple downstream signaling and modulate the induction of the inflammation concerned genes. The LPS is associated with the damage to the multiple vital organs such as kidney, liver, brain, lungs etc. Due to this reason LPS-induced kidney failure is usually used in animals to assess the potential activity of new chemical moiety. The effect of the Puerarin (a natural compound isolated from the Pueraria Lobata plant) was studied against the LPS-induced renal injury model. The LPS administration showed marked changes in the survival rate and about 45 % death were reported in the animals treated with the LPS only using Kaplan-Maier analysis. The Puerarin treated groups showed marked protection against the LPS-indued mortality compared to the Disease control treated with the LPS only. Similarly, the LPS injection is related to the changes in the body temperature i.e., fever. However, the Puerarin treatment showed significant improvement in the body temperature compared to the Disease control. The body weight changes are associated with various diseases including inflammatory diseases. However, in the present study no significant changes were observed in all the treated groups. Furthermore, the weight to dry ratio is used to determine the edema in the tissue following LSP administration. The wet to dry ratio showed a significant increase in the LPS treated groups, however, the Puerarin injection showed dose dependent reduction in the wet to dry ratio in comparison to the Disease control. The in-silico analysis was initiated to understand the molecular mechanism of Puerarin against the inflammatory target. The molecular docking studies were performed against the NF-κB and Nrf2 signaling. The Puerarin analysis revealed significant bonding with the NF-κB and its downstream transcriptional factor i.e., AP-1. Similarly, the Nrf2 signaling was also studied using in silico methods. The Puerarin interacted with the NF-κB, AP-1, and Nrf2 via multiple bonds. In conclusion, Puerarin showed significant

activity against renal injury using both behavioral, biochemical, histological and in silico analysis. However, further studies will be required to employ Puerarin for the treatment of renal injury clinically.

Key words: Inflammation, LPS, Puerarin, Oxidative stress, Cytokines, NF-κB, Nrf2

Synthesis, *In-Vitro* Antidiabetic and Antioxidant Potentials of New Rhodanine Derivatives with Aldehyde Functionality

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Abstract

Diabetes Mellitus (DM) poses a significant global health challenge with its increasing prevalence and associated morbidities. Current antidiabetic medications are limited by side effects and inadequate glycemic control. The search for novel therapeutic agents is imperative. Aldehydes and Rhodanines, known for their broad pharmacological activities, offer a promising avenue for new antidiabetic and antioxidant therapies. This study aims to synthesize new rhodanine derivatives with aldehyde functionality and evaluate their in-vitro antidiabetic and antioxidant potentials. A series of rhodanine derivatives were synthesized using established chemical methods, employing various aldehyde precursors. The antidiabetic potential was assessed through α-glucosidase inhibitory activity and Amylase activity, while antioxidant capacity was evaluated using the DPPH radicals scavenging assay. Molecular docking studies were conducted to explore the interaction between the synthesized compounds and target proteins. Statistical analysis was performed using one-way ANOVA. Five rhodanine derivatives were synthesized and evaluated. The DPPH assay revealed significant antioxidant activity differences among the compounds (p<0.05), (E)-5-(4-Hydroxy-3-methoxybenzylidene)-2-thioxothiazolidin-4-one and (E)-5-(2-Hydroxybenzylidene)-2-thioxothiazolidin-4-one demonstrated superior antioxidant activities, with mean scavenging activities of 1.157 and 1.1126, respectively, indicating varying degrees of free radical scavenging potential. Alpha-glucosidase inhibitory activity assays highlighted (E)-5-(4-(Diethylamino)-2-hydroxybenzylidene)-2-thioxothiazolidin-4-one and (E)-5-(2-Hydroxybenzylidene)-2-thioxothiazolidin-4-one as exceptionally potent, achieving high percentage inhibitions of 94.7791% and 94.9799% at 2000 μg/mL, respectively, Pointing towards their effectiveness in delaying glucose absorption post-prandially. However, α-amylase inhibitory activity did not show significant differences (p>0.05), suggesting similar antidiabetic potentials among the derivatives. Molecular docking supported the potential mechanism of action, with promising binding affinities observed for several compounds. The study on rhodanine derivatives with aldehyde functionality showcased promising antioxidant and antidiabetic properties, highlighting their potential in diabetes management. Specifically, significant antioxidant activity and notable α-glucosidase inhibitory effects were observed, though α-amylase inhibition did not

differ significantly among the compounds. These findings support the ongoing search for novel antidiabetic agents, suggesting a need for further research to refine these compounds for clinical use.

Keywords: Diabetes Mellitus, Rhodanine Derivatives, Aldehydes, Antidiabetic, Antioxidant, α-glucosidase Inhibition, DPPH Assay

Effect of Rutin on Neuropathic Pain Transmittance Mediated by Nmda(Nr2b) Signaling Pathway

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Abstract

Any damage or disease that may affect the nervous system, resulting in chronic pain, associated with hyperalgesia and allodynia may be characterized as neuropathic pain. Cognitive impairments are the most common comorbidities associated with chronic neuropathic pain along with oxidative stress and neuroinflammation. The production and release of free radicals and pro-inflammatory and inflammatory cytokines not only result in progression, but also maintenance of NP. We studied a flavanol rutin due to its innate antioxidant ability in a chronic model of NP achieved by chronic constriction injury (CCI). The first day following surgery, Rutin treatment began, and it lasted until the 21st day. On days 3, 7, 14 and 21, all behavioral investigations were conducted. The sciatic nerve and spinal cord were extracted for further molecular examination. Rutin elevated response latency, was able to delay the onset of mechanical hyperalgesia in rats on days 7, 14, and 21 and reduced the CCI-induced paw deformation. Rutin successfully enhanced the antioxidant status of the body by upregulating and expressing CAT, GST and GSH, but also lowered the NO and LPO levels of the body. Furthermore, the role of NMDA-receptors and the involvement of its NR2B subunit in progression of NP has already been established and in our study, we hypothesized the analgesic effect of rutin in NP to be associated to the blockade of NR2B subunit of NMDARs. It significantly improved the disorientation of the sciatic nerve and spinal cord confirmed by H & E staining and reduced inflammatory markers as observed by the quantification of COX-2, TNF-α, p-NFκb through ELISA. Rutin successfully alleviated pain sensation by blocking NR2B as observed by PCR analysis, which was further strengthened by the use of its selective inhibitor Ifenprodil.

Keywords: Rutin, neuropathic pain, NMDA, NR2B, Signaling pathway.

