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CURRENT TRENDS IN PHARMACEUTICAL RESEARCH

The Official Journal of the Department of Pharmaceutical Sciences

SPECIAL ISSUE FOR ABSTRACTS

DST-PURSE SPONSORED NATIONAL SEMINAR (16-18 NOV. 2023)

"Nanotechnology in Biotherapeutics: Advancement in Drug Discovery, Development and Delivery Systems"

Jointly Organized By
Department of Pharmaceutical Sciences &
Centre for Biotechnology and Bioinformatics

Dibrugarh University

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Editorial

In recent years, nanotechnology has already tested its magnitude in a number of branches of existence science and biotechnology field. It is no longer hyperbole to say that in future, nanotechnological methods would in reality take the associated branches of science to the subsequent level. Despite of some impedance, this technology presents giant hope in the future.

The field of nanobiotechnology is growing at very fast pace. Nanotechnological approaches are being utilized in the development and discovery of drug in upcoming scenario at exponential rate, where atom or molecule level devices can be constructed by incorporation of drug in to suitable biocompatible delivery system. Hence nanobiotechnology can help various aspects of biological problem with the help of nanotechnology and information technology. This technology has capacity to build bridge among different branches of sciences providing newer challenges and opening new door in the field of research & diagnostics in the near future. Various nanomaterials found successful for drug delivery and targeting tumors are liposomes, polymeric nanoparticles, micelles, dendrimers, metal nanoparticles, mesoporous silica nanoparticles, graphene nanoparticles, quantum dots and siRNA-conjugated nanomaterials, which all help to disease targets. Dual drug delivery via nanoparticle systems has also been under process of development in which combinations of drugs are co-delivered to cells, and the presence of one drug enhances the bioavailability of another drug.

Thus, nanoparticles have emerged as promising nanoplatforms for efficient diagnostics and therapeutics possessing characteristic properties at the nano-scale

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range. The feasible immobilization of specific ligands on the surface of biological site has become ideal candidates for molecularly sensitive detection, molecular imaging, and novel carriers for targeted drug and gene delivery.

Dr. Md. K. Zaman
Editor-In-Chief

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ASPECTS OF FULL CYCLE VIRAL VACCINE DEVELOPMENT: CONCEPT TO MARKET

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Abstract:

Emergence of newer infections as well as the need to improve the generation of older vaccines continuously push vaccine researchers towards further research and development. This initiative of developing a new vaccine candidate is a quite complex, time consuming and cost intensive process. Yet this has remained very important over the decades as most of the viral diseases can only be effectively countered by vaccines. The vaccine development journey starts from generation of the concept and reaches the market by passing through many complex sequential phases like establishment of basic manufacturing processes, generating a proof of Principle candidate, pre-clinical studies, different phases of clinical trials and finally the approval by the licensing authorities. Live attenuated vaccines and inactivated vaccines are two popular types of viral vaccine. Live attenuated vaccine is a preferred platform because of its operational simplicity and robust immune response.

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AN INTEGRATIVE APPROACH TO STUDY THE INHIBITION OF *Providencia vermicola* FabDUSING C2-QUATERNARY INDOLINONES

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Abstract:

This study explores the potential bioactivity of twelve uniquely designed C-2 quaternary indolinones against *Providencia spp.,* a group of bacteria within the Enterobacteriaceae family responsible for urinary tract infections. The objective is to uncover the bioactive characteristics of these compounds and their potential for developing innovative treatments against *Providencia spp*. The distinctive chemical structure of these indolinones, coupled with their experimental design, positions them as promising subjects for further investigation. The outcomes of this research may contribute to the creation of novel therapeutic agents for combating *Providencia spp.* infections. The synthesized indolinones (moL1-moL12) undergo assessment, with a particular focus on moL12, distinguished by its aza functionality. Antimicrobial experiments, conducted in triplicate, encompass six distinct Gram-positive and Gram-negative organisms, including *P. vermicola*, showing significant activity ($P<0.05$). Computational techniques are employed to gauge the pharmacokinetic attributes of these compounds. Among the synthesized indolinones, moL12 demonstrates superior activity compared to its counterparts with similar structures but differing functional groups. All six strains tested, including *P. vermicola*, exhibit sensitivity to moL12. Computational

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investigations affirm the pharmacokinetic profile of moL12, highlighting favorable absorption, distribution, metabolism, excretion, and toxicity characteristics. By implementing a protein-protein interaction (PPI) approach, we pinpoint a promising target, FabD, in Gram-negative bacteria. Our analysis indicates that moL12 holds significant potential for binding with FabD, suggesting its capacity to inhibit cell wall formation and display enhanced antimicrobial efficacy compared to other compounds. Consequently, moL12 emerges as a potential therapeutic agent for combatting urinary tract infections caused by *Providencia spp*. The discoveries from this study offer substantial promise for the development of innovative and efficacious treatments for bacterial infections.

Keywords:

C-2 quaternary indolinones, *Providencia vermicola, Providencia stuartii*, Multi-Drug Resistance, Molecular Dynamics Simulation.

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THE UTILIZATION OF MAGNETIC NANOPARTICLES IN BREAST CANCER FOR THERANOSTIC PURPOSE

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Abstract:

The application of Magnetic Nanoparticles (MNPs) with theranostic potential has attracted significant attention in the context of breast cancer treatment. Breast cancer is a highly prevalent and often devastating malignancy affecting women worldwide. These innovative MNP formulations possess extremely small particle sizes, strong inherent magnetic properties, efficient imaging capabilities, drug targeting, and drug delivery characteristics. MNPs also exhibit anticancer properties, in addition to their imaging and magnetic targeting abilities. The utilization of MNPs for theranostic purposes can be valuable in both preclinical and clinical settings, offering potential benefits for cancer treatment and imaging. Moreover, when these nanoparticles are functionalized with antibodies or ligands, they can serve as versatile platforms for various biological applications .

In summary, the development of nanomaterials that integrate diagnostic and therapeutic functions within a single nanoplatform is of paramount importance for advancing drug delivery in the context of breast cancer treatment. To successfully transition these innovations into clinical practice, it is imperative to create drug nanoformulations that are not only safe and efficient but also biocompatible, all while possessing theranostic features.

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METHANOLIC EXTRACT OF *Musa Balbisiana* COLLA FRUIT PEEL EXHIBITS NEPHROPROTECTIVE EFFECTS

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Abstract:

Objective: Carbon tetrachloride (CCl_4) is a toxic substance employed to induce renal toxicity in experimental animals, facilitating the examination of oxidative stress-related kidney injuries. It leads to increased levels of renal biomarkers, impairs the antioxidant system, and inflicts damage upon renal tissues. Multiple scientific investigations have highlighted the exceptional nutritional and therapeutic values of *Musa balbisiana* Colla's fruit peel. The present study is dedicated to investigating the protective effects of a methanolic extract obtained from the fruit peel of *Musa balbisiana* Colla on kidney health.

Methods: The assessment of nephroprotective potential of the methanolic extract derived from the fruit peel of *Musa balbisiana* Colla was performed at two different dosage levels (200 and 400 mg/kg body weight) in a 28-day study on Swiss albino mice. The study included an evaluation of kidney weight, serum renal biomarkers, tissue antioxidant enzyme levels, and a histopathological examination following the induction of renal toxicity using carbon tetrachloride.

Result: Treatments with methanolic fruit peel extract resulted in a significant reduction in renal biomarkers and malondialdehyde (MDA) levels when compared with the nephrotoxic group ($p<0.05$). Furthermore, methanolic fruit peel extract of *Musa balbisiana* Colla treatment led to elevated levels of the catalase,

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superoxide dismutase, and glutathione in compared to the nephrotoxic group ($p<0.05$). Histopathological assessments of renal tissues from the mice treated with MBME revealed a restoration of restored normal architectural features.

Conclusions: Our study findings demonstrate that the administration of methanolic fruit peel extract of *Musa balbisiana* Colla effectively mitigates the nephrotoxicity induced by carbon tetrachloride, thereby preventing kidney damage caused by carbon tetrachloride.

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FORMULATION & CHARACTERIZATION OF CELECOXIB LOADED FILM FORMING GEL FOR ENHANCED PERMEATION

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Abstract:

Celecoxib, a COX-2 selective non-steroidal anti-inflammatory drug is known to be effective in the treatment of inflammation but due to its severe side effects, such as gastrointestinal toxicity, gastric mucosal ulceration, haemorrhage and recently, cardio toxic effects, that restrict its oral use and make it a good candidate for topical/transdermal administration. The present research work was thus aimed to formulate novel topical film-forming gel that can overcome the limitations of existing topical formulations like cream, ointment, gel and patch. Film-forming systems also provide intimate skin contact with drug so the drug can exerts its therapeutic activity completely. In the present study film-forming gels were prepared by using various film-forming polymer (polyvinyl alcohol (PVA), eudragit RS100, hydroxy propyl methyl cellulose (HPMC), and hydroxy propyl cellulose), gelling agents (carbopol 934 & HPMC), tween 80 as a stabilizer, ethanol as a solvent system & triethanol amine as neutralizing agent. The final 1% celecoxib loaded film-forming gel was formulated by using 5%w/w PVA, 1.5%w/w carbopol 934 and 31%w/w ethanol. The final film formulation showed good tensile strength, firmness as compare to other formulations. It showed % cumulative release of 9.88% at 8h and 20.89% at 24h. The ex-vivo permeation flux was found to be 0.099 mg/cm^2/h. The final formulation showed highest skin retention of 53.9% among

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others. The prepared formulation was found to be effective in reducing paw oedema in carrageenan induced paw oedema model and pouch volume and leukocytes counts in air pouch model in female wistar rats. There was a statistical significant difference in change in paw volume & pouch volume of final formulation with marketed formulation ($p<0.05$) & ($p<0.001$) respectively. Leukocytes counts were also found minimum for film forming gel (9500) as compared to reference (13166).

Keywords:
Film-forming gel, PVA, Celecoxib, Air pouch Model, Enhanced permeation rate

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PHARMACOGENOMICS SIGNIFICANCE IN ADVERSE REACTIONS TO MEDICATIONS

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Abstract:

Adverse drug reactions (ADRs) represent a significant global health issue, with various underlying causes, some of which can be avoided. Approximately 80% of the variability in drug effectiveness and safety can be attributed to pharmacogenomics. In the realm of drug metabolism, there are over 400 genes that hold clinical relevance, and around 200 pharmagenes are linked to ADRs. In the Caucasian population, the prevalence of extensive metabolizers, a condition affecting drug metabolism, is less than 20%, leaving roughly 60% of patients at risk of experiencing potential ADRs. Pharmacogenomics is a field that explores the genetic factors contributing to individual variations in drug responses, encompassing aspects like drug effectiveness, required dosages, and adverse reactions. In recent years, pharmacogenomic research has shifted from a targeted gene approach to more comprehensive genome-wide association studies (GWAS). Genetic variations within genes related to drug metabolism, transport, and, more recently, human-leukocyte antigens (HLAs), have been connected to differences in the likelihood of experiencing adverse drug reactions (ADRs). The strong link between specific HLA alleles and severe hypersensitivity reactions, such as Stevens–Johnson syndrome and toxic epidermal necrolysis, emphasizes the critical role of HLAs in the development of these unpredictable drug reactions. However, just like the quest to identify genetic factors for common diseases,

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pharmacogenomics, including GWAS, has not yet yielded significant gene variants responsible for the efficacy of drugs used in the treatment of common ailments. This review primarily focuses on the pharmacogenomics of ADRs, elucidates the underlying mechanisms, and explores the potential application of genomic markers in clinical settings to adjust drug dosages and prevent drug-related toxicity. Additionally, it addresses the challenges in implementing pharmacogenomics and discusses the future directions for translational research in this field.

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DEVELOPMENT OF pH SENSITIVE LIPID POLYMER HYBRID NANOPARTICLES COLOADED WITH PACLITAXEL AND CURCUMIN FOR ENHANCED DELIVERY IN BREAST CANCER

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Abstract:

Breast cancer stands as the second leading cause of mortality among females worldwide. Curcumin, an intriguing phytochemical derived from the rhizomes of Curcuma longa, triggers apoptosis in malignant cells. Likewise, Paclitaxel, sourced from the bark of *Taxus brevifolia*, induces a mitotic block by stabilizing microtubules. There arises a critical necessity to engineer suitable nanocarriers for the concurrent delivery of these therapeutic agents. Lipid polymer hybrid nanoparticles (LPHNPs) emerge as highly efficient nanocarriers, amalgamating the advantageous characteristics of both lipid and polymeric nanoparticles. Within this investigation, we have meticulously crafted Chitosan-coated pH-sensitive LPHNPs loaded with both curcumin and paclitaxel to specifically target breast cancer cells. The LPHNPs were meticulously synthesized through the single-step nanoprecipitation method. Following this formulation, we examined various parameters, including size, polydispersity index (PDI), X-ray diffraction (XRD), transmission electron microscopy (TEM), in vitro drug release profiles, in vitro cytotoxicity against MCF7 cells, and pharmacokinetic attributes. Notably, the

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LPHNPs exhibited a size below 200nm, and TEM imagery unveiled their desired spherical morphology, confirming the successful hybrid structure. In vitro drug release studies unveiled a pH-sensitive and controlled drug release pattern from our formulations. Furthermore, the cell viability assay demonstrated an impressive 39.27% cell survival rate at a concentration of 0.5 mg/ml, a significant improvement compared to the free curcumin and paclitaxel mixture. Pharmacokinetic evaluations underscored the enhanced bioavailability and controlled release of both curcumin and paclitaxel when encapsulated in these specialized nanocarriers. In conclusion, meticulously prepared pH-sensitive LPHNPs exhibit a remarkable ability to release drugs efficiently within the acidic tumor microenvironment, in a controlled manner, over an extended period of time, ultimately leading to the desired antitumor efficacy.

Keywords: Lipid polymer hybrid nanoparticles, Breast cancer, Curcumin, Paclitaxel

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DESIGN AND MICROWAVE-ASSISTED SYNTHESIS OF SOME NEW 1,3,5-TRIAZINE DERIVATIVES FOR ANTIMICROBIAL ACTIVITY

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Abstract:

A series of trisubstituted 1,3,5-triazine analogs were designed, molecular docked and synthesized, as s-triazine is being widely studied for its application in numerous fields. Most of the derivatives were previously found to be potent antimicrobial, anticancer, antimalarial, antifungal, and herbicidal. Therefore, searching for new lead molecules and chemical moiety for the further development of effective antimicrobial agents is an essential approach in medicinal chemistry. This study is directed toward substituting temperature-dependent reactions of amines, replacing chlorine atoms in 2,4,6 positions of 2,4,6-trichloro1,3,5-triazine ring(cyanuric chloride), and thereby docked for their antimicrobial activity. From the designed library, docking study resulted with binding energies between (-53 to -194) kcal mol−1 and (-74 to -138) kcal mol−1 with two different protein complexes. Further *in-vitro* antimicrobial study was carried out with several microbes. Compound vig. 3a-2, 3a-3, 3d-4 had shown highest activity against *E.coli* and 3a-4 had shown better activity as that of others against *S.aureus*.

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Keywords: 1,3,5-triazine, trisubstituted, molecular docking, in-vitro, lead molecule

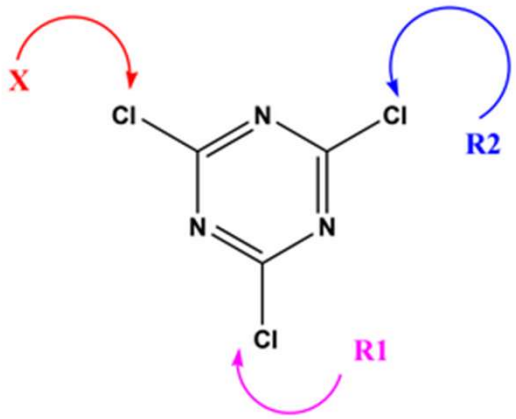

Figure: Design Consideration of lead molecule

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DEVELOPMENT AND EVALUATION OF PLGA-PEG-LHRH NANOCONJUGATES FOR THE SITE-SPECIFIC DELIVERY OF CURCUMIN TO LUNG CANCER CELLS

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Abstract:

The major problems associated with cancer treatment are drug resistance and its extreme systemic toxicity. To combat these problems, the main goals of the current work is to develop a possible p-gp inhibitor for downregulating the efflux pump responsible drug resistance, and developing a new drug delivery system using LHRH ligand for active targeting to cancer cells.

PLGA-PEG-COOH and LHRH-NH2 were used to create the PLGA-PEG-LHRH conjugate, which was further evaluated for effective conjugation using FTIR, 1H NMR, XRD, and the BCA Protein Assay. Thereafter, the double emulsion solvent evaporation (w1/o/w2) technique was used to create the bcl2 siRNA and curcumin (CUR) loaded PLGA nanoemulsions and characterised by particle size and size distribution, Zeta potential, TEM, drug release studies etc. The *in vitro* cell cytotoxicity and cell uptake study were conducted using A549 human lung cancer cell lines. qRT-PCR technique was used to quantify the downregulation of the MDR1 gene and bcl2 RNA expression on A549 lung cancer cells.

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The prepared NCs showed a homogenous size distribution (176-187 nm) and negative zeta potential (−17.0 to −17.4 mV). The *in vitro* drug release studies showed the sustained release pattern upto 80% in 24-hour, TEM study revealed the homogeneity and surface conjugation of the ligand. The *in vitro* Cytotoxicity and cell uptake study showed higher cell inhibition and considerable uptake respectively in A549 cells for PLGA-PEG–LHRH nanoconjugate as compared to the non-targeted PLGA NPs and CUR suspension. The qRT-PCR data revealed that the mdr1 and bcl2 RNA genes were significantly downregulated.

From the findings, it can be concluded that, curcumin and bcl2siRNA-loaded PLGA-PEG-LHRH nanoconjugate system may be develop for safe and site-specific delivery mechanism with lower resistance.

Keywords:

Nanoconjugate, Active targeting, LHRH, Curcumin, Anticancer, Lung cancer.

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GREEN-SYNTHESIZED SILVER NANOPARTICLES AND THEIR ANTIOXIDANT, ANTIDIABETIC AND ANTI-MICROBIAL BIO-EVALUATION

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Abstract:

Nanotechnology has emerged as a rapidly expanding and essential area of science and technology due to its swift developments and continuous introduction to new avenues of modern life. The use of nanotechnology in therapeutics has improved several aspects of medicine and applied biomedical sciences including drug delivery, tissue engineering, biomaterials, biomedical devices, gene therapy, intelligent processes, and many others. Nanoparticles (NPs) are favourable platforms for the target-specific and controlled delivery of micro- and macromolecules in disease therapy due to their stable interactions with ligands, variability in size and shape, high carrier capacity, and ease of binding of both hydrophilic and hydrophobic substances. The unique physiochemical characteristics of NPs raise the curiosity of researchers to develop novel synthesis methods and explore their applicability. The biological route of NPs synthesis is the recent trend in nanomaterial research that is considered safe, efficient and eco-friendly. Green synthesis of NPs is more beneficial than conventional chemical synthesis due to its cost-effectiveness and use of non-toxic chemicals. We have synthesized silver NPs from silver nitrate solution using aqueous leaf extract of *Sarcochlamys pulcherrima*. The plant extract functioned both as a reducing and capping agent during the synthesis process.

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The synthesized silver NPs were characterized by ultraviolet-visible spectrophotometry, X-ray diffraction and transmission electron microscopic analysis. We have also carried out antioxidant, antidiabetic and anti-microbial bio-evaluation of the synthesized silver NPs. The DPPH free radical scavenging assay revealed the potential antioxidant activities of the NPs. The synthesized silver NPs showed efficient anti-microbial activities against pathogenic Gram-positive *Bacillus subtilis* and Gram-negative *Pseudomonas aeruginosa*. The determination of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values of the as-synthesized NPs demonstrated their bactericidal activities against both pathogens. Therefore, this green approach of synthesizing silver nanoparticles could be an effective option for alternative chemical methods and can be explored for various biomedical applications.