Cost-Effective Analysis and Prescription Patterns of Anti-Hypertensive Drugs: Insights from District Headquarter Hospital KDA Kohat

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Abstract

One of the highest variable risk factors for heath costs, cardiovascular morbidity and mortality is hypertension, accounting for 9.3 million fatalities worldwide. Epidemiological studies have found a significant connection between high blood pressure and a number of illnesses. Several factors are including for development of hypertension such as socioeconomic level, diet, inadequate self-health maintenance and lifestyle. The aim of the present study was to analyze the cost of anti-hypertensive drugs which were prescribed in District Headquarter Hospital KDA Kohat. During study period of six months, 180 patients were included, and anti-hypertensive drugs were prescribed i.e., 105(58.33%) males and 85(41.67%) females. The basic factors for the inclusion and exclusion of patients were age and pregnancy. Pattern of Prescribing and Cost of antihypertensive drugs which were prescribed alone or in combination therapy was determined. The total cost accounted for antihypertensive drugs was of 5415.55 PKR in which the highest cost was contributed by angiotensin receptors blockers i.e., 1156 PKR followed by fixed dose combinations of various classes i.e., 1767.25 PKR. Angiotensin converting enzymes inhibitors were obtained with the highest cost per unit dose i.e., 45.6 PKR followed by angiotensin receptors blockers i.e., 35.03 PKR. Monotherapy was used for 73.33% of patients. Study demonstrated that most of the patients responded well to the monotherapy before switching to two-drug combination regimens. Beta blockers and calcium channel blockers were more affordable and in contrast angiotensin converting enzymes were expensive medications. Among monotherapy, majority of the patients were treated using calcium channel blockers. While among combination therapy, amlodipine and atenolol combination was one of the most often given medication regimens. A patient's economic situation should be taken into account before beginning the medication therapy.

Keywords: Cost-effectiveness, Primary hypertension, anti-hypertensive drugs, Amlodipine.

Assessment of Prescription Based on NIH Scale for Stroke Patients

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Abstract

In clinical studies, the neurological outcome following experimental treatment for acute stroke has been evaluated using the National Institutes of Health (NIH) Stroke Scale. The degree and progression of recovery in individuals with acute stroke who received standard care were examined using the NIH Stroke Scale. I have collected 110 patients (30 patients evaluated NIHSS) from the neurology medical C ward of Khyber Teaching Hospital in Peshawar from 1st January to 18th April 2022, where there are 60 beds in the Medical C ward (neurology). The majority of patients have ischemic strokes, with some having hemorrhaged and a small amount of TIA. The current research was carried out at neurology ward (medical C ward) at Khyber teaching hospital Peshawar kp Pakistan. In this study, total no of prescription (n=110) was collected and evaluated. The percentage of male patient was 48.27% (n=53) while the percentage of female patient was 51.84(n=57) as show in table. In patients of ischemic stroke NIHSS score was maximum at baseline and decreased during the hospital stay. There was a slight but significant decrease in the first 24 hours (15.07 ± 5.58 vs 14.10 ± 5.53, p = <0.001). Moreover, there was a significant decrease of NIHSS score at discharge (15.07 ± 5.58 vs 7.54 ± 3.85, p = <0.001). In our study, those patients who were treated with dual antiplatelet therapy had reduced NIHSS rather than those patients who were treated with aspirin alone. NIHSS was minor compared to dual antiplatelet therapy at discharge time. So dual antiplatelets therapy is better in acute ischemic stroke and TIA than alone aspirin.

Keywords: Stroke, NIHSS, American stroke association guideline, Hemorrhage

Evaluation of Nephroprotective Effect of Melatonin in Animals

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Abstract

Melatonin, a vital protein produced within the pineal gland of the central nervous system (CNS), plays a pivotal role in regulating the body's circadian rhythm and facilitating adaptation to variations in light intensity. Along with this, melatonin also exerts influence as an antioxidant, anti-inflammatory agent, participates in anti-cancer activities. The concentration of melatonin has an indirect relation with the intensity of light, as its concentration decrease with the increase of light intensity. During nighttime, the concentration of melatonin is at its peak, gradually receding as morning approaches. These fluctuations in melatonin concentration orchestrate corresponding changes in the body's alertness levels.The CCl_4-induced models of renal injury are commonly used pre-clinically to assess the impact of potential new drug candidates and delve into the underlying mechanism of protection. CCl_4 induce the kidney inflammation and damage by increasing the concentration of the inflammatory mediators and oxidative stress markers. In this study, the nephro-protective effect of melatonin against CCl_4-induced renal failure was evaluated. CCl_4 was administered to induce renal damage and inflammation. Following CCl_4 administration, animals were subjected to a 14-day treatment with melatonin. The melatonin administration led to a significant enhancement in survival rate when compared to the disease control group. Similarly, the effect of the melatonin on weight changes was explored, but no significant changes were observed in all treated groups. Furthermore, the administration of melatonin notably reduced the change in renal biomarkers and liver biomarkers in comparison to the disease control group. The RFTs includes serum creatinine and blood urea nitrogen (BUN), whereas the LFTs comprise ALP (Alkaline Phosphatase), ALT (alanine transaminase) and AST (Aspartate transaminase). Histological investigations demonstrated substantial enhancements in the group treated with melatonin compared to the disease control group. The Melatonin administration significantly improved the behavioral, biochemical parameters such as RFTs, and protected the renal architecture against the CCl_4-induced renal injury. However, further in-depth studies such as molecular investigations will be required to confirm the results.

Keywords: Melatonin, Inflammation, Antioxidant, Biomarkers, Nephroprotective.

Anti-Inflammatory and Anti-Nociceptive Activity of the Novel Imine Ketoprofen Derivative Using Computational and *In Vivo* Models

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Abstract

This study aimed to evaluate the anti-inflammatory and antinociceptive potential of novel imines ketoprofen derivatives through a comprehensive approach involving both in silico and in vivo models. The design of these derivatives was based on the structural modification of ketoprofen, a well-known non-steroidal anti-inflammatory drug (NSAID), to enhance its pharmacological profile. In the in-silico phase, molecular docking studies were conducted to predict the binding affinities of the imines ketoprofen derivatives with key inflammatory and pain-related targets, including cyclooxygenase-2 (COX-2), TRPV1 and NF-kB. The computational analysis provided insights into the potential interactions at the molecular level and guided the selection of promising candidates for further investigation. Following the in-silico predictions, the selected imines ketoprofen derivatives were synthesized and subjected to in vivo evaluation using animal models of inflammation and pain. The inflammation and analgesic effect were assessed by using formalin and acetic acid induced pain. The results of studied revealed that out of ketoprofen derivatives the KW5 showed significant anti-inflammatory and analgesic activity. Results from both in silico and in vivo experiments demonstrated that certain imines ketoprofen derivatives exhibited superior anti-inflammatory and antinociceptive activities compared to the parent compound, ketoprofen. The findings suggested that the structural modifications introduced in the derivatives positively influenced their pharmacological effects. The combined in silico and in vivo approach not only provided valuable insights into the potential mechanisms of action at the molecular level but also validated the therapeutic efficacy of the imine ketoprofen derivatives in living organisms. This study contributes to the exploration of innovative NSAID derivatives with enhanced anti-inflammatory and antinociceptive properties, offering potential candidates for further development as safer and more effective analgesic agents.