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ESTABLISHMENT OF HT29, HUMAN ADENOCARCINOMA COLORECTAL CELL LINE AS A PLATFORM FOR PERFORMING CYTOKINESIS BLOCK MICRONUCLEUS ASSAY (CBMN) FOR GENOTOXICITY EVALUATION OF THEAFLAVIN

Diksheeta Sharma[1]*, Porikhit Borpujari[1] , Podma Pollov Sarma[2], Sangeeta Borchetia[1], Devojit Kr. Sarma[3], Ravindra M. Samarth[4], Pritom Chowdhury[1]

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Abstract:

In recent times natural products have gained importance in the food and drug industry. However, evaluating their genotoxic potential is a necessity to conduct adequate risk assessment. Cytokinesis block micronuclei assay (CBMN) is a WHO-recommended method for genotoxicity assessment. Although CBMN is established in Peripheral blood mononuclear cells (PBMC), very limited information is available about the assay performed in continuous cell lines. This study attempts to establish CBMN assay in the HT-29 cell line using theaflavin di-gallate (TF3), which is one of the black tea polyphenols, as a test compound. Cytotoxicity assay was performed with various concentrations of TF3 for time intervals of 24, 48, and 72 hours. The non-cytotoxic dose of TF3 (75 µg/ml) was considered for CBMN assay along with a cytotoxic dose of 200µg/ml. Cells were seeded in a 12-well plate at a density of 2.5x105 cells/ml. After 24 hours of

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seeding, cells were treated with test compound and colchicine as a positive control. slides were prepared after adding cytochalasin B. Scoring of slides was done under a fluorescence microscope using a score sheet followed by statistical analysis of genotoxic markers found in control and samples. For confirmation of the results at the molecular level, a real-time PCR was performed using a self-designed primer of the histone family protein H2AX gene which is an established biomarker of Double-stranded DNA damage. The study documented that 75 µg/mL of TF3 has been found to be non-genotoxic in both CBMN and Real-time PCR analysis. Investigating the non-genotoxic dose of TF3, the study established HT-29 cell line as a platform for performing CBMN for Genotoxicity evaluation. This is an important development in accordance with the Organization for Economic Co-operation and Development (OECD) TG487 for the establishment of an in-vitro test platform for genotoxicity evaluation.

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DESIGN, SYNTHESIS, AND ANTIMALARIAL EVALUATION OF PYRAZOLE 1,3,5-TRIAZINE DERIVATIVES

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Abstract:

Malaria is still a serious public health concern around the world, particularly in Sub-Saharan Africa, Asia, and Latin America 1 . Because of the fast proliferation of chloroquine-resistant *Plasmodium falciparum* genotypes, the number of possible chemotherapeutic therapies has been dramatically decreased. A new family of hybrid 1,3,5-triazine conjugated pyrazole derivatives was produced to accomplish this. By coupling 4-hydroxyacetophenone with 3,4-dimethoxybenzaldehyde, the chalcone intermediate was synthesized by coupling a trisubstituted 1,3,5-triazine moiety with a chalcone pharmacophore. All synthesized compounds were analysed using FT-IR, Mass, 1 H-NMR, and 13 C-NMR spectroscopy, as well as in vitro antimalarial activity against the chloroquine-sensitive (3D7) strain of *P. falciparum* using the Giemsa stain method. Only the ethyl substituted derivatives outperformed the standard medication chloroquine in terms of activity among the produced compounds.

Keywords:
Pyrazole, 1,3,5-triazine, Synthesis, Antimalarial

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ANTIOXIDANT EFFICACY OF GREEN TEA EXTRACT AGAINST MENADIONE INDUCED OXIDATIVE STRESS IN HUMAN COLON HT29 CELL LINE

Porikhit Borpujari [1,2]*, Diksheeta Sharma[1], Roger Baylis-Duffield[3], Podma Pollov Sarma[4], Sangeeta Borchetia [1], Pritom Chowdhury [1]

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Abstract:

Oxidative stress is the process of accumulating reactive oxygen species (ROS) through the generation of free radicals under various stress conditions and the incapacity of the intracellular antioxidant system to eliminate it. This imbalance leads to chronic health conditions like cancer, cardiovascular, neurodegenerative, etc. Certain bioactive compound possesses antioxidant property that prevents oxidative stress. Tea possesses such bioactive compounds in the form of tea polyphenols. Green tea polyphenol EGCG is known for its free radical scavenging activity, but its stability is an issue. The present study was undertaken to evaluate the antioxidative potential of CSA prophylactic, a food supplement, and a drug candidate recovered from the extract of *Camellia sinensis* leaves containing a complex of phytonutrients including all eight catechins produced in nanosphere particles and protected in amorphous crystal shards for better stability. Cytotoxicity of CSA prophylactic was evaluated at various concentrations for 24,

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48 and 72 hours time interval. The non-cytotoxic doses (upto100 µg/ml) were further used for evaluation of MTT based protection assay against 100 µM menadione induced oxidative stress in two conditions: pre-stress and post-stress treatment. Furthermore, the best protective concentration was evaluated for MDA lipid peroxidation analysis which is an established biomarker for evaluation of oxidative stress. The MTT based protection assay for CSA prophylactic with non-cytotoxic concentrations revealed the viability of pre-menadione treated cells was 68.7% at 100 µg/ml with 8.9% viability in positive control and the viability of post-menadione treated cells was found to be 54.4% at 75 µg/ml with 9.5% viability in positive control. This study documented the most effective dose of the test compound as an antioxidant for both therapeutic and prophylactic administration with identical results for standard EGCG but with better stability at room temperature.

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IN-SILICO SCREENING OF TERPENOIDS AS NRF2 ACTIVATORS: UNEARTHING NOVEL CANDIDATES FOR HEPATOPROTECTIVE INTERVENTIONS

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Abstract:

To activate the transcriptional machinery of Nrf2 and trigger its cellular antioxidant, cytoprotective, and detoxifying capabilities, Keap1 inhibitors can disrupt the covalent bond between Keap1 and Nrf2. Subsequently, the activation of the Nrf2 pathway shields cells against oxidative stress-induced diseases and plays a critical role in hepatoprotection against liver-related pathologies and injuries. Using Keap1 as the apoprotein control, we performed in-silico screening by using pharmacokinetic ADMET profiling, bioactivity assessment, physicochemical studies, and molecular docking studies to investigate the Keap1-inhibiting potential of sixty (60) terpenoids isolated from plants. Molecular docking simulation showed that Rosmarinic acid and Lupenone exhibits strong binding affinities than the co-crystal ligand (K67) at the catalytic site of Keap1 (PDB Id: 4ZY3) with -9.5 kcal/mol, -9.8 kcal/mol, and -9.5 kcal/mol, respectively. Interestingly, Rosmarinic acid shows the highest stability based on molecular interactions asit reveals 9 hydrogen bondings with key amino acids(6 conventional hydrogen bonds and 3 carbon hydrogen bond). Moreover, the two top hits stand out in comparison to the reference co-crystal ligand as they satisfy the Lipinski rule of 5 (RO5) for both ADMET studies and physicochemical qualities making suitable Nrf2 activator candidates. According to our overall in-silico findings,

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Rosmarinic acid have the potential to be pharmaceutical candidate as Nrf2 activator with specific therapeutic uses against hepatotoxicity caused by various pathogenesis and liver injuries suggesting that it might be the most promising option in terms of therapeutic efficacy.

***Keywords*:**

Terpenoids; Virtual screening; Molecular docking; Keap1 inhibiton; NRF2 Pathway; Hepatoprotective activity.

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PRELIMINARY STUDIES TOWARDS THE VALIDATION OF TRADITIONAL USAGE OF *Zanthoxylum nitidum* LEAVES

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Abstract:

North-East India uses the massive, prickly shrub *Zanthoxylum nitidum* (Roxb.) DC (Rutaceae), which is also called Tez-mui in Assamese, for a number of medical conditions, such as fever, rheumatism, toothaches, kidney stones, bleeding gums, pneumonia, and so forth. Traditional medicines also make use of the plant's roots, stems, and bark. The goal of this study is to assess *Zanthoxylum nitidum* leaf extract's phytochemical characteristics and numerous pharmacognostical criteria using a variety of assessment methods. Physico-chemical evaluations (loss on drying, ash values, extractive values), microscopic analyses (fresh leaf microscopy, powder microscopy, and quantitative microscopy), and macroscopic characteristics (organoleptic characters and fluorescence study) were combined in this study to identify the pharmacognostical parameters. Additionally, the powdered crude medication underwent a phytochemical screening, the results of which were reported and indicated the presence or absence of numerous phytochemicals, including sterols, alkaloids, carbohydrates, flavonoids, tannins, and phenolic compounds. Referential data from these investigations helped ensure accurate leaf identification and standardization for *Zanthoxylum nitidum.*

Keywords:
Zanthoxylum nitidum, Traditional uses, Tez-mui, North-East India.

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NANOPARTICLES FOR EFFICIENT DELIVERY OF PROTEINS- A GREEN TECHNOLOGY APPROACH

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Abstract:

Protein therapeutics is one of the advance treatment options evolved in recent time to combat most of the chronic diseases. However challenges associated with protein as a drug candidate make them vulnerable to be used as a drug candidate. With the use of modern tools of drug delivery technology it could be possible to make a protein formulation stable. Here we are reporting for the first time a method of protein formulation development using a self emulsifying drug delivery system (SEDDS). The method utilizes the emulsification process coupled with self assembly of molecules at the biphasic interface (Rawat et al, Mol Pharm 2012). The small molecular protein weight proteins could be easily encapsulated with high encapsulation efficiency. The method minimally affects the stability & activity of protein. However, the method could be preferred and selected for further replication of studies. Varying encapsulation efficiency and activity of a protein could be achieved with optimization studies. The study involves the methodology of mixing and high speed homogenization of mixture of aqueous phase containing dissolved protein with oil phase. This isotropic mixture of oil phase, aqueous phase, a surfactant and protein drug could lead to formation of self assembled nanoparticles through emulsification process. Further optimization of used surfactant, time and speed would give rise to a best possible result of encapsulation and stability of protein. The approach has components derived from

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natural resources hence compatibility and stability of protein is a direct result of its surroundings. Therefore, this method is a robust combination of mild process conditions and used ingredients which emphasizes a green technological approach for protein stability and drug delivery.

Keywords:

Self emulsifying drug delivery system (SEDDS), protein stability, encapsulation efficiency, emulsification, nanoparticles & green technology.

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SUPERPIXEL BASED AUGMENTATION OF CLINICALLY CAPTURED SKIN DISEASE IMAGES OF INDIAN POPULATION

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Abstract:

The biggest challenge of developing any Machine Learning (ML) model is data. Data size and diversity are the key elements for success of any supervised deep learning model. As the number of learnable parameters increase, the requirement of data increases. Medical image based ML models also require data, but due to scarcity of real life data, most researches are conducted based on publicly available dataset. Training on publicly available dataset, also fails to function in condition like skin diseases. To overcome this problem of data shortage, data augmentation techniques are applied to generate augmented data. But applying classical augmentation techniques like scaling and rotation may alter the anatomical structure and features which are clinically irrelevant. Superpixels have been used for solving image segmentation problems. Superpixels are group contiguous pixels in an image that have similar properties like colour texture or other low level image properties. Superpixel based augmented image will preserve the clinical relevance and anatomical integrity of the skin disease images. In this paper we propose a superpixel based augmentation of skin images collected from

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clinics with the help of a camera. Choosing the amount of superpixel was based on trial and error and 150 super pixel per image was chosen for an image size of 500 x 500 pixels. Our experiments showed a SSIM (Structural Similarity Index) value of around 0.5 to 0.7 between the original image and the augmented image in a scale of -1 to 1 . This showed that the images are somewhat similar but different.

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IMPLICATIONS OF THE USE OF BIOSIMILARS IN INFLAMMATORY BOWEL DISEASES

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Abstract:

Inflammatory bowel diseases (IBD) refers to chronic inflammation of the intestine due to the genetically determined abnormal immune responses to the gut microflora. There are two major forms of the disease – Ulcerative colitis and Crohn's disease, based on the extent of inflammation in the various parts of the small and large intestine. There has been an upward trend in the rise of incidence of Inflammatory bowel diseases globally thus redirecting the focus of the healthcare system to find better pharmacological interventions. A biosimilar is a biologic medical product that is almost an identical copy of an original product that is manufactured by a different company. These medications are being increasingly approved by global regulatory authorities in the hopes of bringing in cost effective treatment strategies. Infliximab was the first biological treatment option introduced for IBD followed by others like Adalimumab, certolizumab etc. Interest in biosimilars have risen in the recent years due to the high cost of reference biological drugs and the imminent patent expiry. The lower cost leads to significant cost savings for the community as well as enables the early access to the life saving drugs. But however, there are a few drawbacks with the use of biosimilars. Although approved for use based on their similarity to the reference product, the lack of their hands on knowledge with the use of these drugs has

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resulted in hesitancy on the part of prescribing by physicians. There might be minor dissimilarities in the molecules resulting in altered efficacy as well as toxicity. This has resulted in the dampening of the full blown application of the biosimilars in the current scenario. Hence, more time and data will be need to document as well as maintain their credibility.

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USING COMPUTATIONAL CHEMISTRY AND ARTIFICIAL INTELLIGENCE FOR PRODUCT DEVELOPMENT AGAINST APPETITE SUPPRESSION: IN SILICO AND IN VITRO STUDIES

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Abstract:

Appetite suppression is a complex process involving large assemblage of neurotransmitters that functions together to regulate appetite. Ghrelin, an endogenous ligand for Growth hormone secratagogue receptor (GHS-R1a) is the primary hormone responsible for hunger signaling. Inhibiting ghrelin signal through GHS-R1a receptor is the primary objective of this study. Out of 43 suggested targets, 5 non-redundant targets were selected from reverse docking strategy using Schrodinger version 11.8, 2019. Fluoxetine, a selective serotonin reuptake inhibitor (SSRI) which is mainly used for depression, is expected to elicit anorectic effect by increasing the availability of 5-HT in the CNS. However, no such studies concerning the antagonistic activity of fluoxetine against GHS-R1a have been conducted so far. Docking studies revealed that fluoxetine with ghrelin receptor (PDB ID: 7F83) was the most effective drug target owing to its highest binding affinity (-8.509). To determine the stability of the predicted drug-target complex, molecular dynamics simulation have been performed where the protein did not underwent any large conformational changes after two independent

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simulations. The drug showed good ADMET properties as well. Furthermore, tablets containing fluoxetine HCl have been developed for sustained release paradigm by response surface methodology (RSM) based on central composite design (CCD) using Design-expert 13.0.15 software. The effects of the amount of drug, polymer and diluent on release and tablet hardness were analyzed and optimized. The formulated tablets were characterized and evaluated for incompatibilities, if any, with excipients using FT-IR and DSC-TGA analysis. The *in vitro* drug release studies confirmed the prolonged release of drug up to 8hrs, and the hardness values were found to be within 3.5-6kg/cm 2 . Out of all the 13 formulations, F6 was found to be the best one that followed the Korsmeyer-Peppas model with non fickian diffusion mechanism. Thus, Fluoxetine may serve as a potential candidate for appetite suppression with good future prospects.

Keywords:

Appetite, Ghrelin, Fluoxetine, Molecular Docking, Sustained-release, Central-composite design.

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ARTIFICIAL INTELLIGENCE: A BREAKTHROUGH IN PHARMACEUTICAL SCIENCES

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Abstract:

Artificial Intelligence (AI) refers to simulation of human intelligence in machines or computer systems. It involves the development of algorithms and models that enables computers to perform tasks that typically requires human intelligence. Pharmaceutical science has been playing the role of a pioneer in the fields of diagnosing, predicting, imaging, treatment, and cure. Thus in the era of advancements in medical sciences, introducing AI in pharmaceutical science has made an incredible change. Machine Learning (ML) and Deep Learning (DL) as advanced AI techniques are the main two branches applied in the healthcare system to diagnose diseases, discover medication, and identify patient risk factors. Recently AI has been employed in different medical domains including Dermatology, Radiology, Oncology, Ophthalmology, Cardiology and many more. Evidence of success across such a range of medical domains and applications shows that given enough training data and computing power deep learning systems can be designed that match or exceed human capabilities at narrowly specified medical tasks. Application of AI in retina scanning has helped discriminating different features and further based on the sensitivity & accuracy of features the healthy/pathological states can be identified. AI can predict the diseases based on the genetic makeup, biomarker molecules and imaging of pictures.

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It has become easier for one individual to modify lifestyle and medications to prevent the occurrence of diseases, predicted by AI. Meanwhile AI has shown promising responses in the field of pharmaceutical sciences, a mechanism should be there to monitor its performance. The need to control and monitor AI performance in order to detect any kind of malfunctioning or error. Pharmaceutical products are related to human health and thus its safety is of prime importance and the quality can never be compromised at any cost.

Keywords:

Machine learning (ML); Deep Learning (DL), Patient risk factors; Retina scanning.

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NANOCARRIERS FOR ESSENTIAL OIL DELIVERY: A CONTEMPORARY OVERVIEW

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Abstract:

The medicinal capabilities and pleasing scents of essential oils have drawn a lot of attention to their usage in a variety of applications, such as aromatherapy, cosmetics, and medicines. Essential oils are inherently volatile, unstable, and poorly soluble, which makes it difficult to transport and release them under control. Essential oil fragrances may have a variety of effects on mood and overall well-being when inhaled. Aromatherapy uses popular essential oils for energy and concentration, relaxation, and respiratory support. By using nanocarriers to encapsulate and transport essential oils in a regulated manner, nanotechnology presents a potential possibility. Nanocarriers distribute essential oils to tissues or cells on a targeted basis. This is especially crucial for therapeutic and medicinal uses, since essential oils may be applied directly to the site of action, minimizing adverse effects, and enhancing treatment effectiveness overall. Compounds included in essential oils may be more bioavailable when delivered via nanocarriers, and essential oils are more readily absorbed when they are encapsulated in nanoparticles as well as nanoemulsions, which might result in more noticeable therapeutic benefits in pharmaceutical along nutraceutical applications. This current presentation explores the developments in the field of nanocarriers for the delivery of essential oils, including a range of nanoscale systems including liposomes, nanoparticles, microemulsions, and solid lipid

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nanoparticles. We cover the manufacturing and encapsulation processes of nanocarriers as well as the impact of several parameters on the release kinetics and efficiency of essential oil encapsulation. In addition, we discuss the many benefits of using nanocarriers to distribute essential oils, such as increased stability, extended-release, and tailored distribution, which improves therapeutic results. The presentation also emphasizes how nanocarriers might be used in the domains of health systems. Prospects for essential oil delivery systems based on nanocarriers are also discussed, along with safety considerations.

Keywords:

Targeted delivery, nanoemulsion, nutraceutical application, aromatherapy, Stability.