Keywords: Ketoprofen, NSAID, COX-2, Anti-inflammmatory, Anti-nociceptive

IoT Driven Climate Monitoring and Leaf Disease Classification System

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Abstract

Agriculture is vital for Pakistan's economy, but plant diseases threaten farmers' livelihoods. In this paper, we present our proposed solution to this problem, which is the" IoT-Driven Climate Monitoring and Leaf Disease Classification System." The goal of this system is to empower farmers with an accessible tool that is gathering real time climate data to monitor plant health and growth and in case of any disease, it is capable of classifying it so that necessary action can be taken on time. This will enable us to lessen the loss caused by delayed detection of diseases in our homeland. By combining IoT technology and advanced deep learning, our system has the potential to enhance food security, boost crop productivity, and promote sustainable farming practices. It is also a promising option to improve economic stability and foster innovation in the agricultural sector. We have adapted the VGG16 model and have obtained the accuracy of 96% for disease classification.

Keywords: Deep Learning, VGG616, Plant Disease Detection, Agriculture.

Development, Characterization of Rifampicin Co-Crystals, and Preparation of its Suitable Dosage Form

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Abstract

Cocrystals are "solids that are crystalline single-phase materials composed of two or more different molecular or ionic compounds generally in stoichiometric ratio. According to Biopharmaceutical Classification System (BCS) Rifampicin is a class II drug having low solubility and low bioavailability. It is used, in combination with other drugs i.e., Isoniazid, Pyrazinamide, Ethambutol, for the treatment of tuberculosis. This combination therapy has various side effects e.g., Hepatotoxicity etc. So, there is a need to develop the innovative technologies to overcome solubility problems therapeutic outcomes includes drug resistance and failure of therapy. Therefore, in this study the co-crystals of Rifampicin were prepared with different co-formers i.e., Succinic Acid, Nicotinamide, PVP-K 30 using solvent evaporation technique. The prepared co-crystals were then characterized using FTIR spectroscopy, Differential Scanning Calorimetry (DSC), Scanning Electron Microscope (SEM). The comparison between the FTIR spectra of pure rifampicin and all formulations of co-crystals indicates shifting in the functional group, which indicates formation of co-crystals. From the data obtained from DSC it is concluded that the thermographic peaks of pure rifampicin and all formulations of co-crystals, with the melting point (138 ºC -188 ºC) show the shift in both the endothermic and exothermic peaks that shows a confirm change in melting endotherm, which indicates the formation of co-crystals. The variation in the XRD pattern shows reduction in crystallinity of rifampicin and formation of new bonds. This indicates that the desired goal of forming co-crystals of rifampicin with these co-formers has been achieved, especially in the case of succinic acid. This is evident from the comparison between the cross-sectional image of pure rifampicin and all formulations of co-crystals obtained from SEM that the desired intention of preparing co-crystals has been achieved. The sheet/plate like surfaces show increased specific surface area. The results obtained from the characterization techniques performed confirmed the formation of desired co-crystals.

Keywords: Rifampicin, Co-crystal, Characterization, Tuberculosis

Computational and Pharmacological Evaluation of Anti-Migraine Potential of Emodin

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Abstract

Migraine is a debilitating neurovascular disorder that affects millions of people worldwide. This study attempted to determine the effectiveness of emodin against migraine. In-silico results revealed that emodin possesses better atomic contact energy values against selected targets. In-vivo findings showed that emodin (50-100 mg/kg) significantly decreased migraine pain by altering mechanical allodynia, thermal allodynia, light phobicity and number of head scratchings in mice. In animal brain tissues Emodin enhanced glutathione, glutathione-s-transferase, catalase, reduced lipid peroxide level, improved cellular architecture in histopathological examination and decreased expression of inflammatory markers: nuclear factor kappa beta (NFk-B), tumor necrosis factor-alpha (TNF-α) and cyclooxygenase 2 (COX-2) evident through enzyme-linked immunosorbent assay molecular investigations. Furthermore, the role of NMDA-receptors and the involvement of its NR2B subunit in progression of migraine has already been established. Emodin successfully alleviated pain sensation in migraine by blocking NR2B as observed by PCR analysis. This study indicates that emodin exhibits binding affinity against different targets involved in migraine, possesses anti-migraine action possibly mediated through antioxidant, anti-inflammatory pathways and Blocking NMDA – receptors.
Keywords: *In-silco* Studies, Migraine, Emodin, NMDA, TNF-α

Functionalized Pegylated Niosomes for Glioblastoma Multiforme (Gbm) Through Transferrin Receptors

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Abstract

Glioblastoma multiforme (GBM) poses a significant clinical challenge due to its aggressive nature and limited treatment options, primarily stemming from obstacles in effective drug delivery through the blood-brain barrier (BBB). The primary objective of this research is to address the challenges in treating glioblastoma multiforme (GBM). The study aims to explore and evaluate innovative strategies to overcome these challenges and improve the therapeutic outcomes for GBM patients. This cross-sectional multi-purpose, -center retrospective study demonstrated targeted nano-delivery systems, specifically niosomes. This study was conducted from the year 2023 and back to 2018 by using SPSS 20.0. The literature review showed that the niosomes transiently cross the BBB, allowing for improved drug penetration into the brain. Niosomes, lipid-based nano-carriers, offer stability, controlled release, and decreased toxicity. The research investigates the potential of PEGylated niosomes, which prolong circulation and enhance drug targeting. The research assesses the feasibility and effectiveness of these strategies by considering factors such as stability, controlled release, toxicity, and targeting efficiency of drug carriers. The overexpression of receptors like TfL in gliomas is highlighted as an attractive target for drug delivery systems (DDS), enabling medications to reach tumor cells more effectively. The study concludes by summarizing the challenges associated with treating GBM and emphasizing the importance of addressing BBB complexities. Various strategies, including nanodelivery systems, active targeting through specific receptors, and TfL-mediated DDS, are discussed as potential solutions to improve the efficacy of therapies for brain tumors; GBM.

Keywords: PEGylated niosomes, Glioblastoma Multiforme, Transferrin receptors, blood-brain barriers, nanocarrier

Navigating Drug-Drug Interactions: A Retrospective Study in Medical a Ward of Hayatabad Medical Complex

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Abstract

Drug-drug interactions (DDIs) are the most common cause of concern in patients receiving combination therapy. The World Health Organization underlines that adverse drug reactions and their consequences can be greatly reduced by paying close attention to the population at risk of Drug-Drug Interactions (DDIs). The qualitative or quantitative alteration of a drug's impact caused by the concurrent or subsequent administration of another drug is known as a drug interaction. DDIs have become a substantial concern in the field of healthcare, particularly among hospitalized patients. The retrospective nature of study was carried out in the Hayat Abad Medical Complex Peshawar. The study was conducted in Medical A ward .Hayat Abad Medical Complex is an ISO Certified (ISO 9001:2015) providing tertiary care services. A total of n=64 patients case histories were collected. The duration was between 01/08/2023 to 02/10/2023. The data was collected on official permission. Those patients were excluded from having hospital stay less than 01 day and having insufficient or lost medical record. All the patients having complete medical record, more than one day stay and at least 2 medications prescribed were included. Patients having age between 18 to 65 years were included. In 64 patient profiles, 216 interactions were found. The interactions ranged from large to moderate in severity. A total of 213 pharmaceutical interactions were somewhat significant, 49% were substantial, and 36% were minor; additionally, 14% of medication interactions were contraindicated. The current investigation revealed a significant prevalence of pDDIs in a tertiary care health clinic's medical ward.

Keywords: Drug-drug interactions, Poly pharmacy, Patient quality of life, Hayatabad Medical Complex

Evaluation of Hepatoprotective Effect of Platelets Rich Plasma on Animal Model

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Abstract

Platelet-rich plasma, also known as (PRP), have high praise and emergent consideration in the disciplines of medical sciences. The importance of its application is related to the large number of (growth factors) found in a concentrated PRP. Strong data and studies demonstrate that these GF speed up tissue regeneration to improve wound healing quality and shorten healing times. The biochemical mediators known as GF have both local and systemic effects. Cell migration, adhesion, proliferation, differentiation, and other processes are known to be regulated by these factors. The study has yielded several key findings pertaining to the individual treatment groups of Male Albino Rabbits. Exposure to hepatotoxic doses of CCl4 1 ml/kg body weight at ratio of 1:1 dissolve in olive oil subcutaneously for 14 days resulted in significant alterations in liver function parameters such as Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkaline Phosphatase (ALP), and Total Bilirubin (T.BIL) exhibited distinct changes. The Rabbits also received PRP 1ml/kg body weight TDS (dividing dose) for 14 days on peritoneal route. After completion of doses the animal were bled and their livers dissected for biochemical and histopathological studies. Blood Analysis was performed to evaluate the enzymatic activities. Studying these parameters we found out various changes in the level of hepatic enzyme such as, ALT decreased by approximately 35%, AST decreased by approximately 46%, ALP decreased by approximately 51% and total bilirubin decreased by approximately 38%. The analysis of variance (ANOVA) for ALT levels shows that there is a significant difference between the groups in ALT levels on Day 0. The p-value is extremely low (1.92E-19), which suggests that the difference is unlikely to occur by chance. Therefore, we can conclude that there is a significant effect of the different groups on ALT levels. Similarly The ANOVA results for AST show a significant difference between the groups in AST levels on Day 0. The p-value is very low (1.69E-19), indicating that the observed difference is unlikely to be due to chance. Hence, we can conclude that there is a significant effect of the different groups on AST levels. The ANOVA results indicate a significant difference between the groups in ALP levels on Day 0. The p-value is extremely low (3.89E-16), suggesting that the observed difference is highly unlikely to occur by chance. Therefore, we can conclude that there is a significant effect of the different groups on ALP levels. The ANOVA results showed a significant difference between the groups in T.BIL

levels on Day 0. The p-value (4.35E-11) is less than the typical significance level of 0.05. Therefore, have enough evidence to conclude that there is a significant effect of the different groups on T.BIL levels. This study contributes significantly to the understanding of liver function and its modulation by distinct treatments.

Keywords: Platelet-rich plasma, Aspartate Aminotransferase, Alkaline Phosphatase, Total Bilirubin

Elucidating the Anti-Cancer Properties of *Nigella Sativa*: A Comprehensive Analysis of Multi-Targeted Protein Interactions via Molecular Docking and Simulation Techniques

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Abstract

Nigella Sativa, commonly known as Black Seed, has a long-standing reputation in culinary applications for its distinctive aroma and has been utilized in traditional medicine to treat a variety of ailments such as inflammation, arthritis, and diarrhea. The therapeutic efficacy of Nigella Sativa is attributed to its rich composition of bioactive constituents, including phenols, flavonoids, and terpenes. This study delves into the potential anti-cancer properties of these constituents by examining their interactions with multiple protein targets that play pivotal roles in cancer pathogenesis. Receptor tyrosine kinases (RTKs), Signal Transducer and Activator of Transcription (STAT), Jannus Kinases (JAK), phosphatidylinositol 3-kinase (Pi3K)/Akt, and Mitogen-Activated Protein Kinases (MAPKs) are crucial signaling pathways involved in the development and progression of various cancers, including colon and breast cancer. Our research employed molecular docking and molecular dynamic simulation techniques to investigate the binding affinities of Nigella Sativa constituents to these signaling proteins. These analyses were conducted using AutoDock and YASARA software, respectively. Among the tested constituents, stigmasterol and lanosterol displayed the highest binding energies in molecular docking studies, indicating strong potential interactions with the target proteins. Molecular Dynamic (MD) simulations were specifically focused on stigmasterol and sitosterol, chosen based on their highest negative binding energies. These compounds were analyzed against key signaling pathways, including RTKs/STAT/JAK, Pi3K/Akt, and MAPKs. The MD simulations, extended over 300 nanoseconds, revealed that the ligand-protein complexes-maintained Root Mean Square Deviation (RMSD) within acceptable limits, indicating stable interactions throughout the simulation period. Additionally, the pharmacokinetic and toxicokinetic properties of these constituents were evaluated using pkCSM and Data Warrior software. These analyses provided insights into the various physicochemical behaviors and drug-likeness profiles of the Nigella Sativa constituents, further underscoring their potential as therapeutic agents in cancer

treatment. This comprehensive approach combining molecular docking, MD simulations, and pharmacokinetic/toxicokinetic assessments offers a promising pathway for developing novel anti-cancer therapies based on natural compounds from Nigella Sativa.