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EXOSOMES AS NATURAL NANOCARRIERS FOR THERAPEUTIC MOLECULES IN DIABETIC NEUROPATHY: PROGRESS AND POTENTIAL

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Abstract:

Diabetes mellitus frequently results in diabetic neuropathy, a crippling condition marked by damage to the nerves that causes pain, loss of function, and sensory abnormalities. Because of the poor results of traditional therapy options for diabetic neuropathy, other treatments must be investigated. Diabetic neuropathy is a common complication of diabetes. It refers to nerve damage caused by prolonged high blood sugar levels. Exosomes, which are extracellular vesicles of nanoscale that are released by different types of cells, have been known as naturally occurring nanocarriers that possess great promise for the targeted delivery of therapeutic compounds to alleviate the pathophysiological processes that underlie diabetic neuropathy. These are small vesicles naturally produced by various cell types, including stem cells. They play a crucial role in cell-to-cell communication and are known for their ability to transport various bioactive molecules, including proteins, lipids, and nucleic acids. An overview of the development and promise of exosomes in the treatment of diabetic neuropathy is given in this presentation. It clarifies the mechanisms by which exosomes encapsulate different bioactive chemicals, including as growth factors, anti-inflammatory drugs, and microRNAs, as well as their biosynthesis, composition, and cargo-loading tactics. Exosomes have special characteristics that enable them to target injured nerve tissues and effectively overcome biological barriers like the

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blood-nerve barrier. We also discuss the latest preclinical and clinical research demonstrating the efficacy of exosome-based treatments in reducing neuropathic pain, promoting nerve regeneration, and controlling the inflammatory response in diabetic neuropathy. Exosomes have the potential to be a desirable substitute for conventional drug delivery methods because of their natural origin, lower immunogenicity, and better biocompatibility. In the context of using exosomes as natural nanocarriers, these vesicles can be utilized to transport therapeutic molecules. This approach has gained interest in the field of regenerative medicine and drug delivery because exosomes have several advantages, including biocompatibility and the ability to cross biological barriers.

Keywords:

Diabetes mellitus, Targeted delivery, Neuropathic pain, Lower immunogenicity, Biocompatibility.

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Pentanisia Prunelloides AND *Elephantorrhiza Elephantina*: PHYTOCHEMICALS AND POTENTIAL THERAPEUTICS

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Abstract:

Tuberculosis (TB) continues to be a global health concern, prompting the search for new sources of possible treatment. *Pentanisia prunelloides* and *Elephantorrhiza elephantina*, are plants native to southern Africa found in Lesotho, South Africa, Botswana, Mozambique and Zimbabwe. These plants have gained prominence for their varied therapeutic characteristics, including their traditional usage in treating a variety of diseases such as dermatological diseases, diarrhea, syphilis, wounds and tuberculosis. The purpose of this work is to identify possible TB treatment candidates by assessing the phytochemical composition of *E. elephantina* and *P. prunelloides* using ADMETSAR methodology. The two plants' ethnopharmacological significance and rich history of traditional usage as the herbal remedy have prompted a comprehensive investigation. Multiple classes of phytochemicals, such as anthocyanidins, anthraquinones, esters, fatty acids, phenolic compounds, flavonoids, glycosides, polysterols, saponins, sugars, tannins, and triterpenoids, have been isolated from their rhizome extracts. These compounds have a variety of pharmacological activities including; antioxidant activity, anti-inflammatory activity, antimicrobial activity, anti-tubercular activity, antiplasmodial activity, analgesic activity, antidiarrheal activity. Flavonoids, such as kaempferol and quercetin, are known for their antioxidant and anti-inflammatory properties, which can help protect against cell damage and chronic

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diseases. Tannins, such as proanthocyanidins and catechins, have been shown to have antimicrobial and antiviral properties, making them potentially useful in treating infections. Saponins, such as diosgenin and tigogenin, possess immune-modulating and anti-inflammatory properties, which can be beneficial in managing autoimmune disorders and chronic inflammation. Anthraquinones, naphthoquinones, coumarins, and iridoids are all classes of compounds with diverse biological activities, including anticancer, antimicrobial, and anti-parasitic properties. Therefore, both plants can be used in treatment of tuberculosis as their extracts have the ability of inhibiting the growth of *Mycobacterium tuberculosis*, the bacteria that causes tuberculosis.

Keywords:

Tuberculosis, *E. elephantina, P. prunelloides,* phytochemicals, anti-tubercular activity

PHARMACOGNOSTICAL, PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY OF *Stephania japonica* (Thunb.) Miers

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Abstract:

Stephania japonica (Thunb.) Miers is a member of the Menispermaceae family and is also referred to as Rajapatha (Tape Vine in some areas and Tubuki-lata in Assam). It is occasionally found in the foothills of Western Himalayas and Northeastern states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, and Nagaland. It has been documented to be effective in treating a number of illnesses, including fever, diarrhoea, urinary diseases, hyperglycemia, asthma, tuberculosis and malaria. Over 150 alkaloids together with flavonoids, lignans, steroids, terpenoids, and coumarins have been identified in the genus Stephania, and many of these have been evaluated for biological activity. This plant has a high commercial value in every state, and it is being taken from its natural environment. Correct characterization and quality assurance of starting materials is an essential step to ensure reproducible quality of herbal medicine which will ensure safety and efficacy. Therefore, the aim of the present study is to investigate the pharmacognostical, physicochemical, phytochemical parameters of *S. japonica* extract. Further, the antioxidant activity of the plant extract has also been explored using hydrogen peroxide radical scavenging and DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging method. In macroscopic study, the leaves were found to be petiolate, 3-12 cm long, triangular-oblate lamina with acuminate apex

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and broadly rounded base. Leaf microscopy indicated the presence of stomata, fibres and other microscopic characters. Phytochemical screening revealed the presence of alkaloids, steroids, fats and saponins. The extract showed significant antioxidant activity in both the methods. The results of the study will help in the authentication and identification of the plant.

Keywords:

Stephania japonica, Phytochemicals, Antioxidant, Pharmacognostical.

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PHYTOCHEMICAL SCREENING AND PHARMACOLOGICAL EVALUATION OF *Colocasia esculenta* STOLON

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Abstract:

Colocasia esculenta Linn., commonly known as taro, is a green leafy tropical and sub-tropical root crop belonging to the family Araceae. Taro is valuable for its underground corms, with low protein (1.5%) and fat (0.2%) content but starch-rich (70-80g/100g of dried taro). It is a significant carbohydrate provider. It also contains vitamins and flavouring substances. The herb has been employed in the treatment of asthma, diarrhea, gastrointestinal problems, neurological conditions, diabetes and skin infections in humans since ancient times. The aim of this study is to analyze the phytochemical constitutions, antioxidant potential and anti-inflammatory properties of n-hexane, ethyl acetate, methanol and water extracts of *C. esculenta* stolon. Dried *C. esculenta* stolon powder was successfully extracted with low to high polarity solvents using the maceration method. DPPH and FRAP assay determined *in-vitro* antioxidant activity and *in-vitro* anti-inflammatory potential was assessed through albumin denaturation assay. Phytochemical investigation confirmed the presence of triterpenoid, alkaloid, carbohydrate, tannin, and flavonoid, glycoside compounds in *C. esculenta* stolon. It showed an effective result of total phenolic content (368.25 ± 2.18 mg of gallic acid equivalent per gram of the extract) and total flavonoid Content (224.64 ± 2.04 mg of quercetin equivalent per gram of dry weight) in methanolic and n-hexane extracts, respectively. *C. esculenta* stolon's methanolic and ethyl acetate extracts

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exhibited significant antioxidant and anti-inflammatory properties.

Keywords:

Colocasia esculenta Linn, Taro, Phytochemical, Antioxidants, Anti-Inflammatory.

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UNLOCKING THE ANTIMICROBIAL ROLE OF PHENOLIC COMPOUNDS: A COMPREHENSIVE NETWORK PHARMACOLOGY APPROACH

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Abstract:

Antimicrobial resistance (AMR) is a global health threat primarily driven by excessive and improper antibiotic use, leading to increasingly challenging-to-treat infections. Phenols, organic compounds wit hydroxyl groups attached to aromatic rings, exhibit diverse chemical and biological properties, including antioxidant, antimicrobial, anti-inflammatory, and anticancer effects. Their unique molecular structures and broad therapeutic potential make them promising candidates for drug development. This study aims to explore the antimicrobial potential of synthesized phenols using network pharmacology. Computational models assessed the absorption, distribution, metabolism, excretion, and toxicity (ADMET) properties of these compounds. The PharmMapper server identified protein targets related to microbial growth and virulence. A String interaction-based network was constructed and evaluated using Cytoscape. Topological analysis led to the selection of targets based on degree values, resulting in 36 targets *for Klebsiella pneumoniae* and 19 for *Staphylococcus aureus*. Ontology and pathway enrichment analysis, using the PANTHER database and KOBAS 3.0, revealed that the predominant hub genes in *Klebsiella pneumoniae* were linked to metabolic and cellular processes, while in *Staphylococcus aureus;* they were associated with biological and metabolic processes. Molecular docking was employed to identify the most potent targets and explore interactions with the compounds.

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Molecular dynamics simulations validated the findings. The results demonstrated varying levels of antimicrobial activity among the tested compounds, with some exhibiting strong inhibitory effects against Enolase, a vital protein for carbohydrate degradation via glycolysis in both *Klebsiella pneumoniae* and *Staphylococcus aureus*. This computational approach provides a comprehensive understanding of the compounds' biological activities, aiding in the selection of potential antimicrobial agents. Subsequent research can further explore their effectiveness in complex biological contexts, offering practical applications in infectious disease management.

Keywords:

Antimicrobial resistance, Phenols, Enolase.

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EMPLOYING A SUBTRACTION GENOMICS-ORIENTED METHOD FOR THE DISCOVERY AND CHARACTERIZATION OF NOVEL DRUG TARGETS WITHIN *Streptococcus pneumoniae*

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Abstract:

Gram-positive bacterium *Streptococcus pneumoniae*, commonly known as pneumococcus, is responsible for a range of illnesses, including meningitis, pneumonia, ear and sinus infections, and conjunctivitis. Over 300,000 annual child fatalities globally are attributed to this pathogen, primarily in less developed regions, as reported by the World Health Organization. In 2016, *S. pneumoniae* surpassed all other factors to become the leading cause of pneumonia-related deaths worldwide, with a significant impact in Africa and Asia. In our study, a computational subtractive genomics approach is utilized to identify potential drug targets. The pathogen's proteins are collected from the National Center for Biotechnology Information (NCBI), duplicates are eliminated using CD-HIT, and distinct proteins are identified through BLAST analysis. Subsequently, BLASTp analysis in collaboration with the Database of Essential Genes (DEG) is employed to pinpoint critical bacterial proteins. A comparative analysis is then carried out between these essential genes and those found in human gut bacteria, recognizing the pivotal role of gut microbiota in maintaining health. Emerging evidence underscores the influence of gut microbiota on immunity, metabolism, energy

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production, and susceptibility to diseases, which is impacted by factors like age, gender, BMI, environment, genetics, diet, and antibiotic usage. Furthermore, BLASTp is employed to identify dissimilar bacterial proteins using DEG for essential bacterial protein identification. The UniProt ID Mapper is utilized to link various biological identifiers to UniProt Knowledgebase (UniProtKB) entries, facilitating data integration.

The Drugbank Database is utilized for the validation of drug targets. Furthermore, the metabolic pathways of the identified proteins are examined through various in-silico methods, and gene ontology is ascertained through the Panther Database, uncovering targets that were not reported previously. This approach offers a route for the development of pathogen-specific therapeutics, with a focus on reducing harm to humans and the potential for transforming the treatment of bacterial infections.

Keywords:

Subtraction Genomics, CD-HIT, Metabolic pathway.

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EMERGING TRENDS IN PLANT-BASED MEDICINE: *Zanthoxylum acanthopodium* FRUIT ESSENTIAL OIL FOR ADVANCED MEDICAL APPLICATIONS

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Abstract:

The convergence of plant-based medicine and nanotechnology has opened up a new frontier of inventive medicinal solutions. One such botanical resource is *Zanthoxylum acanthopodium*, commonly known as Lemon pepper, whose essential oil, derived from the berries, has an abundant chemical composition, including bioactive compounds with potential therapeutic benefits. However, the challenge lies in optimizing the delivery of plant-based remedies like *Zanthoxylum Acanthopodium* essential oil to achieve maximum therapeutic efficacy. This is where nanotechnology comes into play. Nanoformulations, when expertly designed, provide an advanced platform for the encapsulation and controlled release of bioactive compounds from plant extracts. These nanocarriers enhance the solubility, stability, and bioavailability of the essential oil, ensuring precise and targeted delivery to the intended site of action.

Keywords:

Essential oil, nanoformulation.

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MOLECULAR DOCKING, DRUG-LIKELINESS STUDIES AND ADMET PREDICTION OF HYDROXY XANTHONE DERIVATIVES TOWARDS DIFFERENT TARGETS OF TYPE 2DM

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Abstract:

Objective: The objective of the study was to determine the antidiabetic potential of the designed hydroxy xanthone derivatives towards different targets of Type-2 Diabetes Mellitus (T2DM).

Material and methods: Using *in-silico* drug design tools, a series of hydroxy xanthone derivatives were designed and evaluated for hypoglycaemic activity. The molecular docking was performed with different target enzymes. Further, drug-likeness and ADMET prediction studies were also conducted using in-silico tools. The hydroxy xanthone derivatives were screened using Discovery studio software, PyRx tool, Swiss ADME web tool, and Protox-II web tool.

Results: The activities of the different synthesized compounds were analyzed for their potency against different targets of diabetes.

Conclusion: Based on the ADMET profile, binding energy, and drug-likeness evaluations, we conclude that A1, A2 ligands have a safety profile towards toxicity and hence can act as a prominent lead molecule towards the treatment of type 2 DM.

Keywords:

Diabetes mellitus, xanthone, α-Glucosidase.

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EGG SHELL ORCHESTRATED CELLULOSE-CHITOSAN AEROGEL LOADED WITH CLOVE OIL FOR PERIODONTAL APPLICATIONS

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Abstract:

Chitosan based mucoadhesive aerogel being an efficient drug delivery system offers sustained release, while the incorporation of clove oil provides inherent antibacterial, anti-inflammatory, and analgesic properties, making it potential carrier for addressing periodontal diseases and post-dental surgery consequences. This aerogel was fabricated by casting chitosan-cellulose composite (2:1) with egg shell powder (0.1% w/v, 0.5% w/v and 1% w/v) incorporated with clove oil. The preparation of aerogel was attempted by simple lyophilization method. Several preclinical and clinical studies where as suggested that egg-shell powder, an inedible kitchen waste having about 98% calcium can be efficiency used as remineralizing agent to restore the damaged enamel surface as well as an effective pulp capping material. The structural integrity and ideal drug-polymer interaction of the formulation were guaranteed by physicochemical evaluation, where loading of clove oil was found to be 78.25±2.31%. Low swelling index (14.19 ±3.24%) of the 1% w/v egg shell loaded aerogel indicated irregularities in three-dimensional porous network leading to less absorption of water and further increasing concentration of egg-shell powder did not show any significant effect on moisture content of the freshly dried samples. Surface pH of the polymer composites were

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calculated to be 6.71±0.2 indicating recovery of acidic pH in periodontal inflammatory diseases to near neutral salivary pH . Evaluation of in-vitro release of clove oil from the aerogel showed persistent release over time, providing prolonged therapeutic efficacy. Demonstration of efficient crosslinking of cellulose-chitosan as observed from FTIR and aerogel porous morphology was evident from SEM study. The ex-vivo mucoadhesion time on porcine dermal tissue of about 1.30 hrs and high compressive mechanical strength enables the aerogel as a promising candidate for periodontal treatment with improved mechanobiological properties.

Keywords:

Eggshell, Clove oil, Chitosan, Periodontal, Aerogel, Lyophilization.

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WATER SPINACH (*Ipomoea aquatica*): A HERBAL SUPPLEMENT FOR ANAEMIA

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Abstract:

Anaemia is a frequent nutritional deficiency illness that has serious implications for human health as well as the social and economic development of both developing and industrialised nations. It is a global public health concern (WHO 2005). A third of the world's population, more than 2 billion people are anaemic as a result of an imbalance in their intake of nutrient-dense foods, according to WHO reports from 2004.

Anaemia can result from a number of red cell defects, including those related to production (aplastic anaemia), maturation (megaloblastic anaemia), defects in the synthesis of haemoglobin (iron deficiency anaemia), genetic defects in the maturation of haemoglobin (thalassaemia), abnormal haemoglobin synthesis (haemoglobinopathies, sickle cell anaemia, and thalassaemia), and physical loss of red blood cells (haemolytic anaemias). Our society is widely aware of water spinach as a green vegetable with a high vitamin and mineral content that is inexpensive, easy to procure, and reasonably simple to cultivate. This trait is in favour of the development as a possible commodity horticulture crop. Leafy green

vegetables are the primary source of vitamins. Provit A, also known as pro-beta-carotene, is the precursor form of vitamin A found in vegetables. Water spinach is one among the leafy green foods that contain provit A. Iron, which is crucial for

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human health, is among the nutrients found in water spinach, along with protein, calcium, phosphorus, vitamin B1, and vitamin C. Limpness, vertigo, and blurred vision are the earliest symptoms of anaemia caused by iron deficiency. Iron is essential for the body's ability to create red blood cells. So, water spinach which is high in it and works wonders for overcoming blood loss or anaemia. Furthermore, there is a requirement to formulate herbal supplements for anaemia.

Keywords:

Anaemia, Water spinach, Red blood cells, Nutrients, Herbal supplements.

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DEVELOPMENT AND EVALUATION OF AN HERBAL FORMULATION WITH POTENTIAL ANTIMICROBIAL AND ANTI-INFLAMMATORY PROPERTIES

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Abstract:

The presents study depicts the successful development and evaluation of a liquorice toothpaste formulation aimed at providing an alternative and potentially beneficial oral care product with potential antimicrobial and anti-inflammatory properties. Liquorice, derived from the root of Glycyrrhiza glabra plant, has been used as traditional medicine for its antimicrobial and anti-inflammatory properties. Briefly, the extraction of liquorice root using a suitable solvent and subsequent concentration provide a standardized liquorice extract. This extract was then incorporated into a toothpaste base along with other essential ingredients such as abrasives, humectants, and flavouring agents. The formulated toothpaste underwent rigorous testing and evaluation to determine its physical properties, such as pH, viscosity, and stability. The results exhibited that the liquorice extract exhibited significant antimicrobial effects, inhibiting the growth of various bacteria known to contribute to dental caries and periodontal diseases. In addition to its antimicrobial properties, the formulated liquorice toothpaste was evaluated for its potential anti-inflammatory effects on oral hygiene using oral epithelial cells and inflammatory markers. The results demonstrated a reduction in the production of inflammatory mediators, suggesting a potential benefit in managing

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oral inflammation. Further studies and commercialization efforts are recommended to explore the broader implications and market viability of liquorice toothpaste. The incorporation of liquorice extract into the toothpaste resulted in favourable oral health outcomes, suggesting its potential as a novel oral care product.

Keywords:

Liquorice. Antimicrobial toothpaste, Glycyrrhiza glabra, Oral hygiene, Anti-inflammatory.

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NANOPARTICLES IN TOPICAL ACNE MANAGEMENTS: ENHANCING EFFICACY OF DRUGS

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Abstract:

Acne can be attributed to several factors, such as the presence of *Propionibacterium acnes,* hormonal imbalances, inflammatory mediators, genetic predisposition, and additional contributing factors. The management of mild to severe acne often entails the utilization of topical anti-acne medicines. The topical route of drug administration is considered the optimal approach for delivering medication to the skin tissues, particularly for the purpose of treating localized skin disorders. Various approaches have been explored in order to enhance the transdermal absorption of pharmaceutical substances. These include electroporation, iontophoresis, ultrasound, and the utilization of microneedles to create openings in the skin. The utilization of transdermal nanocarriers is a quite new advancement. A comprehensive understanding of the specific medication, the structure of the skin, and the method of drug administration will be crucial in the development of a drug delivery system. The utilization of nanoparticles or nano formulations, characterized by exceptional physicochemical stability and precise targeting to the intended site of action, significantly improves drug delivery. The utilization of nano formulations, such as liposomes, polymeric nanoparticles, solid lipid nanoparticles, and transferosomes, within gel-based systems has the potential to enhance patient outcomes through a multitude of advantages.

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These advantages encompass enhanced solubility, stability, tissue distribution, sustained release, and protection against degradation, thereby contributing to the optimization of the dosage form. The utilization of a nano particle delivery method facilitates enhanced permeation and transdermal absorption of medicinal compounds. The primary determinant in the selection of nanoparticle-based formulations foracne therapy is the attainment of enhanced effectiveness while minimizing the occurrence ofundesirable effects on the skin surface. The aforementioned products need to possess qualities that render it aesthetically satisfactory, efficacious, tolerant, and compliant.