Keywords: Ethnopharmacology, Medicinal plants, Receptor tyrosine kinases, molecular docking, *Nigella Sativa*

Factors Affecting Adherence to Antihypertensive Medication in Holy Family Hospital Rawalpindi

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Abstract

Hypertension is the major public health problem and according to WHO it's the third main killer disease in the world. A cross sectional survey was conducted in the holy family hospital Rawalpindi to find out the possible factors that can affect adherence to antihypertensive medications. Patients were selected by convenient sampling method. Data was collected from 227 patients attending the emergency and cardiology wards following inclusion and exclusion criteria. Verbal consent was taken before administering questionnaire. Hill-Bone Medication Adherence Scale (HB-MAS) score was used to check medication adherence. Data collected was about sociodemographic which included age, gender, education, income. Other information includes presence of co-morbidities, hypertension management strategies, medication use, and awareness regarding blood pressure. Descriptive statistical analysis revealed 60.5% of total subjects were male and 79.8% of total subjects were older aged (>55 years).82.8% were having previous history of cardiovascular disease.39.5% were smokers. Higher adherence score was shown by subjects with CVD as compared to the patients with no cardiovascular disease having β co efficient 0.813, CI 95 % = 0.103-1.522, having p-value 0.025,additionally no smoking was also having a higher adherence score as matched to patients who smoke with β co efficient = -1.097: CI 95% = -1.613-0.581 having p-value <0.001. The results revealed that drug adherence for the patients who do B.P. checks once a week was lower as compared to the patients who check B.P. once a month or on a visit to the doctor having β coefficient -0.266; CI 95% =-0.461-(-0.071/) with p-value=0.008. Additionally, the results demonstrated that for every unit increase in the number of tablets of HBP medications prescribed, the adherence score increases, having β coefficient 0.235; CI 95%= 0.011- 0.4591 with p-value 0.040. Our study concludes that the main characteristics that contribute to adherence to anti-hypertensive medicine are the presence of cardiovascular illness, the number of tablets taken daily, and regular blood pressure monitoring. Furthermore, nonsmoking has been shown to be a factor associated with drug adherence to HBP therapy. However, adherence to hypertension medication is complex and there could be other potential factors associated with it which still needs to be explored and confirmed by conducting future studies.

Keywords: Hypertension, Poly pharmacy, Patient quality of life, WHO, illness

In silico analysis of synergism between SARS-nCoV-2 and Hepatitis Virus "C" and interaction with Human proteome to decipher the impact of Covid vaccine on HCV carriers

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Abstract

The recent COVID-19 pandemic has affected 660 million people worldwide. Reports are steadily emerging that COVID-19 has an impact on other organs, i.e., the heart, liver, nervous system, kidney, and muscles etc. Among these, between 14.8% to 53% of COVID-19 patients developed liver diseases in China. Pakistan has one of the world's highest prevalence rate (3.8%) of chronic hepatitis "C" and ranks second after Egypt (6.3%).Therefore, the risk of of co-morbidity of COVID-19 and HCV in Pak- istan is likely to affect a large portion of population. Therefore, this study was carried out to understand the interaction of HCV and SARS-CoV-2 proteins with the human proteome to understand the possible health implications of co-infection between SARS-CoV-2 and HCV (and Hepatitis B virus as well). We gathered two different types of Protein-Protein Interaction (PPI) data: (I) from the literature and (ii) from public RNA-seq data from Gene Expression Omnibus. A thorough review of the literature revealed that a total of seven human genes were common inter-actors of the three viruses under study. Where 27 were up-regulated, and 1 was down-regulated as common inter-actors from public RNA-seq data. Moreover, enrichment analysis of the common proteins helps us characterize proteins that are involved in different pathways, such as protein binding, cellular response to viruses, viral life cycle, and glucose import. According to our analysis, there were six different proteins (CTH, SYT12, SLC38A4, CXCL2, ANXA10, and HSH2D) that were regulated differently (up and down) by different viruses' pathogenicity. So we can hypothesize and say that SARS-CoV-2 co-infection can have a beneficial or harmful effect on patients. The results from the HCV, HBV, and SARS-COV-2 were also compared with the spike protein inter-actors. This demonstrates that up-regulated inter-actors share a commonality.

Antibiotic Resistance Profiling of Infection Causing Microorganisms Isolated from Burn Patients

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Abstract

Antibiotic resistance is currently one of the major challenges to world's health, food security and development. Every country is being affected by antimicrobial resistance to greater or lesser extent. Drug resistance is a severe and widespread problem especially in developing countries like Pakistan. The objectives of this study were to characterize the bacteria isolated from wound samples of burn patients, to find the antibiotic resistance profile of isolates against commonly prescribed antibiotics and to check the extent of resistance through Multi Drug resistant (MDR), Extensively Drug-resistant (XDR) and Pan Drug-Resistant (PDR) determination. A total of 1312 tissue, pus swab and blood samples were collected and processed for a 6 month period (April 2021 to September 2021) at the Department of Microbiology, Burn and Trauma Center of Hayatabad, Peshawar. All the culturing was performed according to the protocol of (CLSI., 2010). In 1312 samples, the percentage of infected samples was 69% (903) and non-infected was 31% (409). Out of all isolates, 79% isolates were Gram negative species, 17% isolates were Gram positive microbes and 2% isolates were fungal species. Whereas in 1% samples combined growth of Gram positive and Gram negative species along with Providentia species was also observed. Total numbers of 718 (79%) Gram negative bacteria were isolated from swab, tissue and blood samples.. Out of 903 microorganisms isolated during study. 41% bacteria were XDR spp. followed by 39% MDR spp and 1% Pan drug resistant microorganisms.

Keywords: species, staphylococcus, Multi Drug resistance, Extensive-Drug resistance

Application of *Actinomycetes* isolates for the Biotransformaton of heavy metals accumulated through pesticides in peach orchards in swat

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Abstract

Due to extensive usage of pesticides in agriculture sector, heavy metal accumulation in soil has become one of the most serious environmental problem all over the world including Pakistan. Bioremediation has the advantages of removal of large amounts of heavy metal efficiently at a low cost. Among the microorganisms, the bioremediation ability of Actinomycetes are well-documented. The present work identified a total of 22 species of Actinomycetes from the peach orchards having the ability of biotransformation of heavy metals (Cupper, Cu and Zinc, Zn). The physiochemical parameters of soil samples were temperature for all samples 26°C, moisture content range 25 to 8.7 and PH 7.5 to 8.8. The isolates A17 and A17.1 showed high resistance level on plates supplemented with salts of Cu and Zn. The OD_{600} of selected Actinomycetes inoculated in media having different concentrations of CuCl2, ZnSo4 and CuCl2 + ZnSo4, decreased as the concentration of heavy metals increased. The pre-elemental analysis of soil samples showed a range of 7.3 - 19.8 mg/kg for Copper (Cu) and that of Zinc (Zn) is 18- 86 mg/kg. The bio-sorption experiment showed that isolate A17 removal is maximum than A17.1 for both Cu and Zn. Furthermore, the results also determined that in binary metal system the bio-sorption activity of both isolates increased. The post-elemental analysis of soil samples revealed that the range of Cu was decrease to 7.11 - 19.38 mg/kg and that of Zn was 17.58 - 84.19 mg/kg in different soil samples in pots experiment. Additionally, the results also determined that in binary metal system in pots experiment the activity of both isolates decreased. It is concluded from the current study that Actinomycetes have transformation ability for heavy metals (Cu and Zn) both in laboratory as well as pots experiment, and it can be used as a safe, economic and eco-friendly and alternate removal strategy for heavy metals contaminated horticultural soil and agricultural fields.

Keywords: Peach orchards, Heavy metals, *Actinomycetes*, Copper, Zinc, Biotransformation

Identification of Novel Chemical Scaffolds as Trehalose-6-phosphate Phosphatase Inhibitors: A Multi-pronged *in Silico* Approach

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Abstract

Burkholderia pseudomallei cause melioidosis, a deadly infection prevalent in Southeast Asia and Australia during the rainy season. Its diverse symptoms make diagnosis challenging. Despite high fatality rates (20–50%) and antibiotic resistance, there's no effective drug or vaccine. Trehalose, vital for B. pseudomallei, influences its resilience and pathogenicity. Bioinformatics and computational advancements augment drug/vaccine development, minimizing time and costs required for novel drugs development. This proposed computational strategy focuses on to develop targeted novel drugs to combat this pressing health threat. This study found three probable novel drugs from the drug libraries Asinex, Zinc, Chembridge, and Drugbank by structure-based virtual screening against the known active region of TPP protein. The process screened three compounds; BDG_34042863, BDF_33738612 from Asinex antibacterial library and DB00139 from DrugBank antibacterial library with binding energy score -8.8 kcal/mol, -8.4 kcal/mol and -7.7 kcal/mol, respectively. The binding energy score of the control molecule (2-methyl-6-phenoxytetrahydro-2H-pyran-3,4,5-triol) was -6.4 kcal/mol. Chemically, the BDG_34042863, BDF_33738612, and DB00139 is 4-(2-oxo-2-(4-(2-oxooctahydro-1H-pyrano[2,3-d]pyrimidin-4-yl)piperidin-1-yl)ethyl)phthalazin-2,3-diium-1-olate and 2-amino-5-(3-fluorophenyl)-4-(1-(pyridin-1-ium-2-ylmethyl)piperidin-3-yl)pyrimidine-1,3-diium, respectively. With the protein TPP, the drug molecules revealed strong hydrophilic and hydrophobic interactions and stable docked conformation in molecular dynamics simulation. The compounds exhibited steady dynamics throughout the simulation period, with no apparent shifts in the binding mode or interactions. The antibacterial library complexes BDG_34042863, BDF_33738612 from Asinex, and DB00139 from DrugBank each had a mean root mean square deviation (RMSD) of 4.04 Å, 7.184 Å, and 7.109 Å, respectively. In addition, the simulation trajectories of complexes underwent MM/GBSA analysis, which revealed binding energy scores of -33.39 kcal/mol, -41.1 kcal/mol, -49.16 kcal/mol, and -41.29 kcal/mol for the control, BDG_34042863, BDF_33738612, and DB00139, respectively. For the control, BDG_34042863, BDF_33738612, and DB00139, the binding energy values in MM/PBSA were -34.18 kcal/mol, -42.05 kcal/mol, -49.75 kcal/mol, and -41.87 kcal/mol, respectively. By utilizing DFT, various molecular characteristics such as geometry parameters including Hartree optimization energy and Frontier Molecular Orbitals (FMO) comprised of HOMO/LUMO

orbitals with energy gaps have been analyzed. The global and local reactivity descriptors such as chemical hardness (η), electronegativity (χ), chemical potential (μ), softness (σ), electrophilic index (ω), ionization potential (I) and electron affinity (A) [5-7] were calculated to explore the reactivity of investigated compounds. Further, electrophilic and nucleophilic sites were determined by analyzing the molecular electrostatic potential (MEP). Visualization of the output files were supported by Gauss View6 .The compounds also had favourable pharmacokinetic characteristics and were categorised as druglike. Based on their expected potential as novel drugs, the compounds may be used in experimental research to investigate their anti-TPP activity against B. pseudomallei in the treatment of melioidosis.

Keywords: *Burkholderia pseudomallei*; Computer aided drug designing, molecular docking and molecular dynamic simulation

Phytochemical screening and Biological activities of Allium sativum on MDR pathogens isolated from wounds