Keywords:

Acne, Nanoparticles, Drug delivery.

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ANALYTICAL METHOD DEVELOPMENT OF OKRA MUCILAGE BY HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY

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Abstract:

Green Pharmaceuticals are becoming more and more well-liked worldwide. Plant-based gums and mucilages are commonly used as main constituents in pharmaceutical formulations because of their affordability, wide accessibility, low toxicity, and high bioavailability. *Abelmoschus esculentus* L. is popularly known as okra or lady's finger. Features such as low cost, non-toxicity, biocompatibility, and high availability in nature arouse the interest of researchers for the study of okra mucilage. The goal of the study is to isolate and analyze the mucilage in order to demonstrate its fundamental characteristics and quality control parameters of okra mucilage, as well as to determine some bioactive compounds using high-performance thin layer chromatography and furnish insight into its possible applications in the globe of pharmaceutical and nutritional. The HPTLC technique is used to access the chromatographic profile of the methanolic and ethanolic extracts of lady finger (okra) mucilage. The Camag HPTLC system, which was outfitted with a Linomat 5 applicator and a TLC scanner 3, was used to conduct the HPTLC analysis. Using a Camag Twin Trough Chamber, the fingerprint profile of the methanolic and ethanolic extract was created. WinCATS Planer Chromatography software was used to scan for the presence of components at 254 nm and 356 nm. Qualitative analysis studies verified that the okra mucilage

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extract contained flavonoids, phenols, tannins, carbohydrates, and mucilage. HPTLC determination of mucilage MeOH and EtOH extract showed the presence of 8 components with Rf values in the range of 0.14 to 0.62 and 0.14 to 0.54 respectively when detected at wavelengths 254nm and at 356nm .The developed method expresses the various patterns of the components distribution in the mucilage at two different solvents and such analysis may provide the analytical tool for identification and authentication of the extract in the future.

***Keywords*:**

Okra mucilage, quality control parameters, HPTLC.

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ROLE OF SODIUM ALGINATE MICROSPHERE LOADED WITH D-LIMONENE AND HONEY TO ALLEVIATE EFFICACY OF CRYOTHERAPY FOR DERMAL DISORDERS

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Abstract:

Skin is susceptible for developing self-sustainable microenvironment for variety of microorganism to reside and grow. Hyperkeratosis, over production of sebum, hyper secretion of testosterones, obstruction of the ductal cell linings is reported underlying mechanisms of severe pain and inflammation. Despite having myriad of therapy in line, symptomatic treatment by cryosurgery or localized cryotherapy presumably causes downregulation of molecular markers associated with post-inflammatory hyperpigmentation. This therapy further restored the healthy microflora and vascularity of the infected regions thereby providing promising anti-inflammatory activities. This work proposed application of cryotherapy to reduce the tendency while exploiting add-on anti-oxidant, anti-inflammatory, anti-infective activities of D-limonene and honey. The prepared sodium alginate microspheres crosslinked with calcium chloride was formulated by encapsulating D-limonene and honey. The dried microspheres were poured into mould and freezing was performed in presence of water at -4°C. The loaded microspheres were characterized for particle size (440±50.13µm), morphology (smooth and spherical), oil encapsulation efficiency (81.23±2.15%), swelling (125±12%) as well as in-vitro release of D-limonene and honey. The microspheres also showed

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significant in-vitro anti-oxidant potential. Rheology of water mixed with D-limonene and honey loaded microspheres was also recorded at 4℃, 15℃, 30℃ and 37℃ to estimate viscosity of the molten formulation while applying on skin. Melting pattern of the freeze microsphere was tracked and concentration of sodium chloride was optimized to lower the freezing point thereby preventing fast melting. D-limonene and honey loaded microsphere preparation could be promising approach as add-on therapy for the treatment of dermatological disorders.

***Keywords*:**

Microspheres, D-limonene, honey, cryotherapy, Acne vulgaris

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EXPLORING THE HERBAL ALTERNATIVE IN PROTECTION AGAINST TOPICAL ANTIBACTERIAL INFECTION

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Abstract:

Herbal medicines are the mainstay of about 75-80% of the world's population, mainly in developing countries, for primary health care because of better cultural acceptability, better compatibility with the human body, and lesser side effects. Gel is a semisolid non-greasy dosage preparation, mainly used for its protective action on the skin. The objective of the study is to formulate and evaluate an antibacterial topical hydrogel containing the essential oil of *Zingiber officinale* for its antibacterial efficacy against *Staphylococcus aureus* and *Escherichia coli* by disk diffusion assay. The herbal gel was prepared with concentrations 1%, 2%, and 4% v/v ginger oil with 10% w/v gelling agent i.e., Na-alginate, and was evaluated. Ginger essential oil (GEO) was extracted with hydro-distillation methodology and incorporated in the gel formulation oil in the most effective concentration. The characterization of the gel was assessed in terms of UV-Visible spectroscopy, and FT-IR. The anti-bacterial property was evaluated using in-vitro assay, and the diameter of the inhibition zone (DIZ) against E. Coli (gram –ve) and S. aureus (gram +ve) were found to be 1.53±0.15 cm, 2.27±0.21 cm, 2.47±0.17 cm (n=3) and 1.43±0.11 cm, 2.00±0.25 cm, 2.53±0.25 cm (n=3) with a minimum inhibition concentration (MIC) of 1%v/v, 2%v/v, 4%v/v gel formulation respectively and compared with standard drug Tetracycline. To support our *in-vitro* inhibitory

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activity, *in-silico* molecular docking study was performed with the active component of ginger oil, and the protein of E. coli (PDB ID: 6CQA) and *S. aureus* (PDB ID: 2I87) imported from Protein Data Bank. Further, detailed mechanistic biological studies can be performed to make the herbal gel as an effective medicine.

***Keywords*:**

Ginger, *Zingiber officinale*, essential oil, antibacterial assay, minimum inhibition concentration, in-silico studies.

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THERAPEUTIC POTENTIAL OF LINALOOL ESSENTIAL OIL IN RHEUMATOID ARTHRITIS: IN SILICO, IN VITRO, AND IN VIVO INVESTIGATIONS

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Abstract:

Rheumatoid arthritis (RA), an autoimmune inflammatory disorder characterized by persistent synovial inflammation, presents substantial challenges in treatment due to its uncertain etiology and associated toxicities of conventional therapies. As interest in natural remedies grows, essential oils have gained attention for their potential health benefits. This study explores the antiarthritic properties of linalool, an essential oil compound, using a comprehensive methodology encompassing in-silico, in-vitro, and in-vivo investigations. In the in-silico phase, key proteins involved in inflammation and oxidative stress, namely Interleukin-6, COX-2, C-reactive protein, and NADPH Oxidase, were selected as potential targets. Docking studies between linalool and its derivatives were conducted, revealing promising interactions that could modulate inflammatory pathways. Subsequent in-vitro analyses focused on antioxidant and anti-inflammatory activities. Linalool exhibited robust antioxidant effects, demonstrated by its scavenging activity against various radicals (DPPH, ABTS, Superoxide, Nitric oxide, and Hydrogen peroxide). Moreover, it showed significant anti-

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inflammatory potential through protein denaturation inhibition, HRBC membrane stabilization, and proteinase inhibition assays. In the in-vivo phase, a collagen-induced arthritis (CIA) model was employed to evaluate linalool's antiarthritic efficacy. The administration of linalool led to a notable reduction in liver enzyme levels (AST, ALT, ALP) compared to the negative control group. Remarkably, linalool administration resulted in a substantial decrease in paw volume, indicative of reduced inflammation, particularly evident after the 28th day. Collectively, the findings underscore the potential of linalool as an alternative medicine for RA treatment. The multifaceted approach, encompassing in-silico predictions, in-vitro assessments, and in-vivo validation, provides a robust foundation for considering linalool as a novel therapeutic agent. Its antioxidant and anti-inflammatory properties, as well as its ability to ameliorate arthritis symptoms in the CIA model, highlight linalool as a promising avenue for future research and development in the field of rheumatoid arthritis therapy.

***Keywords*:**

Rheumatoid arthritis, In silico, In vivo, inflammation, essential oil, in vitro.

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PREDICTING AIR QUALITY DATA BY SUPERVISED LEARNING ALGORITHM: A MACHINE LEARNING APPROACH IN CLIMATE MODELLING

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Abstract:

Machine learning involves the development of algorithms and models that enable computers to learn from data and enhance their performance on specific tasks over time, without explicit programming. Machine learning helps to recognize patterns, make predictions, or take actions by analyzing and processing extensive data. This process includes various techniques and algorithms, allowing computers to learn and adapt without specific programming for each circumstance. In climate modelling, machine learning utilizes different algorithms and techniques to analyze and forecast climate patterns, comprehend environmental processes, and simulate the Earth's climate system. Machine Learning models forecast future climate conditions, including temperature changes, precipitation patterns, sea-level rise, and extreme weather events, by leveraging historical data for future projections. Furthermore, machine learning aids in identifying and predicting extreme weather events, such as hurricanes, floods, droughts, and heatwaves, providing vital information for disaster preparedness and mitigation. Here we describe about a machine learning model that utilizes Support Vector Machines (SVM) to predict air quality levels based on input features such as PM10, NO2 and SO2. The model aims to provide accurate air quality predictions, which can be

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valuable for monitoring and managing environmental conditions. Data was obtained from the website of Pollution Control Board. It was pre-processed and divided into train and test data. Support vector machine which is a supervised machine learning algorithm was applied to train the model. After testing the model with the test data the model showed 95% accuracy. Python libraries along with Google Collab was used for developing the model. This model is currently in its developing stage before implementing it in environmental monitoring.

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INVESTIGATION OF A BIOPOLYMER BLEND AS CORROSION INHIBITOR FOR API5LX60 MILD STEEL IN ACID MEDIUM

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Abstract:

Acid corrosion is a severe threat to wells and crude oil transportation pipes in the oil and gas industry across the world. Many compounds, including inorganic complexes, organic molecules, and rare earth elements, act as corrosion-preventing agents. However, most of them are not effective environmentally and has low shelf-life. As a result, environmentally friendly, biodegradable, and green corrosion inhibitors have become a need of the hour. This report presents the initial investigation of the corrosion inhibitory property of a biopolymer blend namely Polyvinylalcohol-histidine blend for API5LX60 mild steel in 1N HCl test solution. The blend was synthesized with 95-99% yield and characterized using UV–visible, FTIR and 1H NMR spectroscopy. Gravimetric Analysis and Electrical Resistance measurement showed 90-95% corrosion inhibition efficiency, which makes it a potential corrosion inhibitor for mild steel.

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IMPLICATIONS OF BROWN FAT AND BROWNING IN OBESITY THERAPY

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Abstract:

Brown fat, formerly thought to be human vestigial, has become a crucial component in metabolic health. The treatment of obesity may benefit from considering the effects of brown fat activation and browning, a process in which white adipose tissue takes on properties of brown fat. Uncoupling protein 1 (UCP1) mediated thermogenesis gives brown fat the ability to release stored energy as heat, which offers a potential strategy against obesity. Current studies demonstrate how cold exposure, exercise, and pharmaceuticals can all increase brown fat activity and provide therapeutic approaches to managing weight. In addition to being able to use lipids in the blood and glucose, brown fat improves blood lipid and glucose metabolism without causing weight loss. Recent human research indicates that the results observed in mice may apply to humans as well, indicating that brown fat is a promising organ to treat obesity and related disorders.

Keywords:

Brown fat, Browning, Obesity, UCP1, Brown fat activation, Thermogenesis.

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THE MULTIFACETED ROLE OF ARTIFICIAL INTELLIGENCE IN DISEASES WITH A SPECIAL EMPHASIS ON NEUROLOGICAL DISORDERS: A COMPREHENSIVE REVIEW

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Abstract:

Artificial intelligence (AI) takes a front-row seat in the transformation of healthcare, with a significant focus on diagnosing and treating diseases. This discussion underscores AI's pivotal role in healthcare, with a special emphasis on its contributions to neurological diseases like Alzheimer's, Parkinson's, and multiple sclerosis, known for their complex challenges. AI excels in analysing extensive datasets, unveiling intricate patterns and correlations often elusive to human clinicians. In the realm of neurological diseases, this translates into early detection. Machine learning algorithms adeptly process diverse data sources, including brain imaging, genetics, and patient records, enabling timely intervention, often before noticeable symptoms manifest. Furthermore, AI plays a central role in personalizing treatment. Given substantial variations in patient responses to therapy, personalized treatment plans are essential. AI leverages patient-specific data to predict responses and tailor interventions, optimizing patient care. Additionally, AI significantly contributes to monitoring disease progression by analysing shifts in cognitive assessments, imaging data, and biomarkers. This empowers clinicians and caregivers to make well-informed decisions regarding patient management. AI extends its role to the discovery of novel therapies, identification of drug development targets, and optimization of

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clinical trials for neurological diseases, expediting the development of effective treatments. Moreover, AI continues to reshape healthcare by predicting heart failure risks, diagnosing conditions in the ear, nose, and throat, enhancing breast cancer screening and diagnosis, and improving ophthalmological care. It also aids in early diagnoses in oral medicine, detecting a wide range of oral and maxillofacial abnormalities. Winding up, AI enhances precision, accessibility, and patient outcomes in healthcare. Whether in neurology or other medical disciplines, AI represents a beacon of hope, promising a future where advanced technology seamlessly integrates with human expertise to provide enhanced healthcare for individuals worldwide.

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IN-SILICO DESIGN AND EVALUATION OF ANTILEISHMANIAL ACTIVITY OF NOVEL PIPERINE DERIVATIVES

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Abstract:

The leishmaniases are a group of diseases caused by protozoan parasites of several Leishmanias species. More than 1 billion people live in leishmaniasis endemic areas and are at risk of infection. As per current WHO report, an estimated 30,000 new cases of visceral leishmaniasis and more than 1 million new cases of cutaneous leishmaniasis occur annually. To treat Leishmaniasis, there are very few effective drugs and also development of resistance to first-line drug(s) has a very big impact on the treatment of leishmaniasis. Thus, there is an urgent need for the search and the development of new therapeutics with scientifically demonstrated antileishmanial action. Piperine, is a naturally occurring alkaloid (amide), derived from pepper has shown various biological activities including antileishmanial activity. The present work focuses to design and evaluate the ADMET (absorption, distribution, metabolism, excretion and toxicity) properties of the novel Piperine derivatives by using various *in silico* methods. In addition, *in silico* molecular docking studies were also carried out to investigate the binding affinities of all compounds with the target protein Interleukin-12P40 (PDB ID: 1F42).

Keywords:

Piperine, Derivatives, Leishmaniasis, *In Silico* study

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INNOVATIVE DRESSINGS FOR ACCELERATED WOUND HEALING: RECENT BREAKTHROUGHS

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Abstract:

The process of wound healing is an essential and intricate aspect of the skin's key physiological functions. Traditional methods commonly include the use of wound dressings, essentially bandages, which act as protective agents against infection and additional tissue damage. Todays advanced wound dressings, renowned for their exceptional biocompatibility and biodegradability, have become the favored selection for effectively managing a range of different wound types. These modern dressings offer not only protection against potential infections but further benefit the preservation of warmth, moisture, augment pain relief, and help the establishment of hypoxic conditions, all factors that significantly hasten the complex wound healing process. Natural compounds, proved to be cost-effective, biocompatible, and have low levels of toxicity, have encouraged scientists to pursue their use in creating biopolymer-based wound dressings. Such innovative dressings, incorporating elements such as cells, medication, and biomacromolecules, demonstrate cytocompatibility, hemostatic properties, induce skin regeneration, stimulate quick healing, and possess capabilities to be anti-inflammatory and antibacterial, thus aiding in the faster recovery. Among these naturally technical materials, one of the modern material is nanofibrillar cellulose (NFC), which is derived from both bacterial and plant sources. Key material traits

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such as renewability, biocompatibility with biodegradability, physical properties - high tensile strength and flexibility, drug loading, moisture retention, render NFC highly applicable for a range of pharmaceutical and biomedical uses. Excellent NFC-based wound dressing creations focus on adjusting to the needs to maintain flexibility while retaining moisture, and effectively regulating pH levels within the wound's immediate vicinity. This comprehensive review is an attempt to project the practical application of biomass-sourced nanocellulose and anticipates its potential contributions to the sphere of wound dressings. The critical objective of this assessment is to provide some direction to progressive advancements in this ever-evolving domain and aim to promote ongoing developments within the world of wound treatment technologies.

Keywords:

Wound healing, Nano cellulose, Wound dressings.

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RECENT ADVANCEMENT IN NANO DRUG DELIVERY SYSTEM FOR THE TREATMENT OF PEPTIC ULCER

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Abstract:

Peptic ulcer remains a prevalent gastro intestinal disorder, causing significant morbidity and healthcare burden worldwide. While conventional therapies have proven effective, they are often associated with various limitations, such as poor bioavailability, frequent dosing, and potential adverse effects. Recent advancements in nanotechnology have revolutionized the field of drug delivery, offering innovative solutions to enhance the treatment of peptic ulcers. This review provides an overview of the latest developments in nano drug delivery systems tailored for peptic ulcer treatment. The primary objective is to highlight the potential of nano technology in improving therapeutic outcomes and patient quality of life. In recent advancements of nano drug delivery systems for peptic ulcer treatment, we observed significant improvements in drug bioavailability, targeting precision, and controlled drug release. Nano formulations demonstrated enhanced drug solubility and dissolution rates, ensuring higher drug concentration at ulcer sites, thereby increasing therapeutic efficacy. Recent advancements in nanodrug delivery systems offer innovative approaches to the treatment of peptic ulcers. These technologies have the potential to enhance drug bioavailability, target ulcerated tissues, reduce side effects, and improve patient compliance. However, further research, including clinical trials and regulatory approvals, is

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needed to fully realize the clinical benefits of these novel approaches.

Keywords:

Peptic Ulcer, drug delivery system, Helicobacter pylori, nonsteroidal anti-inflammatory drugs.

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A REVIEW ON BIOFUEL PRODUCTION WITH SPECIAL REFERENCE TO INDIA

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Abstract:

Biofuels are any fuel developed and manufactured from organic material such as plants and their residues, agricultural crops, and byproducts that can be used as alternatives to petroleum-derived fuel. Biofuels can be used as fuel additives or in their pure form. They are commonly classified into bioethanol and biodiesel. Moreover, they are classified on the basis of the feedstock used to produce them, depending on the feedstock they are classified as the following-A. First-generation biofuel, B. Second-generation biofuel, C. Third-generation biofuels and D. Fourth-generation biofuels. Biodiesel is another important first-generation biofuel made from vegetable oils and animal fats using transesterification processes. Biodiesel production in India is mostly based on non-edible sources like as Jatropha, Mahua, Karanja, Neem, etc. Bioethanol is another renewable source of energy obtained from ethanol through the fermentation of sugar and starch. It is a first-generation biofuel obtained from agricultural crops such as corn, sugarcane, potatoes, rice, etc. United States (US) is the highest producer of ethanol extracted from corn starch (it is made from 10% ethanol and 90% gasoline), followed by Brazil. In India, sugarcane molasses is the major source for ethanol production. About 1.3 million litres can be produced against the installed capacity of 3.2 billion litres. Biodiesel production in India is mostly based on the

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utilization of Jatropha. In 2022, the volume of biodiesel produced in India was 185 million litres which is expected to rise to 200 million liters by 2023. *Mesua ferrea* L. seed oil is a possible feedstock for biofuel production, available in northeastern (NE) region of India. *Mesua ferrea* L. seeds are available throughout the year in the districts Lakhimpur and Sibsagar of Assam. This study aims to review the various sources of biofuel production with special reference to India.