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Abstract

Wound infections are associated with morbidity and mortality in developing countries accounting for about a quarter of the total number of nosocomial infections, sidewise multi-drug resistant bacteria are becoming more dominant. This dilemma urge for alternative strategies. Healing with medicinal plants is as old as mankind itself. Garlic, Allium sativum a member of the Alliaceae family, has been widely recognized as a valuable spice and a popular remedy for various ailments and physiological disorders. The study was conducted at MBRL and PCSIR labs from Tuesday 1st March, 2022 – Friday 29th July, 2022. 3 types of the infectious wounds were targeted i.e. surgical wounds, burn wounds and diabetic foot ulcer and a total number of 60 samples were collected; 20 of each type. Isolation and identification of bacteria were done using culture medias and biochemical analysis whereas antibiogram profile was formulated using disc-diffusion method. Later, methanolic extract of Allium sativum was prepared and antibacterial potential was evaluated using well-diffusion method. Phytochemical screening, anti-oxidant analysis using DPPH – assay and insecticsidal activity were also performed.The results depict that Staphylococcus aureus and Staphylococcus epidermis are the major cause of septic wounds alongside Escherichia coli, Klebsiella pneumonia, Enterobacter aerogenes, Salmonella typhimurium, Shigella dysenteriae, Pseudomonas aeruginosa and Proteus mirabilis. Antibiotic susceptibility testing of these microbes revealed that all isolates are multi-drug resistant. On the other hand, antibacterial activity of Allium sativum showed effective results against all the clinically isolated bacteria except Escherichia coli. The highest zones were achieved against Enterobacter aerogenes followed by Staphylococcus aureus (the most isolated bacteria), Shigella dysenteriae and Pseudomonas aeruginosa respectively. The phytochemical screening and antioxidant analysis unveiled the presence of saponins, flavonoids, tannin, phenolic compounds, cardiac glycosides, reducing sugar and alkaloids and showed marvelous free radical scavenging ability of the plant. Allium sativum was also concluded to have an excellent insecticidal potential as 75% of mortality rate was recorded against 'Acarus siro'.The results confirmed the pharmaceutical and biological activities of Allium sativum (Garlic). Aseptic environment, proper wound care and management and Allium sativum as alternative is exhorted.

Keywords: Phyochemical screening, Biological activities, MDR pathogens, infectious wounds, Allium sativum

Commercial Herbal & Allopathic Mouth Rinses in prevention of *Veillonella parvula*, *Porhryomonas gingivalis* & other pathogens
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Abstract

Mouth rinses are the germicidal compounds that are used for mitigation of periodontal diseases and dental caries in humans. The study investigated the antimicrobial properties of mouthwash against eleven bacterial isolates causing oral infections. Microbial limit tests, specified microorganisms' detection, minimum inhibitory concentration and agar well diffusion method were performed to evaluate the antimicrobial effectiveness of different herbal & allopathic mouthwashes. Allopathic mouthwash (PMW) reported an amazing zone of inhibition (mm) against Veillonella parvula, Porhryomonas gingivalis, Escherichia coli (the two isolates), Salmonella typhi, Salmonella enterica, Pseudomonas aeruginosa, Bacillus spizizenii and Staphylococcus aureus, Candida albicans and Aspergillus brazilensis. Herbal mouth wash (H) reported less zone of inhibition against Salmonella enterica and Bacillus spizizenii. Another herbal mouth wash (HMW) used during study didn't show any antimicrobial activity.

Keywords: Dental caries, Antimicrobial activity, Zone of inhibition, Mouthwashes, Chlorhexidine gluconate.

Biological Properties of Gold Nanoparticles Synthesized by Using *Colchicum luteum* Extract

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Abstract

Nanobiotechnology, combination of the nanotechnology and biology, integrates significant biological molecules in nanostructures. It has revolutionized the recent world due to its diverse applications. Nanoparticles are those particles that possess at least one dimension in the range of 01-100 nm. NPs also exhibit many improved and novel characteristics such as physiochemical properties including solubility, diffusivity, color, strength, optical, toxicity, thermodynamic and magnetic properties along with their biological activities (antimicrobial, anti-cancer, antioxidant etc.) and many others in comparison with their bulk counterparts. During this study, crude methanolic extract of tubers of Colchicum luteum was used to reduce Gold metal in order to synthesize AuNPs. Gold nanoparticles (AuNPs) were successfully synthesized by mixing crude extract solution with 0.1mM Aurochloric acid ($H(AuCl_4).3H_2O$). Antibacterial activity of plant extract and synthesized AuNPs were assessed against some bacterial clinical isolates by disc diffusion method. DPPH Free Radical Scavenging activity was carried out to evaluate antioxidant activity. Antibacterial potential of synthesized AuNPs were assessed against various clinical isolates including Pseudomonas aeruginosa, Staphylococcus epidermidis and Staphylococcus aureus at various concentrations. DMSO was used as negative control. Ciprofloxacin antibiotic was used as positive control. Antibiotic reported around 28mm, 30mm and 25mm Zone of Inhibition (ZoI) against P. aeruginosa, S. epidermidis and S. aureus, respectively. Among all test bacteria, tuber AuNPs reported greatest ZoI against S. epidermidis at 3mg/ml concentration. Analysis of DPPH free radical scavenging activity of AuNPs revealed that activity was concentration–dependent. Highest antioxidant activity (92.0%) was reported by tubers AuNPs at 250 µg/ml concentration. The synthesized AuNPs were biologically active and showed significant antibacterial and antioxidant activities.

Keywords: Green synthesis, Gold Nanoparticles, *Colchicum luteum*, Antibacterial activity, Antioxidant activity.

Evaluation of Antibacterial Activity of *Piper nigrum* and *Cuminumcyminum* extracts on Bacterial Isolates from Throat Infection

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Abstract

Urinary tract infections (UTIs) are very common infections in human population which are 14 timesmore common in women as compared to men due to anatomical length of urethra. For this purpose, medicinal plants and their extracts have been used as traditional remedies to treat different types of infectious diseases. The Ricinus communis and Cuscuta reflexa are famous valuable medicinal plants found in Pakistan that are used as traditional medicine. Thus, this study was aimed to explore the antibacterial activity of R. communis and C. reflexa against Multi Drug Resistant (MDR) uropathogens. The leaves of both plants' leaves were collected from District Khyber, Khyber Pakhtunkhwa and extracted with methanol. A total of 100 UTIs clinical samples were obtained from Al-Khidmat Hospital, Peshawar, Pakistan and processed on nutrient agar and identified by using different biochemical tests. Out of 100 urine samples, 75% were positive, among positive cases 60% from female, while 40% were from male patients. The isolated bacteria were Escherichiacoli, Proteus mirabilis, Klebsiella pneumoniae, Acinetobacter baumannii and Staphylococcus aureus. For MDR confirmation different antibiotics were used. According to the findings, S. aureus showed resistance to Ceftriaxone (22mm) followed by K. pneumonia (18mm) and A. baumannii (13mm) respectively. Whereas, resistance was observed against Gentamicin by E. coli (20mm), A. baumannii (20mm), K. pneumonia (16mm), S. aureus (15mm), and P. mirabilis (15mm) respectively. Similarly, E. coli and P. mirabilis (18) and to S. aureus (14mm) were resistant to ciprofloxacin. Foremost, the most of the resistance was observed against Levofloxacin by S. aureus and P. mirabilis (14mm), E. coli and K. pneumonia (16mm) and A. baumannii (17mm). Also, E. coli (12mm), P. mirabilis (13mm), A. baumannii (13mm) and S. aureus (23mm) showed resistance to Ampicillin. In addition, the methanolic extracts of both plants were evaluated for antibacterial activity. Among the extracts, the R. communis was more effective against E. coli (28mm), K. pneumonia (20), P. mirabilis (18mm), A. baumannii (17mm) and S. aureus (15mm). Similarly, C. reflexa showed highest zones of inhibition against E. coli (23mm), K. pneumonia (22mm), P. mirabilis (19mm), A. baumannii (15mm), and S. aureus (13mm), respectively. Therefore, it is concluded from the present study that UTIs is more prevalence among all age groups and should be properly diagnosis before prescribed antibiotics. It's also concluded from the study that, both plants extracts possess differentbioactive constituent on which showed a good antibacterial activity.