Keywords:

Biofuel, Biodiesel, Bioethanol, Sugarcane, Molasses, India

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ETIOPATHOLOGY, ROLE OF TOLL LIKE RECEPTOR 4 (TLR4) SIGNALLING CASCADE AND THERAPEUTIC INTERVENTIONS WITH NANODRUG DELIVERY SYSTEM IN LIVER DISEASES

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Abstract:

The liver is the largest gland and the biggest solid organ of the human body that is in charge of various functions of the human body including metabolism, detoxification, etc. An estimated 2 million people die from liver disease worldwide each year; including cirrhosis, viral hepatitis and hepatocellular carcinoma. The causes of liver disorders include infection, immune system abnormality, genetics, cancer, chronic alcohol abuse, fat accumulation in the liver, certain medications, etc. Genetic factors are important in progression of all forms of chronic liver diseases including hepatocellular carcinoma with interplay of genes involved in glucose, lipid and iron metabolism, insulin signalling, oxidative stress, inflammatory pathways and fibrogenesis. The most prevalent liver illness in the world, non-alcoholic fatty liver disease (NAFLD) affects 25% of people, though rates vary by area. Other than managing the risk factors, there is no pharmacological therapy for NAFLD yet. TLR4(Toll like Receptor 4) is implicated in the recognition of fatty acids and damage-associated molecular patterns (DAMPs) in this context, leading to inflammation and potentially progressing to non-alcoholic steatohepatitis (NASH). Liver failure is diagnosed based on the symptoms, medical history and the results of tests (blood tests, urine

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tests, abdominal imaging). Many liver enzymes, including the cascade of serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), alkaline phosphatase (ALP), gamma-glutamyl transpeptidase (GGT), and total bilirubin (TBIL), are conventional liver biomarkers. In recent decades, nanotechnology has greatly contributed to the design and application of nanomedicine in terms of diagnosis and treatment for liver diseases. A lot of organic or inorganic nanoparticles have been developed for liver fibrosis, including lipid nanoparticles. Targeted drug delivery, combination therapy, and theranostics have become possible due to the size, shape, variety of constituents, and adjustable surface properties of nanoparticles. These features also provide superior advantages, such as extended circulation, enhanced internalization and penetration, regulated drug release, high contrast, improved drug pharmacokinetics, and decreased adverse reactions.

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NANOTECHNOLOGICAL ASPECTS OF ENZYME IMMOBLIZATION: A REVIEW

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Abstract:

Enzymes are the biological molecules that acts as catalyst by speeding up the chemical reactions occuring inside our body. They actually reduces the activation energy of the reactant molecules that is required for converting them into the products such that these reactants can be converted with a low energy into the product. Enzymes have a wide number of applications in the Industrial, Medical and Pharmaceutical Fields. However, due to its altered chemical activity and less stability in extreme pH and temperature, less biocompatible, poor selectivity and presence of inhibitors etc. often makes a barriers in the activity of an enzyme. So to overcome these barriers, application of enzymes into a nano – material is often found to be useful upto a greater extent. Nanoparticles are solid dispersion particulates of size range 10 – 100 nm. They cause enhancement of particle mobility, diffusibility, thermal stability, storage capacity, gretater surface area and also modulate catalytic activity of the attached enzymes. The Enzymes can be immoblized into the nanoparticles by the process of Simple adsorption or via chemical linkages. Thus immoblization of enzymes into nanoparticles usually acts as commercial applicable and a convenient method because of it usually results in enhanced thermal and pH stabilities of the enzyme, lower cost of production, reusability with easy handling and seperation. Current compilation attempts to put forward an overview of the current state of enzyme immoblization in Nanoparticle

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research, including information on how they are made, what they are like, and their applications in therapeutics particularly of that of cancer.

Keywords:

Enzyme Immoblization, Nanoparticals and biological molecules.

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BURGEONING NANOTECHNOLOGY IN SKIN WOUND HEALING AND TISSUE REGENERATION: A NOVEL APPROACH TO THE FUTURE

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Abstract:

A wound is an injury that is caused physically or thermally and causes a laceration or rupture of the skin's epithelial integrity. Wound healing, has, up to now remained a problem. In reality, wounds caused by long-term illnesses, burns, and post-operative traumas can often be lethal because resistant germs and microorganisms can colonise them. Traditional wound management approaches, such as skin grafts and dressings, have limitations in achieving optimal tissue regeneration and functional recovery. Nanotechnology enables the development of innovative strategies for skin regeneration in wound treatment by leveraging the unique properties of nanomaterials. This abstract discusses key aspects of nanotechnology's role in wound healing, emphasizing its potential to revolutionize the field. It explores various nanomaterials, such as nanoparticles, nanofibers, and nanoscaffolds, and their applications in promoting tissue regeneration, antimicrobial properties, and drug delivery systems. These nanomaterials can be tailored to mimic the extracellular matrix and provide a favorable microenvironment for cell proliferation and differentiation, accelerating wound closure. Nanotechnology holds significant advantages in wound healing by enabling precise and controlled drug delivery, enhancing tissue regeneration, and preventing infections. The versatility of nanotechnology in wound healing offers

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the potential for faster and more targeted therapeutic interventions, ultimately improving healing outcomes and reducing complications, such as scarring and chronic wounds. In conclusion, the integration of nanomaterials and advanced drug delivery systems offers innovative solutions to accelerate wound closure, reduce complications, and enhance the overall effectiveness of wound healing.

Keywords:

Skin Wound Healing, Tissue Regeneration, Nanotechnology

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RECENT DEVELOPMENTS IN THE TREATMENT OF VITILIGO

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Abstract:

The loss of skin pigmentation in vitiligo patients results in depigmented patches that can significantly lower their quality of life. Vitiligo is a chronic skin illness. Although there isn't a single treatment that will completely cure vitiligo, there has been a lot of advancement in the formation of more focused and efficient treatment alternatives in recent years. An overview of the most recent advancements in the treatment of vitiligo is given in this abstract, which includes novel treatments utilizing JAK inhibitors and regenerative therapies, topical corticosteroids and calcineurin inhibitors, and improvements in phototherapy techniques. Biologics, topical vitamin D analogues, and immunomodulatory treatments are also investigated as possible means of addressing the autoimmune components of the illness. Clinical trials and continuous research are helping the area of vitiligo therapy advance, giving patients with this difficult skin condition hope for better results and a higher quality of life. It is recommended that dermatologists and other healthcare professionals remain current on these novel treatments and engage in patient consultations to customize treatment regimens according to each patient's unique needs and the severity of their illness.

Keywords:

Vitiligo, pathology, recent treatment.

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Enhydra fluctuans LOUR.: A COMPREHENSIVE REVIEW ON ITS ETHNOBOTANICAL AND PHARMACOLOGICAL USES

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Abstract:

Herbs have been used as medicines and therapeutic agents for a wide range of illnesses since the beginning of humanity. About 80% of people worldwide still use plant-based treatments due to their great availability, low cost, and fewer side effects. One such edible plant in the Asteraceae family is *Enhydra fluctuants* Lour. bearing common name 'helencha' or 'heleshi'. It has wide geographical diversity which is mostly grows on damp wayside vegetation. Traditionally, this plant has been very useful for the treatment of skin-related issues, diabetes, constipation, bronchitis, inflammation, neurological illnesses, leucoderma, biliousness, smallpox etc. *Enhydra fluctuans* Lour. is enriched with wide range of phytochemicals belong to carotene, saponins, flavonoids, alkaloids, tannins, germacranolide, sesquiterpene lactone, and essential oil and because of their presence, this plant can express various pharmacological activities such as antioxidant, hepatoprotective, analgesic, anti-diarrheal, thrombolytic, anti-diabetic, phagocytic, cytotoxic, and neuroprotective activities in addition to anti-microbial, and anti-inflammatory activities. In conclusion, further investigation is required to identify unidentified phytoconstituents and to verify the different ethnopharmacological assertions made about the herb *Enhydra fluctuans* Lour.

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New bioactive molecules may open new fields of research in the therapeutics of several diseases.

Keywords:

Enhydra fluctuans Lour., ethnopharmacology, Antidiabetic, Antioxidant.

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STRESS-INDUCED CORTISOL RESPONSE AND ITS ROLE IN ABDOMINAL FAT ACCUMULATION: A COMPREHENSIVE REVIEW

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Abstract:

Stress, a prevalent phenomenon in our society, exerts a profound influence on various physiological and psychological aspects of human health. One of the key physiological responses to stress is the activation of the hypothalamic-pituitary-adrenal (HPA) axis, which leads to the release of cortisol, a primary glucocorticoid hormone. Cortisol, commonly referred to as the "stress hormone," plays a crucial role in energy metabolism and homeostasis. Elevated cortisol levels during acute stress responses serve to mobilize energy reserves, enhancing the body's ability to cope with imminent challenges. However, chronic stress and prolonged elevation of cortisol levels have been associated with a range of adverse health outcomes. While fat accumulation primarily results from a surplus of calories, elevated cortisol levels play a significant role in determining the specific storage location of excess fat during caloric surplus. Elevated cortisol levels can lead to the storage of surplus fat in the form of energy within adipose cells situated around abdominal organs as a protection from the perceived threat from the high stress. It also impairs insulin sensitivity, potentially leading to elevated blood sugar level in the blood stream. Moreover, cortisol can lead to changes in eating behavior, favoring the consumption of high-calorie, comfort foods, and promoting overeating. Excess cortisol has been associated with central adiposity, increasing the risk of various metabolic disorders, including type 2 diabetes and cardiovascular disease. This

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review explores the impact of chronic stress on long-term weight management and provides insights into potential strategies for mitigating the adverse effects of stress on fat accumulation, emphasizing lifestyle modifications, stress management techniques, and targeted interventions. In summary, understanding the intricate relationship between stress, cortisol levels, and fat accumulation is crucial for addressing the growing global health concerns related to obesity and its associated comorbidities.

Keywords:

Stress, Cortisol, Fat Accumulation

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BOSWELLIC ACIDS-LOADED ETHOSOMES: PHYSICOCHEMICAL INSIGHTS AND *IN VIVO* ASSESSMENT

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Abstract:

Elastic nanovesicles known as ethosomes, composed of phospholipids, exhibit a significant concentration of ethanol. The efficacy of these ethosomes in enhancing skin permeability of various drugs is attributed to the interactions facilitated by the elevated ethanol content. The preparation of ethosomal formulations was carried out using the hot method. The optimization and characterization of Boswellic acids-loaded vesicular ethosomes involved the assessment of parameters such as particle size, entrapment efficacy, and microscopy, including both scanning and transmission electron microscopy. Additionally, the interaction between the drug and excipients was scrutinized using Fourier transform infrared (FTIR) spectroscopy. Moreover, in vitro drug permeation tests were performed on Boswellic acids ethosomal formulations using pig ear skin. The *in vivo* evaluation of the formulated product was conducted through a paw edema assay utilizing carrageenan-inducing method. The results of FT-IR studies indicated the absence of any interaction between the drug and the excipients. The morphological characteristics of ethosomes were confirmed through the application of TEM and SEM. One specific ethosomal formulation, was selected for further skin permeation studies due to its substantial

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drug entrapment efficiency (88.43%) and small particle size (129.3 ± 0.75nm). Particularly, formulation comprising 30% alcohol and 2% w/w phospholipid, exhibited the highest drug permeability (73.22%).

Comparative analysis of the anti-inflammatory efficacy of ethosomal vesicles and that of the plain gel containing Boswellic acids was carried out using pharmacodynamic studies. The results indicated that the ethosomal gel formulation displayed higher anti-inflammatory activity compared to the plain gel. Consequently, our findings suggest that the developed ethosomal system has the potential to deliver Boswellic acids through the skin.

Keywords:

Skin penetration, Ethanol, Lipid-based vesicles, Ethosomes, Anti-inflammatory activity.

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IN SILICO STUDY OF FUCOXANTHIN TO INDUCE APOPTOSIS VIA ACTIVATING INK4 MEDIATED APOPTOTIC PATHWAY

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Abstract:

Fucoxanthin is a marine carotenoid found in brown seaweeds and other macroalgae. It has a distinct chemical structure which confers its biological effects. Fucoxanthin scavenges free radicals and singlet molecular oxygen, thus exhibiting a potent antioxidant and antiinflammatory effects. Research suggests that fucoxanthin may be beneficial in preventing long-term conditions such as cancer, obesity, and hepatic diseases. A family of tumor suppressors known as INK4 proteins is essential for controlling the course of the cell cycle and halting the growth of cancer. Cyclin-dependent kinases (CDKs), important regulators of cell division, are inhibited by these proteins, which include p16INK4a, p15INK4b, p18INK4c, and p19INK4d. Furthermore, INK4 proteins are subjected to regulation by various signaling pathways that influence their expression and activity. This study focuses on the application of molecular docking, a crucial tool for organizing the systematic exploitation of the structural variety of natural products, to predict the interaction between Fucoxanthin, and the INK4 molecule. The potential binding affinity and modes of interaction between these molecules

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were explored using computational tools. This study used Auto-Dock Vina for docking and other computational tools for the investigation of fucoxanthin, a marine carotenoid with naturally occurring anticancer components. Research was done to determine the possible molecular targets of such specific pigments. Docking was done on the INK4 family i.e.., CDK4 and CDK6, implicated in various cell cycle pathways. It was discovered that the best anticancer target for fucoxanthin was CDK6. The results of the molecular docking simulations provided insights into the binding affinity and binding modes between Fucoxanthin and the INK4 molecules. The docking scores highlighted the potential strength of the interaction, indicating a favorable binding affinity.

Additionally, by performing docking of recognized inhibitors against their corresponding chosen macromolecules, the study's efficacy was further assessed. Nevertheless, these are preliminary findings, and further experimental investigations will be carried out in the near future.

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HERBAL DRUGS AND VACCINATION IN DENGUE PREVENTION AND TREATMENT

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Abstract:

Dengue virus remains a formidable global threat, causing significant morbidity and mortality. It is mainly transmitted by Aedes aegypti and Aedes albopictus mosquitoes particularly in regions with favourable mosquito vectors and limited healthcare resources. While conventional treatment focuses on symptomatic relief and supportive care, the role of herbal medicine in dengue management is gaining attention. Among the herbal drugs explored, the use of papaya leaf extract has shown captivating results in increasing platelet count, which is crucial in managing the thrombocytopenia commonly associated with dengue fever. Additionally, fenugreek, turmeric, and ginger have exhibited anti-inflammatory and analgesic properties. Blue weed and Indian Siris exhibit ovicidal activity of Aedes aegypti. Furthermore, the antiviral and anti-inflammatory properties of neem has been highlighted for its potential in supporting the immune system's response to the dengue virus. The challenges associated with the integration of herbal medicine in conventional dengue management includes the need for further research to establish standardized dosages and assess potential herb-drug interactions. In conclusion, this presentation encourages further exploration of the role of herbal medicine in dengue treatment, emphasizing the need for comprehensive clinical trials and research to validate their efficacy and safety. Integrating herbal medicine with conventional approaches has the potential to

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enhance the holistic management of dengue fever, providing a more comprehensive and patient-centered therapeutic approach.

Keywords:

Dengue virus, herbal remedies, thrombocytopenia, Papaya leaf, Blue weed and Indian Siris.

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AN OVERVIEW ON THE APPLICATION OF HYDROGELS FOR THE TREATMENT OF VAGINITIS

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Abstract:

Vaginitis is the inflammation of the squamous epithelial layer of the vagina of the external female genitalia. It is associated with symptoms such as abnormal vaginal discharge, itchiness, swelling, and a general discomfort in the vagina. It is common for women in their reproductive period. In the affected females, it is caused by multiple factors such as infections or irritation to certain substances. A widely used approach for treating various vaginal infections involves the use of hydrogels. Hydrogels are three-dimensional polymer structures known for their capacity to absorb and expand when in contact with water. Due to the specific qualities of the polymers used in hydrogel formulation such as mucoadhesiveness, it becomes possible to decrease the frequency of dosing and enhance the effectiveness of the treatment. Few examples of such polymers are carbopol, polyethylene glycol, alginate, chitosan, hydroxypropyl methylcellulose etc. The aim of this review is to offer a concise overview of the hydrogel-based methods that have surfaced for the management of vaginitis. Extensive literature research was conducted across multiple databases, including Google Scholar, PubMed, etc. to bolster this review. The gathered information was then meticulously analyzed. A concerning aspect of this condition is that many women resort to self-medication with over-the-counter drugs, hindering the accurate diagnosis of the

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underlying causes. While vaginitis often doesn't lead to other health issues, untreated cases can elevate the risk of developing pelvic inflammatory diseases and sexually transmitted infections. Therefore, this comprehensive report on treatment options empowers individuals to get proper knowledge about the hydrogel-based methods and resort to the treatment accordingly.

***Keywords*:**

Novel Drug Delivery, Vaginal Health, Hydrogel, Inflammation.

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VIROSOMES: A NOVEL NANOCARRIER IN CANCER IMMUNOTHERAPY AND VACCINATION

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Abstract:

Virosomes, nanoparticle structures inspired by viruses, lack viral genetic material, and are designed for drug delivery and vaccination purposes. Their outer layer is composed of a single layer of phospholipids and glycoproteins, facilitating interaction with target cells. Within the virosome, a cavity holds macromolecules or drugs for precise delivery. They have been employed in vaccine delivery due to their noninfectious, immune system-activating adjuvant properties, as well as their biodegradable and non-replicative nature in the host. They are responsible for the induction of both B-cell, CD4+, and CD8+ immune responses. Influenza virus is the most common virus of choice for virosome preparation utilised in clinical trial patients or in commercial products, the underlying concept applies to nearly all encapsulated viruses. Based on physical properties, influenza virosomes satisfy the requirements for being classified as virus-like particles (VLPs); nonetheless, their processing is fundamentally different from that of conventional VLPs. These minuscule entities, comprising a lipid bilayer membrane and viral proteins, possess the remarkable ability to penetrate cells and initiate a robust immune reaction. The key to effective vaccine creation lies in modifying virosomes surfaces with crucial viral fusion proteins. Leveraging their viral envelope fusion capability, virosomes efficiently introduce large molecules into cell cytoplasm. Additionally, their capacity to function as immune-stimulating adjuvants, thanks

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to virus-derived elements, adds to their appeal. Consequently, virosomes have gained widespread use as vectors for drug delivery, paving the way for countless medical breakthroughs. Virosomes represent versatile antigenic lipid nanocarriers with immense potential in drug delivery and vaccination.

Keywords:

Virosome, Influenza virus, Vaccine, Nanocarrier.

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Debregeasia longifolia (BURM. F.) WEDD, AN ETHNOMEDICINAL PLANT OF NAGALAND, INDIA, AS A POTENT NATURAL SOURCE OF ANTI-INFLAMMATORY AND ANTIDIABETIC BIOACTIVITY

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Abstract:

Debregeasia longifolia (Burm. f.) Wedd is a plant that is highly valued for its medicinal properties belonging to the Urticaceae family. It is found in the Northeastern(NE) part of India. Out of eight states of NE, India, the plant has a well established traditional usage in Nagaland state. Traditional healers from several tribes like Sumi, Chungtia of Nagaland, India utilizes the plant to cure a variety of problems including diabetes, inflammation, arthritis and skin disorders. It is a compact tree reaching a height of approximately 5 meters. It produces pale white flowers and grows in shaded, damp environments, displaying resilience in challenging climates. This remarkable tree exhibits the capacity to flourish even in acidic water. Alkaloids, phenols, flavnoids, tannins and saponin are main secondary metabolites of this plant. It possesses phenolic compounds and flavonoids that have significant antioxidant properties. The leaves stand out as a prominent source of the primary bioactive components. The fruit's composition comprises (16.19%) ash, (65.56%) moisture, (2.39%) crude fat, (1.26%) crude fiber, (11.99%) protein, and (68.15%) carbohydrate. Also five flavonoids have been isolated and identified from the ethyl acetate fraction of the alcohol extract of leaves of *Debregeasia longifolia* (Burm. f.) Wedd. Therefore to establish its folkloric use scientific investigations are to be conducted.

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INNOVATIONS IN CANCER GENE THERAPY: A RECENT OVERVIEW

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Abstract:

Cancer has traditionally been regarded as one of the most significant and vital causes of mortality in the world, accounting for more than 10 million deaths each year. Many approaches have been created based on the nature and stage of the tumour. Currently, cancer therapy involves surgical intervention, radiation, and the use of chemotherapeutic medications, which frequently damage healthy cells and induce harmful effects in the patient. Researchers are always exploring for novel techniques to remove only malignant cells while leaving healthy ones alone. However, the fundamental challenge with successful cancer treatment is intra tumour heterogeneity of malignant cells.

Better understanding of the molecular basis of tumours and the development of new diagnostic tools might aid in the treatment of different cancers. As a result, it is critical to investigate cancer cell gene expression, epigenetic modifications, and ways to mitigate these changes. Here, we will address nanosized systems or nanoparticles for systemic cancer treatment and their current level of development in this section.

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IN-SILICO DESIGN AND SCREENING FOR ANTIMALARIAL ACTIVITY OF BERBERINEDERIVATIVES

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Abstract:

Malaria is a potentially fatal disease that is spread by some types of mosquitoes to humans. People often acquire malaria through the bites of infected female Anopheles mosquitoes, contaminated needles, and blood transfusion. Malaria caused by *Plasmodium falciparum* can escalate to severe sickness and death within 24 hours if left untreated. It has a high rate of resistance outbreaks and a there has been a constant need for the discovery of novel antimalarials. For several reasons, Plasmodial proteins are difficult to characterize structurally and target using traditional physical approaches. However, these problems can be partially overcome using several in-silico approaches. For this purpose, in the present work, Berberine was selected as a lead molecule to design some new drug derivatives for targeting the protein *Plasmodium falciparum* dihydroorotate dehydrogenase receptor, which was co-crystallizedwithN- (2,2-Diphenylethyl)-4-Hydroxy-1,2,5-Thiadazole-3-carboxamide and the docking process was carried out, using this protein. The interaction between protein and derivatives were studied, along with the toxicity analysis and ADME analysis. Amongst 30newdrugcandidates 8 derivatives displayed satisfactory in-silico results. Hence, these derivatives can be promising candidates in antimalarial therapy and overcoming resistance of conventional treatment. Further in-depth in-vitro studies will be carried out on these compounds for screening their antimalarial activity.

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Keywords:

Plasmodium Falciparum, Antimalarial activity, Berberine, In-Silico study

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UNLOCKING NEW AVENUES: REPURPOSING EXISTING DRUGS FOR ENHANCED DENGUE TREATMENT

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Abstract:

Dengue virus (DENV), belonging to the Flaviviridae family is a major global health threat, with over half of the world's population at risk of infection. Despite extensive research, there are no specific antiviral drugs approved for the treatment of dengue fever. This lack of targeted therapeutics highlights the urgent need for innovative approaches to combat the virus. Repurposing existing drugs has emerged as a promising strategy for rapidly identifying potential treatments for DENV infection. This review summarizes the current state of repurposing existing drugs for the treatment of Dengue virus. It highlights the rationale behind drug repurposing, which capitalizes on the existing knowledge of drug safety and pharmacology, potentially accelerating the drug development process. Various drug classes with known antiviral or immunomodulatory properties have been explored for their efficacy against DENV, including antimalarials, antiretrovirals, antiparasitic agents, antidiabetic agents. These drugs have shown varying degrees of success in preclinical studies and, in some cases, have advanced to clinical trials. This review highlights the potential benefits of drug repurposing in terms of cost-effectiveness and reduced time-to-market, which are particularly critical in the context of emerging infectious diseases. In conclusion, repurposing existing drugs for the treatment of Dengue virus represents a promising avenue for drug discovery. It offers the potential to identify effective therapies by leveraging the

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vast pharmacological knowledge already available, thereby expediting the development of treatments for this globally significant disease. Further research and clinical trials are necessary to establish the safety and efficacy of these repurposed drugs, ultimately paving the way for improved clinical management of Dengue virus infections.

Keywords:

DENV, repurposing, immunomodulatory properties

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AN EXTENSIVE STUDY ON THE USE OF POLYPILLS TO TREAT TYPE 2 DIABETES

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Abstract:

The hallmark of type 2 diabetes (T2DM) is elevated blood glucose levels brought on by insulin resistance or inadequate insulin synthesis. Oral hypoglycemic medications and insulin therapy are two examples of pharmacological therapies used in conjunction with lifestyle changes like diet and exercise to manage type 2 diabetes. However, because T2DM is a complex disease and requires many drugs to regulate different risk factors, managing the condition can be difficult. Polypills, or cardiovascular fixed-dose combination pills, have the potential to alleviate the pervasive inaccessibility and noncompliance with established medications. Switching from existing individually taken drugs is usually required to begin polypill-based therapy. The impact of polypill treatment across various patterns of previous pharmaceutical regimen is of relevance due to the heterogeneity in usual care. Utilizing a polypill helps streamline drug schedules, lessening patients' burden with pills, and possibly increasing adherence. In type 2 diabetes, when controlling blood pressure, cholesterol, and blood glucose levels frequently necessitates the use of many drugs, this is especially crucial. Recommendations state that those with established cardiovascular disease are probably now receiving aspirin, a statin, and blood pressure (BP)-lowering drugs. It might be reasonable to combine these medications into a cardiovascular polypill for these patients in order

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to reduce prescription gaps and non-adherence. A sizable portion of individuals suffering from long-term cardiovascular conditions currently use a combination of prescription drugs. Introduce a polypill to high-risk patients to reduce prescription gaps and enhance adherence to recommended therapy.

Keywords:

Polypill, T2DM, Combination pills, high-risk patients, fixed dose.

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AN OVERVIEW ON BIOTECHNOLOGY FOR HUMAN HEALTH AND WELFARE

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Abstract:

Biotechnology has revolutionized the field of healthcare and holds immense potential for improving human health and overall welfare. This abstract explores the multifaceted impact of biotechnology on medicine, agriculture, and environmental sustainability, all of which contribute to enhancing the quality of life. In medicine, biotechnology has led to groundbreaking advancements. The development of genetically engineered pharmaceuticals, such as insulin for diabetes and monoclonal antibodies for cancer treatment, has significantly improved patient outcomes. Biotechnology also plays a pivotal role in agriculture. Genetically modified crops have increased agricultural productivity, making it possible to feed a growing global population. These crops are engineered for resistance to pests, diseases, and adverse environmental conditions, reducing the need for harmful pesticides and enhancing food security. Environmental sustainability is another vital aspect of biotechnology. Bioremediation, the use of microorganisms to clean up environmental contaminants, offers a promising solution to pollution problems. Additionally, biofuels derived from renewable sources, such as algae and switchgrass, have the potential to reduce greenhouse gas emissions and combat climate change. Infectious disease control and prevention have been significantly enhanced through biotechnology. Techniques like polymerase chain reaction (PCR) and next-generation sequencing allow for

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rapid and accurate identification of pathogens, aiding in the development of vaccines and treatments. Biotechnology also enables personalized medicine, tailoring treatments to an individual's genetic makeup. This approach can lead to more effective and less invasive treatments, improving the patient's overall experience. In conclusion, biotechnology has become an indispensable tool for human health and welfare. It has revolutionized medicine, agriculture, and environmental conservation, offering innovative solutions to some of the most pressing challenges facing humanity. The continued development of biotechnology promises a brighter and healthier future for all.

Keywords:

Biotechnology, Healthcare, Pharmaceuticals.

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COMPARATIVE HPTLC AND ATOMIC ABSORPTION SPECTROSCOPY ANALYSIS OF DIFFERENT PARTS OF TWO EDIBLE PLANTS OF ASSAM FOR DIABETES

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Abstract:

Edible plants belonging to different families are consumed in the state of Assam as food on the basis of their medicinal properties. Plants contain wide range of pharmacologically active components such as phytochemicals and minerals that exhibit different physiological effects. In recent times, diabetes has become one of the most common disorders among Indians. While conventional antidiabetics does come handy in its mitigation, they are associated with several adverse effects. These limitations make it imperative to look for new potential antidiabetic agents. The leaves and flowers of *Nyctanthes arbor-tristis* L. (Sewali Ful) and leaves, flowers and fruits of *Cucurbita maxima* Duchesne (Ronga Lau) are commonly used in different dishes of Assamese cuisine and have the reference of benefit in diabetic population.

Aim: The aim of these study was estimation of quercetin and antidiabetic trace elements (Zinc, Chromium and Selenium) in leaves and flowers of the two plants.

Materials and Methods: Methanolic extract was used for HPTLC analysis on aluminium backed HPTLC plates layered with silica gel 60 F254. The mobile phase used was Toluene-Ethyl acetate-Formic acid-Methanol (5.5:3:1:0.5 % v/v/v/v). For AAS analysis, sample was digested using two methods:

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wet oxidation and dry ashing, which was followed by quantification of trace elements.

Conclusion: Among the studied plant parts, the flowers of *Nyctanthes arbor-tristis* L. contained the highest amount of quercetin, while the lowest amount was estimated in flowers *Cucurbita maxima* Duchesne. Taking both methods used for sample digestion into account, the highest levels of Zinc was found in flowers of *Cucurbita maxima* Duchesne, and the highest levels of Selenium and Chromium were estimated in leaves of *Nyctanthes arbor-tristis* L.

Keywords:

HPTLC, AAS. Quercetin Trace elements, Antidiabetic.

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QUANTITATIVE METHODS OF ESTIMATION OF COUMARIN COMPOUNDS FOUND IN *Aegle marmelos* LINN. USING HPTLC: A REVIEW

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Abstract:

Aim: This review is focused on the HPTLC methods employed for quantification of umbelliferone and psoralen.

Introduction: Aegle marmelos L. commonly known as Bael or Bilva belonging to the family Rutaceae, is a medicinal plant used in the traditional system of Indian Ayurvedic medicine to treat a wide variety of ailments like inflammation, coagulation, bacterial, viral and fungal infection, cancer, hyperglycaemia etc. These plants are indigenous to the Indian subcontinent. The fruit, leaves, and bark of the bael tree are used for various medicinal purposes. These plants are a rich source of coumarins with a wide range of biological activities. Coumarins shows various different pharmacological activities such as anti-inflammatory, anticoagulant, antibacterial, antifungal, antiviral, anticancer, antihypertensive etc. Beal fruits contains several coumarins such as imperatorin, marmelosin, marmin, marmesin, alloimperatorin, marmelide, scoparone, xanthotoxol, umbelliferone, scopolentin, and psoralen. Psoralen, umbelliferone, marmelosin and skimmianine are deemed as medicinally important amongst these. Many quantification methods have recently been reported and validated for the estimation of these coumarins in alcoholic and water extracts of *Aegle marmelos* L.

Methods: Dhalwal *et. al* employed HPTLC for quantitative estimation of

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umbelliferone and psoralen by using a mixture of toluene-methanol (9.6:0.4 v/v) as solvent system, followed by scanning at 331 nm for umbelliferone and at 304 nm for psoralen. Gajbhiye *et.al* used solvent system of toluene–ethyl acetate–formic acid (6:4:0.1, v/v) for TLC run.

Conclusion: The results of various analysis justify the use HPTLC methods for separation and quantification of umbelliferone and psoralen in the fruits of *Aegle marmelos*(L). Presence of these compounds may indicate positive correlation between traditional claims made about this plant and the scientific evidence.

Keywords:

Aegle marmelos, coumarins, HPTLC, umbelliferone and psoralen.

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QUANTITATIVE ESTIMATION OF MINERALS IN SELECTED INDIAN LEGUMES

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Abstract:

Since the world's rapid population expansion, the demand for food worldwide is rising quickly, which is a challenge to provide people with a nutritionally appropriate diet. Legumes could serve an important role in the human diet as they are rich source of minerals as well as other nutritional components. People require sufficient amounts of each essential mineral, including trace elements. Legumes such as mung bean, garden pea, grass pea, common bean, cowpea etc. are rich source of minerals and other nutritional components which are consumed as a staple diet food in all over the world. The study aims to determine the mineral content of Zinc, Selenium and Chromium in commonly consumed legumes *Vigna radiata* (L.), *Pisum sativum* (L.), *Phaseolus vulgaris* (L.), *Vigna unguiculata* (L.) through atomic absorption spectroscopy. The study revealed that the consumption of *Phaseolus vulgaris* (L.) is good for our diet or nutritional supplementation as it contains sufficient amount of Zn, Se and Cr followed by *Pisum sativum* (L.). The findings can be helpful for recommendation of the pulses on the basis of their mineral content for prevention of different diseases. Further study can establish these legumes as alternative source of protein of low cost and with rich mineral content and proper nutrition based diet for human being.

Keywords: Legumes, minerals, zinc, selenium, chromium, AAS.

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EMERGENCE OF THE UBIQUITOUS COSMOPOLITAN PLANT *Vernonia cinerea* AS A POWERFUL RENOPROTECTIVE AGENT: A REVIEW

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Abstract:

Vernonia cinerea Less has been used as a traditional medicine for decades to treat a variety of diseases. The plant, which belongs to the Asteraceae family, has been discovered to have anti-inflammatory, anti-diabetic, renoprotective, anticancer, antiviral, and antibacterial activities. For decades, the plant's leaves, blossoms, roots, and seeds have been used to treat rheumatoid arthritis, conjunctivitis, hypertension, and psoriasis respectively. The traditional siddha medicinal system suggests using a V. cinerea decoction to alleviate metal poisoning. Various extracts and fractions of the plant have been proven in studies to have renoprotective activity against cytotoxicity caused by cisplatin in Human Embryonic Kidney (HEK293) cells and Human Cervical Epitheloid Carcinoma (HELA) cell lines.

Cisplatin is a popular cancer treatment option, however its nephrotoxicity makes it unsuitable for long-term use. One study found that alcoholic, ethyl acetate, and petroleum ether extracts of the plant had considerable renoprotective effect. The current review attempts to bridge the gap between different doses of *Vernonia cinerea* plant extracts and their effectiveness as a renoprotective agent.

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Begonia aborensis DUNN : PHARMACOGNOSTIC STUDIES AND PHYTOCHEMICAL SCREENING

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Abstract:

The pantropical genus Begonia Linnaeus is the fifth largest genus of flowering plants, with over 1,800 species and hybrids currently accepted. Around 45% of the species are harbored in tropical and subtropical Asia, and many new species are described from this hotspot of Begonia variety each year. *Begonia aborensis*, belonging to the family *Begoniaceae*, is native to Arunachal Pradesh, Assam, East Himalaya, Myanmar. It is a rhizomatous, dioecious herb and grows primarily in the wet tropical biome. Begonia has shown great promise in treating fungal infections, inflammation of the body, liver issues, and digestive abnormalities. Phytochemical screening of petroleum ether extract showed positive results for alkaloids, flavonoids and carbohydrates. It underwent phytochemical screening, as well as analyses of the plant's physicochemical properties (loss on drying, extractive values), microscopic, macroscopic, powder microscopy, and other characteristics that must be assessed in pharmacognostic studies.

Keywords: *Begonia aborensis*, Arunachal Pradesh, Pharmacognostic studies, Loss on drying

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CURRENT INSIGHTS INTO CHALLENGES & ONGOING ADVANCES IN DIABETES RETINOPATHY

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Abstract:

Diabetic retinopathy (DR) is a microvascular complication of diabetes and becoming more prevalent as a major factor in middle-aged adults' visual difficulties and disruptions to their workday. The rise in diabetes cases worldwide endangers not only personal health but also to resources, accentuating the risk of blindness. In response, there's a pressing need for innovative programs to diagnose and treat patients effectively. The existing treatments fall short when it comes to targeting the early stages of the disease or slowing down its progression. Thus, there's a crucial demand for the identification of new therapeutic targets, the creation of novel therapies addressing the initial phases of the disease, and the development of accurate models mimicking the pathological characteristics of DR. This review aims to shed light on the mechanisms fueling the development of DR, emphasizing recent strides in both current and upcoming treatments. A comprehensive analysis of conventional and recent advances in the treatment of diabetic retinopathy was conducted, providing insights into the prioritization of various treatments within the clinical landscape. The spectrum of DR treatment spans increased metabolic control, laser therapy, pharmacological interventions (anti-angiogenic and anti-inflammatory treatments, enzymatic vitreolysis, and intravitreal injections), and surgical procedures.

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Other approaches comprises pan-retinal photocoagulation therapy, anti-vascular endothelial growth factor therapy (anti- VEGF therapy), corticosteroid therapy, Artificial intelligence, Gene therapy, nanocarrier based approaches. Recent breakthroughs in retinal diagnostics are proving instrumental in fine-tuning the initiation and maintenance of therapy. Furthermore, strides in novel pharmaceutical agents and ocular drug delivery methods offer hope for better disease control and a reduced treatment burden.

Keywords: Diabetic Retinopathy, Microvascular complication, Metabolic control, Laser therapy, Pharmacological interventions, Artificial intelligence, Gene therapy.

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EXPLORING THE POTENTIAL OF FAST DISSOLVING ORAL FILMS

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Abstract:

Oral drug delivery is a widely used and convenient approach for administering medications, offering various options such as tablets, capsules, liquids, powders, chewable tablets, effervescent tablets, controlled-release formulations, sublingual and buccal administration, orally disintegrating tablets (ODTs), gastrointestinal coatings, and sustained-release and extended-release formulas. Oral fast-dissolving films (OFDFs) disintegrate quickly in the mouth, making it easy to provide medication without the need for water or chewing. They offer numerous advantages, including enhanced bioavailability, precise dosing, improved patient compliance, versatility in drug formulation, discreet administration, suitability for diverse patient populations, stability, and portability. In addition, OFDFs hold promise in enhancing patient compliance by enabling direct absorption through the oral mucosa, circumventing first-pass metabolism in the liver, and enabling a quicker start of action and more effective drug delivery. The formulation of OFDFs is intricate, involving the selection of critical components like water-soluble polymers, active pharmaceutical ingredients (APIs), plasticizers, taste-masking agents, disintegrants, surfactants, antioxidants, and colorants. Polymers, in particular, play a pivotal role in film formation and disintegration, influencing mechanical properties and water absorption. Formulation development incorporates the choice of suitable polymers and excipients and employs various techniques. The

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role of surfactants in enhancing API dissolution is underscored. Different manufacturing methods are explored, and comprehensive characterization measures are detailed. In this review, we discuss the current state of the art in the field of ORDFs, focusing on the development of novel oral fast dissolving buccal films.

Keywords:

Oral fast-dissolving films (OFDFs), controlled release, First-pass metabolism, active pharmaceutical ingredients, polymer.

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BIOFLUORESCENT PARTICLE COUNTING METHODS FOR PHARMACEUTICAL-GRADE WATER AND AIR CLEANLINESS MONITORING IN ASEPTIC PROCESSING AREAS

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Abstract:

Maintaining the highest standards of cleanliness and contamination control is paramount in pharmaceutical manufacturing, particularly in aseptic processing areas where the quality and safety of pharmaceutical products are at stake. Biofluorescent Particle Counting (BFPC) methods have emerged as a cutting-edge approach to ensure the stringent monitoring of pharmaceutical-grade water and air quality in these critical environments. This abstract provides a concise overview of BFPC, its applications, and its significance in the pharmaceutical industry. Biofluorescent Particle Counting (BFPC) is an innovative technique that combines the principles of traditional particle counting methods with the power of biofluorescence. It involves the use of biofluorescent markers, typically attached to microbial particles, which emit fluorescence when excited by an appropriate light source. These markers enable the sensitive detection and counting of particles, including bacteria, fungi, and other microorganisms, in pharmaceutical-grade water and air. This method can identify even low concentrations of biofluorescent particles, providing early warning for potential contamination events. By enabling real-time monitoring, BFPC ensures that water used in drug formulation and aseptic processing is of the highest quality, reducing the risk of product contamination. Air cleanliness monitoring in aseptic processing areas is equally critical, as airborne

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particles can be a significant source of contamination. BFPC allows for continuous air particle monitoring with the capability to differentiate between inert particles and biofluorescent particles, such as airborne microorganisms. In conclusion, BFPC plays a pivotal role in enhancing the quality control processes in pharmaceutical-grade water and air cleanliness monitoring and contributes to the production of safe and high-quality pharmaceutical products offering exceptional sensitivity and specificity in the detection of biofluorescent particles.