Green Synthesis of Iron Nanoparticles using *Chlorophytum comosum* leaf extract and its effect on Pathogenic Bacteria, Fungi and biodegradation of Methyl Orange

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Abstract

Nowadays, green synthesis methods have gained growing attention in nanotechnology owning to their versatile features including high efficiency, cost-effectiveness, and eco-friendliness. Here, the methanolic extract of C.comosum leaf was applied for the preparation of iron nanoparticles (INPs) to obtain spherical and amorphous INPs with a particle size approximately 50 nm as confirmed by SEM. The synthesized INPs managed to eliminate methyl orange (MO) from the aqueous solution. The concentration of MO can be easily checked via ultraviolet-visible (UV-Vis) spectroscopy throughout the usage of INPs at the presence of H2O2. The synthesized INPs exhibited MO degradation efficiency of 83% after 6 h. Furthermore, The antibacterial and antifungal activity of these NPs was investigated on some Gram-negative and Gram-positive bacteria and on fungi species such as Aspergillus niger and Penicillium).In accordance with the results, INPs show bactericidal effect against Gram-positive Staphylococcus epidermidis (the lowest zone of inhibition is 12mm and the highest is 18mm) and Gram-negative Psuedomonas aeruginosa (the of zone of inhibition is 11mm to 16mm). And the lowest zone of inhibition against Aspergillus niger is (17mm) and highest is (20mm) where as the range of zone of inhibition of Penicillium is (12mm to 17mm).Results of antibacterial and antifungal activity indicated the strong bactericidal effect of these INPs on both Gram-negative and Gram-positive bacteria and also on fungi. Overall, environmentally-friendly INPs can be a valuable candidate for various scientific fields, in particular the removal of organic dyes and the destruction of bacteria and fungi.

Laboratory diagnosis of anemia and evaluation of red blood cells parameters used in morphological classification of anemia

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Abstract

Anemia is a global problem affecting the population in both developing and developed countries and there is a debate on which hemoglobin level limit should be used to define anemia in general population and particularly in the elderly. The normal ranges of blood for healthy man are 13-17g/dl and the healthy women are11-16g/dl. If the ranges are less than 11g/dl the person considered as anemic. The main objectives of the research were to diagnose the types of anemia based on morphologies and evaluation of red blood cells parameters used in morphological classification of anemia. The ferritin level of blood samples used to confirm the iron storage level. Blood sample were collected from each patient. The blood was then poured into the EDTA tube to check the Red Blood Cells parameters on hematology analyzer (GENRUi). The blood smear was prepared and for identification Light Microscope (Tension) was used. Total 100 blood samples were processed and identified the three types of anemia. Among these samples the Normocytic anemia frequency was (n=55) 55%, Macrocytic anemia was (n=33) 33.5% and Microcytic anemia (n=11) 11.5%. The prevalence of anemia was more in female than the male. RBC parameters were identified on hematology analyzer for the diagnosis of three types of anemia such as RBCs parameters for Microcytic were HB<10g/dl, MCV<80fL, MCH<26pg, MCHC<32g/dl, HCT in male<41% and in female<36%, for Macrocytic RBCs parameters were HB<10g/dl, MCV>99fL, MCH>32pg, MCHC>36g/dl, HCT in male>52% and in female>36% and for Normocytic RBCs parameters were HB<10g/dl, MCV=80-99fL, MCH≥26pg, MCHC were normal, HCT in male>41% and in female> 36%, Reticulocytes count were increased (Male=2-5% and Female2-4%).The ferritin test was performed on the special chemistry reader using Acculite Kit to confirm the iron storage to confirm the three types of anemia. Ferritin level was decreased in Microcytic anemia and the level of ferritin was increased in both Normocytic and Macrocytic anemia. From above results it was concluded that both RBCs parameters and ferritin test were important for the laboratory diagnosis of anemia.

Comparative study of *Ricinus communis* and *cuscuta reflexa* extracts effects towards multi-drug resistant uropathogenic bacteria

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Abstract

Urinary tract infections (UTIs) are very common infections in the human population. The Ricinus communis and Cuscuta reflexa are medicinal plants found in Pakistan that are used as traditional medicine.It was a comparative study to evaluate the antibacterial activity of R. communis and C. reflexa leaves extracts against MDR uropathogens. The technique used for collection of uropathogens was by collecting midstream urine samples and the leaves extracts were prepared using methanol. A total of 100 urine samples were obtained from Al-Khidmat Hospital, Peshawar by using sterile urine kits and were processed on CLED media at Microbiology Research Laboratory, Abasyn University Peshawar and SPSS 16.0 version was used for data analysis. This study duration was from June-December, 2023.Out of 100 urine samples, 75% were positive, among positive cases 60% from female, while 40% were male patients. The isolated bacteria were Escherichia coli, Proteus mirabilis, Klebsiella pneumoniae, Acinetobacter baumannii, and Staphylococcus aureus. For bacterial MDR confirmation different antibiotics like Ceftriaxone, Gentamicin, Ciprofloxacin, Levofloxacin and Ampicillin were used. Plants methanolic extracts were evaluated for antibacterial activity. Among the extracts, R. communis was more effective against E. coli (28mm), K. pneumonia (20mm), P. mirabilis (18mm), A. baumannii (17mm) and S. aureus (15mm). Similarly, C. reflexa showed more effective against E. coli (23mm), K. pneumonia (22mm), P. mirabilis (19mm), A. baumannii (15mm), and S. aureus (13mm), respectively.It is concluded that both plant extracts possess different bioactive constituents which showed good antibacterial activity.

Keywords: Plant extracts, UTIs, Antibiotics, MDR bacteria, Antibacterial Activity, CLED media