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NANOMEDICINE AND ARTIFICIAL INTELLIGENCE IN HEALTHCARE: A SYNERGISTIC REVOLUTION

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Abstract:

The combination of nanomedicine with artificial intelligence has ushered in a new era of healthcare transformation. This review investigates the synergistic potential of these two cutting-edge domains, as well as the substantial impact they have on patient care, diagnosis, and therapy. We look at how nanotechnology can be used for targeted drug delivery, imaging, and diagnostics, allowing for unparalleled precision in medicine. Simultaneously, AI improves decision-making processes, patient management, and medication development through its extensive data analysis capabilities. This review shows the potential of nanomedicine and AI collaboration to optimize treatment techniques, limit side effects, and individualize healthcare, ultimately transforming the healthcare environment. This poster presentation seeks to shed light on the tremendous accomplishments made at the junction of nanomedicine and AI, in order to inspire future discoveries and encourage a new era of healthcare suited to individual requirements.

Keywords:

Artificial intelligence, Nanomedicine, Targeted Drug delivery.

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ISOLATION AND IDENTIFICATION OF PHOSPHATE SOLUBILIZING BACTERIA (PSB) FROM THE RHIZOSPHERE SOIL OF *Lablab purpureus* (L.) SWEET

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Abstract:

Phosphate Solubilizing Bacteria (PSB) present in the soil help in the solubilization of phosphates. Use of chemical fertilizers have led to negative impact on the environment. Use of Phosphate Solubilizing Bacteria is one of the best alternative and eco-friendly practices to supplement the soil phosphate. A laboratory study was conducted to isolate PSB from the rhizosphere soil of *Lablab purpureus* (L).Sweet. Isolation was done on Pikovskaya agar medium by serial dilution of the soil samples. Using biochemical and molecular characterization, the PSB were identified as *Burkolderia cepacia* and Burkholderia sp. Both the strains have shown high Phosphate Solubilizing Efficiency (PSE) and may serve as potent Phosphate Solubilizing Bacteria in the system.

Keywords:

Chemical fertilizer, Eco-friendly, Phosphate Solubilizing Efficiency.

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ADVANCING ALOPECIA MANAGEMENT: A SCIENTIFIC REVIEW OF NOVEL DRUG DELIVERY SYSTEM

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Abstract:

Alopecia or hair loss is a very common innocuous disorder, which with time becomes chronic and greatly effects self-esteem and quality of life of the patients. The main disadvantages with alopecia treatment can be divided into two determinants –1) the genetic base of the disease which makes it non – curable 2) Absence of an appropriate drug delivery system which makes it difficult to manage the conditions. Though in recent times various research are being carried out by which incorporation of targeted drug delivery systems so that the disorder becomes manageable. Follicle-Targeted Delivery of Betamethasone and Minoxidil in polymeric- lipid nanoparticles have showed considerable potential for treatments of AA. Similarly for androgenic alopecia various strategies are made which includes lipid nanoparticles, liposomes, gene delivery to hair follicles which has significant potential. For hair growth, various studies in microneedles are done which shows a potential NDDS to facilitate hair growth is also reported Ethosomes are also in play for alopecia treatments. PRP –fibrin-rich matrix, stem cells, biofilms are also potential treatment options for managing alopecia.

Keywords:

Alopecia, Nanoparticles in Alopecia, Targeted Delivery System in Alopecia, Bioflims, Hair Growth, Microneddles.

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BIOACTIVITY GUIDED ISOLATION AND STRUCTURAL CHARACTERIZATION OF THE ANTIHYPERGLYCEMIC COMPOUND FROM ASSIMILATORY ROOT EXTRACT OF *TINOSPORA SINENSIS* (LOUR.) MERR

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Abstract:

Naturally-derived antihyperglycemic medications have been explored as alternatives to the widely-used drugs that can cause mild to severe side effects. *Tinospora sinensis* has been traditionally used to treat hyperglycemic patients. The present study was aimed at evaluating the hypoglycemic effect of fractions and subfractions of the assimilatory root extract of *T. sinensis.* The plant sample was extracted using five solvent systems. The extracts were fractionated using TLC and column chromatography. Antihyperglycemic activity of crude extracts, fractions and sub-fractions were screened by alpha-amylase and alpha-glucosidase inhibitory assays. Mass spectral analysis and structural elucidation of bioactivity guided active isolated compound was determined by HRMS and NMR. Results of in-vitro studies revealed that among the solvent extracts, ethanolic extract recorded higher inhibitory activity. Based on the TLC profile of ethanolic extract, Petroleum ether : Ethyl acetate was detected as the appropriate solvent system for column chromatography. Further screening of fractions of ethanolic extracts through in-vitro assays FR-A3 recorded higher inhibitory activity. The characterization and structural elucidation of FR-A 3 of assimilatory root through HRMS and NMR, revealed the compound to be Gloriosine. This study

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validates the importance of *T.sinensis* assimilatory root as an important resource for anti-hyperglycemic remedies.

***Keywords*:**

Antihyperglycemic, assimilatory root, bioactivity guided isolation, column chromatography.

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EXPLORATION OF CHEMICAL CONSTITUENTS AND THERAPEUTIC POTENTIAL OF THE GENUS *TRICHOSANTHES*

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Abstract:

Trichosanthes is considered as one of the largest genera in the Cucurbitaceae family consisting of about 125 genera and 1000 species widely distributed throughout the tropics and temperate areas around the world. This plant is dioecious or rarely monoecious, annual or perennial, herbaceous with climbing or trailing stems bearing tendrils. Many species of this family are constantly used in traditional medicines to cure diverse human diseases and is also utilized as ingredients in some food recipes. A total of 103 compounds including 15 steroids, 55 triterpenoids classified into 30 cucurbitacin triterpenoids, 4 cycloartane triterpenoids and 21 pentacyclic triterpenoids, 9 flavanoids and 24 other compounds were identified from *Trichosanthes* plant. In modern medicine, it comprises of great interest with a wide range of biological activities including anti-diabetic, anti-tumoral, anti-parasitic, anti-bacterial, anti inflammatory and cytotoxic activities. This review enlightens the therapeutic potential and different type of chemical constituents of the *Trichosanthes* plants and expected to draw the attention of general public as well as pave the way for detailed research in the future.

Keywords*:*

Trichosanthes, Cucurbitaceae, traditional medicine, triterpenoids.

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A REVIEW ON THE TRADITIONAL APPLICATION AND HEALING CAPACITIES OF THE PLANT DENDROCNIDE SINUATA (BLUME) CHEW

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Abstract:

Traditional Medicines plays an important role in the primary healthcare in India. *Dendrocnide sinuata* (Urticaceae) locally known as hemtsa zaklo (stinging plant) is an evergreen large shrub to small trees and a genus of approximately 40 species of plants has been traditionally used for treating diseases such as inflammation, urinary disorder, irregular menstruation, and jaundice. The main objective of this study is to conduct an extensive literature review on the ethnomedicinal uses and healing capacities of the plant *D.Sinuata*. Various researches have reported that the plant exhibit vivid pharmacological activities like anti-inflammatory, analgesic, hepatoprotective, antimicrobial, antioxidant which could be responsible due to the presence of a wide array of phytochemicals like alkaloids, flavonoids, triterpenes, and numerous phenolic acids. Thus, the plant holds a huge potential which need to be scientifically validated for its medicinal value and valorisation of the natural resource of North-East India.

Keywords:

Dendrocnide sinuata, North-East India, Traditional Medicine, Jaundice, Urinary disorder.

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MULTIFUNCTIONAL NANODIAMONDS AS EMERGING NEW AGE NANOPARTICLES FOR MOLECULAR TARGETING IN PANCREATIC DUCTAL ADENOCARCINOMA.

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Abstract:

Globally, pancreatic ductal adenocarcinoma (PDAC) is a leading cause of cancer-related morbidities. Molecular targeting of the chemotherapeutic payload is one of the novel medication delivery strategies supported by nanotechnology that have been contemplated. The gross survival rate of PDAC patients hasn't increased significantly, though. Tumour desmoplasia, or the appropriately named tumour microenvironment (TME), is a stromal extracellular matrix that is abundant and heterogeneous within the tumour. It is one of the most stromal-rich malignancies and plays a crucial role in the tumour pathogenesis of PDAC, taking up the majority of the tumour mass. Drug delivery may be hampered by the intricate interplay that affects tumour growth and exists between the tumour and dynamic TME components. It is imperative that we comprehend and decode the intricate cascade of this “tumor-stromal” interactions in order to create novel nano-carriers that can target the tumour and disrupt the stroma. Because of their distinct surface properties, Nanodiamonds (NDs) have become a novel “new age” nano-delivery method in a number of pre-clinical cancer models, and they may be able to deliver the chemotherapeutic payload by passing through the dynamic tumor-stromal barrier. It might be the next big revolution in the arena of nanotechnology and pancreatic cancer targeting with nanoparticles.

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GREEN-GOLD REVOLUTION: A COMPREHENSIVE REVIEW ON THE GREEN SYNTHESIS OF GOLD NANOPARTICLES AND THEIR THERAPEUTIC ACTIVITY

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Abstract:

Gold nanoparticles have gained significant attention in recent years, not only for their unique optical and physical properties but their diverse therapeutic applications. Their small size allows them to penetrate cells and tissues, making them valuable tools in biomedical research and applications. The green approach for synthesizing gold nanoparticle is an eco-friendly process and produces non-toxic and biocompatible nanoparticles. This article covers the green approach for synthesizing gold nanoparticles using biocompatible agents such as plant extracts. Furthermore, it discusses the wide array of therapeutic applications of green synthesized gold nanoparticles ranging from cancer therapy, antimicrobial action, to anti-viral action. This article concludes that the versatility and adjustable properties of gold nanoparticles holds great promise in the field of nanomedicine. The potential of green-synthesized gold nanoparticles in addressing various healthcare challenges and encourages further research in their therapeutic applications.

Keywords:

Gold nanoparticles, green chemistry, biomedical applications.

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PHARMACOGNOSTICAL, PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY OF *Musa balbisiana* COLLA

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Abstract:

Musa balbisiana, a wild-type banana species, belongsing to the family *Musaceae*, is a herbaceous plant with several medicinal values. It is a major fruit bearing plant native to eastern South Asia, northern Southeast Asia, and southern China. It has been documented to be effective in treating a number of diseases as pinworm infection, cough, infertility in women, jaundice, diabetes, gout and gastritis. *Musa Balbisiana* contains flavonoids, polyphenols, tannins, terpenoids, quinones, and saponins. In many district of Assam, the decoction of stem part of the plant is traditionally used to reduce uric acid levels. This plant has a high commercial value in every state, and it is being taken from its natural environment. Correct depiction and quality assurance of starting materials is an essential step to ensure reproducible quality of herbal medicine which will ensure safety and efficacy. Therefore, the aim of the present study is to investigate the pharmacognostical, physicochemical, phytochemical parameters of *Musa balbisiana.* Phenolic and flavonoid contents were estimated following standard protocols. The antioxidant activity of the plant was further studied by hydrogen peroxide radical scavenging assay and 1,1-diphenyl-2-picryl-hydrazyl scavenging assay. The results of powder microscopy showed the presence of calcium oxalate crystal, fibers etc. The phytochemical study revealed that the stem extract is rich in protein, carbohydrates,

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phenolics, and flavonoid content. Antioxidant study revealed strong free radical scavenging property. Therefore this plant can be explored to identify the phytoconstituents responsible for antioxidant activity and evaluate its effectiveness in oxidative stress-related diseases.

Keywords*:*

Musa balbisiana, physicochemical, phytochemical.

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NOBLE METAL NANOPARTICLES FOR CANCER NANOTHERANOSTICS: A RECENT UPDATE

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Abstract:

The limitations of current treatment strategies for cancer management have provoked a significant transference in the research and development of new effective strategies exhibiting optimum and accurate efficacy having minimal side effects. In this course, nanotheranostics has gained significant interest in recent years, combining both the diagnostic and therapeutic proficiencies of nanostructures for efficient disease diagnosis, treatment, and management. Such nano-assisted platforms authorize the site-specific release of bioactive cargo in a controlled manner while allowing non-invasive real time *in situ* monitoring. A superfluity of materials has been developed as pharmacologically relevant nano-formulations for theranostic applications ranging from metallic to lipid and polymer-based composite systems, with each offering potential prospects and its own limitations. To improve advancements with better clarity, the main focus of this poster is to highlight the recent developments concentrating on using different noble metal nanoparticles (MNPs) as cancer nanotheranostic agents, highlighting their properties, advantages, mechanism of actions and potential modifications for their successful utilization in personalized medicine. The advantage of using noble metals (not all, but those with an atomic number ≥76) over metal NPs is their tendency to provide additional properties, such as X-ray attenuation and near-infrared activity. The combination of these properties translates to noble MNPs for

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therapeutic and diagnostic applications, independent of the need for additional active molecules for cancer.

Keywords:

*C*ancer; noble metal; nanoparticles; nanotheranostics; nanotherapeutics; tumour.

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A COMPREHENSIVE ANALYSIS OF NUCLEAR MEDICINE METHODS FOR CANCER DIAGNOSIS AND TREATMENT

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Abstract:

Nuclear Medicine8 defines new standards/guidelines for nuclear medicine practice on a regular basis to help progress the science of nuclear medicine and enhance patient care. The most recent nuclear medicine advancement is the prostate specific membrane antigen (PSMA) PET, which is emerging as the most promising medical imaging technology and gaining ground on a daily basis. Molecular imaging with PET/CT targeting the prostate-specific membrane antigen (PSMA) receptor is increasingly utilized in men with prostate cancer (PCa).

Nevertheless, the disparate beginning of many investigations fails to develop a global acceptance and adoption of this technique in guidelines, as well as its role in day-to-day medical algorithms. Targeting the prostate-specific membrane antigen (PSMA) protein has proven to be extremely beneficial in the treatment of prostate cancer (PCa). PSMA positron emission tomography/computed tomography (PET/CT) is increasingly being employed in the initial staging and restaging of biochemical recurrence in patients with PCa, where it has demonstrated superior detection rates when compared to other imaging modalities. Even though PSMA PET reveals more extended disease than expected, Studies being in progress and future trials with clarify whether PSMA PET will be the new gold standard technique for specific groups of patients. In both primary and secondary tumors,

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radioembolization has been shown to be a safe and effective treatment option resulting in markedly increased response rates and overall survival, Therefore, the choice to undertake radioembolization should be made in accordance with current clinical recommendations in order to help the nuclear medicine physician treat and manage patients having radioembolization treatment.

The Nuclear Medicine Manual on Gynaecological Cancers and Other Female Malignancies is a publication that seeks to expand the role of nuclear medicine in gynaecological oncology, particularly breast cancer research.

***Keywords*:**

Nuclear medicine, Cancer, Positron emission tomography, Radio immobilization.

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CURRENT ADVANCES IN CARBON NANOTUBES (CNT) AND ITS CONTRIBUTIONS TOWARDS CANCER DETECTION, DIAGNOSIS AND THERAPY.

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Abstract:

While promising advances in medical technology, cancer remains one of the leading causes of mortality, and traditional therapy approaches frequently fail to achieve an effective cure. Cancer is a sickness characterised by uncontrolled cell proliferation with the potential to infiltrate other human organs, with an anticipated 10 million deaths worldwide in 2020. Nanobiotechnology has recently achieved significant advances in cancer therapy, with enormous application potential due to its capacity to provide precise and controlled medication release, increase drug solubility, and reduce unwanted effects. Carbon nano tubes are one dimensional hexagonal meshes of synthetic sp2 hybridised carbon atoms with nanosized diameters. Because of their huge surface area, stability, high aspect ratio, and rich surface chemical capabilities, they have gained a lot of interest in biological applications. Because of their tubular and fiber-like shape and ease of functionalization with nucleic acid, peptides, and proteins, they have also shown to be efficient transporters for the delivery of medicines and biomolecules. Carbon nanotubes (CNTs) have lately piqued the interest of researchers in the field of cancer detection and therapy due to variables like as biocompatibility, thermodynamic characteristics, and diverse functionalization. Following researchers' common objective of developing a

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novel delivery mechanism to improve the pharmacological performance of the supplied medicine, carbon nanotubes (CNTs) were considered a viable cargo for cancer therapy and diagnostics. We will emphasise current advances in CNT contributions to cancer detection, diagnosis and therapy in this review

***Keywords*:**

Carbon nanotubes, Nano biotechnology, Cancer detection, Cancer diagnosis.

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GREEN CORROSION INHIBITORS FOR MILD STEEL: A COMPREHENSIVE REVIEW

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Abstract:

Corrosion of mild steel is a significant challenge in various industrial sectors, leading to substantial economic and environmental costs. To address this issue various organic, inorganic, and mixed inhibitors have long been used. In recent years, there has been growing interest in the development of green and sustainable corrosion inhibitors to mitigate the adverse effects of corrosion. Nanomaterials have emerged as promising candidates for this purpose due to their unique properties and environmental friendly characteristics. Nanomaterials can act as effective barriers against corrosion by forming protective layers on the surface of mild steel. They can also inhibit electrochemical reactions that lead to corrosion, thus extending the lifespan of the material. This comprehensive review highlights the immense potential of nanomaterials as green corrosion inhibitors for mild steel, offering sustainable and ecofriendly solutions to combat corrosion related challenges. The integration of nanotechnology into corrosion inhibition strategies presents a promising path for the advancement of material sciences and the protection of mild steel in diverse industrial applications.

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RECENT ADVANCES IN DRUG DISCOVERY AND SCREENING

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Abstract:

The poster presentation, "Recent Advances in Drug Discovery, Designing and Screening," offers a comprehensive overview of the transformative innovations that have reshaped the landscape of pharmaceutical research and development. This dynamic field has witnessed remarkable progress in the identification and validation of novel drug candidates, as well as the optimization of screening processes. The poster will explore key developments in drug discovery, emphasizing cutting-edge techniques in target identification, lead compound generation, and molecular modeling. It discusses the integration of artificial intelligence and machine learning, which have revolutionized the analysis of vast biological datasets and accelerated the identification of potential therapeutic agents. Besides, the poster reinforces the advancements in high-throughput screening methods, including the use of micro fluidics and lab-on-a-chip technologies. These innovations have significantly improved the efficiency and accuracy of screening campaigns, allowing for the rapid identification of drug candidates with higher success rates. Added to that, the application of CRISPR-Cas9 technology and gene editing tools for target validation and disease modeling are featured, as they have paved the way for more precise and personalized drug development strategies. These breakthroughs have enabled the creation of disease-specific cellular models and platforms for testing potential drug candidates.

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Finally, the integration of computational chemistry, virtual screening, and in silico methods are discussed, showcasing their pivotal role in rational drug design and the optimization of lead compounds.

Keywords:
Molecular modeling, Artificial intelligence, Machine learning, High-throughput screening, Microfluidics, Lab-on-a-chip, CRISPR-Cas9 technology

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RECENT ADVANCES IN DRUG DELIVERY SYSTEMS

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Abstract:

The field of drug delivery systems has witnessed remarkable advancements in recent years, revolutionizing the way pharmaceuticals are administered and optimizing their therapeutic efficacy. This poster presentation highlights the most significant breakthroughs in drug delivery technologies, showcasing innovative strategies that have the potential to reshape the future of medicine.

The poster will delve into various drug delivery approaches, including nanoparticle-based carriers, liposomes, microneedles, and implantable devices. These approaches enhance drug stability, control release kinetics, and improve targeting accuracy, ultimately leading to increased patient compliance and reduced side effects. Furthermore, the poster will shed light on the integration of smart materials and nanotechnology in drug delivery systems, providing a glimpse into the possibilities of personalized medicine. These advancements allow for precise drug dosing, real-time monitoring of patient responses, and adaptive treatment plans, ensuring optimal therapeutic outcomes. Key topics covered include advances in biocompatible materials, bio responsive drug carriers, and minimally invasive delivery methods. Additionally, we will explore the potential applications of 3D printing and micro fabrication techniques in the design and fabrication of customized drug delivery devices. The poster underscores the impact of these

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recent developments on various medical fields, from oncology and immunotherapy to chronic disease management. By enabling better drug delivery, these breakthroughs promise to enhance patient well-being, reduce healthcare costs, and open up new horizons in pharmaceutical research. In conclusion, this poster offers a comprehensive overview of recent advances in drug delivery systems, highlighting their potential to transform healthcare and improve the quality of life for patients worldwide. It serves as a valuable resource for researchers, clinicians, and pharmaceutical industry professionals seeking to stay at the forefront of this dynamic and evolving field.

Keywords:- Nanoparticle-based carrier, Liposomes**,** Micro-needles**,** Implantable devices**,** Drug stability**,** Release kinetics**,** Targeting accuracy**,** Patient compliance**,** Reduced side effects**,** Smart materials**,** Nanotechnology.

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OFLOXACIN-ORNIDAZOLE (O2) INDUCED TOXIC EPIDERMAL NECROLYSIS: A RARE PHARMACOVIGILANCE REPORT

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Abstract:

O2 drug, used commonly as a treatment for diarrhea, considered to be relatively safe but can cause serious cutaneous reactions very rarely. Toxic epidermal necrolysis (TEN) - a rare, life threatening usually drug induced which caused mucocutaneous disorder. A 76 year old female received 2 tablets of O2 for multiple episodes of loose motion with no history of intake of other drugs. She has not reported of any other co-morbid conditions. On the next day, she experienced a severe, skin blister and raw area involving bilateral extremities, front and back of chest, upper eyelids, oral mucosa and genitals which turned to TEN. On investigation, she was found to have deranged KFT and electrolyte imbalance. The patient's outcome was fatal on the 14th day. The causality assessment done using WHO-UMC criteria showed probable type of relation with the medicine. TEN affecting approximately 1 or 2/1000000. Drugs at high risk of TEN- Allopurinol, Trimethoprim, sulfonamide antibiotics, aminopenicillins, cephalosporins, quinolones, phenobarbitones, NSAIDS etc. It is hoped that this case report creates awareness that **O2** induced TEN is possible.

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CONTROLLED DRUG DELIVERY SYSTEMS: CURRENT STATUS AND FUTURE DIRECTIONS

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Abstract:

Controlled drug delivery systems have revolutionized the field of pharmacology, offering precision, efficacy, and enhanced patient compliance. This topic explores the current status and future directions in the development of these systems, shedding light on their potential to reshape the landscape of healthcare. The current status of controlled drug delivery systems is characterized by a diverse array of technologies and approaches. From oral formulations with extended-release profiles to implantable devices and nanocarriers, these systems have improved therapeutic outcomes across a broad spectrum of medical conditions. This poster will showcase the diversity and adaptability of these systems, with a focus on recent advancements. The future of controlled drug delivery systems promises even more remarkable breakthroughs. Nanotechnology and personalized medicine are expected to play pivotal roles in shaping the next generation of drug delivery systems. The poster will discuss the potential of nanoscale drug carriers for precise targeting. It also discusses the conventional drug delivery systems and their limitations. Further, controlled drug delivery systems are discussed in detail with the design considerations, classifications and drawings. In addition, nano-drug delivery, targeted and smart drug delivery using stimuli-responsive and intelligent biomaterials is discussed with recent key findings. In conclusion, this poster presentation offers a comprehensive overview of the current status and

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future directions of controlled drug delivery systems. As we stand on the cusp of a new era in healthcare, the integration of cutting-edge technologies and a commitment to patient-centric approaches will drive innovation in this field, potentially revolutionizing the way we deliver and experience medicine.

***Keywords*:**
Implantable devices, Nanocarriers, Nanotechnology, Personalized medicine, Nano-drug delivery, Smart and stimuli-responsive delivery, Intelligent biomaterial.

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ENHANCING WOUND HEALING WITH LIPID-BASED NANOPARTICLES

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Abstract:

Wound healing is a complex, dynamic process involving several sequential steps. Although there are a variety of topical skin preparations commercially available, they have several limitations that frequently impair wound healing, such as drug instability, toxicity, limited time of action, and ineffective skin permeation. Drug delivery techniques based on nanoparticles can be utilized to get around these limitations. Recently, lipid nanoparticles (LNPs) have drawn a lot of interest from dermatologists because of their many functions, including better skin adhesion and film formation, the ability to hydrate and maintain skin integrity, and more efficient penetration through the skin barrier. These nanoparticles are composed of biodegradable and biocompatible lipids that enable controlled drug delivery, drug protection, and targeted drug delivery. LNPs are mainly divided into liposomes, solid-lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs). Furthermore, these lipid nanoparticles as drug carriers have proved to be effective in treating wounds, such as second-degree burns, cuts, and chronic wounds, as they effectively cover the surface of the wound site and deliver the desired drug which activates a cascade of events that accelerate the wound healing process and maintain a moist environment without causing toxicity. The present work highlights the recent advances of lipid-based nanoparticles for improving wound

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healing along with the challenges.

Keywords:
Wound healing, Controlled release, Toxicity, Lipid nanoparticles, biodegradable lipids.

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A SYSTEMATIC FOCUS ON EMERGING ANTIBODY BASED THERAPY FOR MULTIPLE SCLEROSIS

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Abstract:

Monoclonal antibodies are proteins made in laboratories. Monoclonal antibodies are identical immunoglobulins, generated from a single B cell clone. These antibodies recognize unique epitopes, or binding sites on a single antigen. Monoclonal antibodies are prepared using hybridoma technology. Monoclonal antibodies nowadays are widely used in the treatment of autoimmune diseases. Multiple sclerosis is a chronic, progressive, degenerative and autoimmune disease which affects brain and spinal cord. The actual cause of multiple sclerosis is unknown may be some genetic factors like family history, low vitamin D levels, obesity, certain infections, etc. Monoclonal antibodies treatment for multiple sclerosis slows the disease progression while reducing the frequency and severity of relapses. Monoclonal antibodies are highly specific in nature as they perform targeted drug delivery, shows high efficacy. Monoclonal antibodies used commonly in the treatment of multiple sclerosis are natalizumab, alemtuzumab, ocrelizumab. In multiple sclerosis, monoclonal antibodies are used to modulate the immune system to lessen central nervous system (CNS) attacks and effectively reduce relapses as well as the inflammation that results in lesions. On the other hand, monoclonal antibodies cause various side effects such as fever, chills, fatigue, headache, hypotension, dermatological reactions, nausea, vomiting, diarrhea, others include infusion problems and injection related reactions. Though

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many challenges are being faced regarding monoclonal antibodies technology, but treatments in diseases using monoclonal antibodies appears to be much promising and efficient nowadays.

***Keywords*:**

Monoclonal antibodies, Multiple sclerosis, Autoimmune disease, Hybridoma technology, Immune system.

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DNA ORIGAMI NANOROBOTS: A CUTTING EDGE APPROACH IN CANCER THERAPY

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Abstract:

Nanoparticles are widely used for drug delivery, targeting specific cells. However, they have limitations related to their uniformity and the efficiency of modification. DNA Origami is a significant field within DNA Nanotechnology that allows for precise construction of DNA nanostructures which are biocompatible, biodegradable and highly customisable as they can be modified with various functional components like aptamers, lipids, proteins and inorganic nanomaterials. DNA Origami involves folding of a long single-stranded DNA molecule (ssDNA) known as the scaffold (typically viral DNA ~7,000 nucleotides long) with hundreds of designed short ssDNAs called staples. These staples contain multiple binding domains that connect distant sections of scaffold through crossover base pairing. The geometries of the resulting structures can be programmed with the staple sequences. Using DNA Origami, scientists have formulated nanoscale robots or "Nanorobots" that show potential as smart drug delivery systems which respond to molecular triggers. This 100nm cylindrical device is initially a flat DNA sheet loaded with DNA-tagged thrombin enzymes. The DNA fasteners converts the sheet to a tube which shields thrombin from the environment. The aptamers present in the DNA fasteners binds with Nucleolin, a tumour-vasculature marker and exposes thrombin to the blood which results in blood clotting, thus inducing tumour cell infarction and ultimately tumour shrinkage. Preclinical

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in-vivo studies demonstrated that these nanorobots are immunologically inert. While challenges like production costs, in-vivo stability, and biodistribution need further investigation, these nanorobots offer a promising approach for precise drug delivery.

Keywords:

DNA Nanotechnology, DNA Origami, Nanorobots, DNA Fasteners, Nucleolin, Thrombin, DNA Aptamers.

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BIOTECHNOLOGY AND ITS APPLICATION IN HUMAN HEALTH

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Abstract:

Biotechnology is a broad and advanced technology which uses biology to develop new products or methods that can help the human health and welfare not only in agricultural, forestry, chemical, household products but especially in the field of pharmaceuticals. This presentation focus on the pharmaceutical applications such as Genetically engineered Insulin, Molecular diagnosis and Gene therapy. With the help of biotechnology we can easily grow a large quantity of the bacteria and make as much insulin as we need. With Molecular diagnosis like ELISA, Recombinant DNA technology, PCR, etc., we can understand and increase the effectiveness of treatment and diagnosis of diseases. Gene therapy allows correction of gene defect that has been diagnosed in the embryo. It was observed that the areas and scope of applications of biotechnology would broaden with respect to advancement in science. It was concluded that the applications of biotechnology are so broad and advantageous that virtually every industry is using this technology and enables these industries to make new or better products with greater speed for the development of human health and welfare.

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NANOPARTICLES: RECENT BREAKTHROUGH IN DRUG DELIVERY SYSTEMS

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Abstract:

Nanoparticles have emerged as promising tools in biomedical applications, particularly in the area of drug delivery, revolutionizing the landscape of healthcare. This topic provides a comprehensive overview of the pivotal role that nanoparticles play in enhancing therapeutic interventions for various health conditions. The versatility of nanoparticles stems from their unique physicochemical properties, allowing for precise control over size, surface characteristics, and drug-loading capacity. In drug delivery, nanoparticles serve as carriers that can encapsulate a diverse range of pharmaceutical agents, ensuring targeted and controlled release. This targeted delivery minimizes off-target effects, enhances drug bioavailability, and reduces systemic toxicity. This topic focuses on the intricate interplay between nanoparticles and their biomedical applications, exploring their potential impact on the treatment of diseases. The design and fabrication of nanoparticles can be tailored to optimize drug delivery systems for specific diseases, such as cancer, infectious diseases, and neurodegenerative disorders. The ability to navigate biological barriers, including the blood-brain barrier, further extends the scope of nanoparticle-based therapies. Moreover, the incorporation of stimuli-responsive elements in nanoparticle design adds an extra layer of sophistication, enabling on-demand drug release in response to

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cues. This not only improves therapeutic efficacy but also allows for personalized medicine approaches. The abstract delves into recent advancements in the field, highlighting cutting-edge strategies for synthesizing nanoparticles and characterizing their interactions within biological systems. Additionally, it addresses challenges associated with nanoparticle-based drug delivery, such as scalability and long-term safety concerns. In conclusion, this poster presentation sheds light on the transformative potential of nanoparticles in biomedical applications, with a special emphasis on drug delivery. Understanding the intricate dynamics between nanoparticles and biological systems is crucial for unlocking their full therapeutic potential and advancing the future of healthcare.

Keywords:

Nanotechnology, Nanoparticles, Drug delivery, Nanomedicine.

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ISOLATION AND CHARACTERIZATION OF NANOFIBRILLATED CELLULOSE FROM THE AQUATIC WEED WATER HYACINTH: *Eichhornia crassipes*

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Pratiksha Institute of Pharmaceutical Sciences, ASTU, Assam, India

Abstract:

The escalating demand for sustainable and eco-friendly materials has led to the exploration of alternative sources of nanomaterials, one of which is Nanofibrillated cellulose (NFC). In recent years, NFC has garnered significant attention due to its remarkable mechanical properties, biocompatibility, and renewability. It is a novel approach for the extraction and characterization of NFC from an unlikely source: aquatic weed. A completely unexplored source of cellulose fibers are aquatic weeds, which are frequently seen as environmental annoyances. This work shows how to extract NFC from common aquatic weed species like water hyacinth (Eichhornia crassipes), in an economical and environmentally beneficial manner. Rapid growth of these aquatic weeds causes ecological imbalances in bodies of water. We reduce the negative effects of these weeds on the environment and offer a reliable supply of nanomaterials by turning them into useful NFC.

The cellulose fibers are efficiently broken down into nanoscale dimensions during the NFC extraction process by a mix of mechanical and chemical treatments. The effective separation of NFC with high crystallinity and nanoscale dimensions is revealed by characterization tests using X-ray diffraction (XRD), transmission electron microscopy (TEM), Scanning electron microscopy (SEM), Fourier-

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transform infrared spectroscopy (FTIR) etc. Aquatic weed-derived NFC has superior mechanical characteristics like Young's modulus and tensile strength compared to conventional NFC, making it suitable for applications in composites, biomedicine, paper and packaging industries, tissue engineering, wound dressings, and drug delivery systems, making it biocompatible and suitable for various industries.

This study underscores the feasibility of using aquatic weed biomass as a valuable resource for NFC production, mitigating the ecological impact of invasive aquatic plants while promoting sustainable materials. The multifaceted potential of NFC extracted from aquatic weed demonstrates its versatility in various industrial and environmental applications, contributing to the development of greener and more sustainable technologies.

Keywords:

Nanofibrillated cellulose, Aquatic weed, Biomass, Sustainable materials, Extraction, Characterization, Applications.

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NANOSTRUCTURED LIPID CARRIERS (NLC): A POTENTIAL CARRIER SYSTEM FOR TOPICAL DELIVERY OF BIOACTIVE

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Abstract:

Since ancient times, a wide range of plant-based bioactive compounds have been used as the origin of drugs, many of which have been shown to be effective in treating a variety of diseases. However, there clinical applicability has been limited due to their poor aqueous solubility, low bioavailability, stability and extensive transformation due to the first-pass metabolism. Topical delivery offers many advantages over oral delivery, such as avoidance of first-pass metabolism, effective targeting of the active ingredient, enhancing the bioavailability of poorly soluble drugs, and providing patient compliance. However, several problems have been reported with the conventional topical preparations e.g. low uptake due to the barrier function of the stratum corneum, absorption to the systemic circulation and the delivery of larger molecules remains a challenge. Therefore there is a need for development of pharmaceutical nanocarrier to ameliorate the limitations of bioactives and also the conventional topical delivery. Nanostructured lipid carriers (NLCs) are second-generation lipid nanocarriers composed of biocompatible solid lipids, liquid lipids, the incorporation of liquid lipid improved drug loading, drug release flexibility and better stability over Solid lipid nanoparticle (SLN). And also due to its ability to overcome the complex structure of skin barrier and enhance skin penetration rate it is most suitable for topical treatment. NLCs are truly a “nanosafe” carrier due to their biodegradable composition which facilitate

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unique interactions at interfaces with the barrier membrane and have immense promise to overcome the challenges. The present review provides a detailed overview of the composition, production and application of these nanocarriers to improve the topical delivery of bioactives for local and systemic effects.

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CURRENT DRUG DELIVERY STRATEGIES FOR PROSTATE CANCER

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Abstract:

Prostate cancer is characterized by cells in the prostate gland that divide abnormally, leading to aberrant prostate gland growth. Most men do not die from prostate cancer; instead, they either have a slow-growing tumor that affects them or receive good therapy and live. Metastasis, or the spread of cancer cells to other parts of the body, including the pelvic and retroperitoneal lymph nodes, the spinal cord, the bladder, the rectum, the bone, and the brain, is the primary cause of death from prostate cancer. Worldwide, prostate cancer remains a serious public health concern, particularly in nations where men can expect to live long enough to develop the disease's clinical symptoms. Despite considerable advancements over the past few decades (such as the development of prostate specific antigen [PSA], improved radiation and surgical methods, and innovative systemic medicines), many aspects of the detection and treatment of prostate cancer patients remain unclear. For instance, there is considerable debate over the benefits and drawbacks of PSA-based screening, including who should be tested, how to screen, when to stop, and when to perform a biopsy. Although certain dietary recommendations, including adjustments to nutrition and lifestyle, have been promoted, there are currently no surefire ways to avoid prostate cancer. The majority of the study on dietary substances is currently under progress, therefore definitive findings and

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suggestions are not yet accessible. The success rates for managing or controlling prostate cancer have grown as a result of increased awareness of the advantages of early detection and treatment options, and new clinical trials are now being made available to treat the disease at various stages of disease progression. Some of the most cutting-edge and inventive medication delivery methods now available for the treatment of prostate cancer are covered in this review.

Keywords:

Prostate cancer; drug delivery systems; prostate cancer treatments

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PHARMACEUTICAL APPLICATION AND FUTURE PROSPECTIVES OF DILLENIA INDICA: A REVIEW

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Abstract:

Dillenia indica f. *elongata (Miq.) Miq*. (Dilleniaceae) is commonly known as the Elephant apple with vernacular names including Karambel, Outenga, Bhavya and Ramphal. It is geographically found in Assam, West Bengal, Orissa, and Bihar regions of India. It has been prevalently used in Indian traditional and ayurvedic medicine for curing a plethora of ailments. Traditionally different parts of *Dillenia indica* f. *elongata (Miq.) Miq.* have been used for the relief of indigestion, asthma, influenza, dysentery, jaundice, weakness and rheumatic pain. This review aims to study the traditional and pharmaceutical applications of *Dillenia indica* and its future perspectives which provide important information on various pharmaceutical research works of *Dillenia indica.* An extensive literature study was carried out in various online databases to find the chemical constituents of *Dillenia indica* and research work on it. Major chemical constituents present in *Dillenia indica* are betulin and betulinic acid which show a wide spectrum of pharmacological activities. Other phytoconstituents are Dillenetin, Sitosterol, lupeol, Stigma sterol, Pectin etc. *Dillenia indica* has been reported to have anti-oxidant, anti-proliferation, anti-diarrhoeal, wound healing, analgesic, anti-diabetic, antibacterial activity etc. The juice of its leaves, bark and fruits is reported to be used in the treatment of cancer and diarrhoea. The leaves and bark have a laxative, tonic and astringent effect. Its seed is used to enhance digestion, and tackle

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weakness, and rheumatic pain. The present study provides characteristic features of *Dillenia indica* and previous research work on it. It would provide an opportunity for researchers to carry out further studies in this area, especially in the drug development process.

Keywords:

Dillenia indica, ayurvedic medicine, botulin, betulinic acid.

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SURVEY ON PLANTS USED BY ETHNIC COMMUNITIES OR ASSAM TO PREPARE TRADITIONAL ALCOHOLIC BEVERAGES

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Abstract:

Assam is a diverse region where many distinctive tribes coexist harmoniously with unique traditions and cultures. Notably, these tribes are renowned for their production of a variety of ethnic fermented beverages, which play a significant role in their cultural heritage. Among the prominent tribes, we investigated regarding the plants used to prepare alcoholic beverages by Mishing, Deori, and Sonowal for their cultural and medicinal significance. The major beverages prepared are Poro Apong and Noggin Apong by the Mishing, Sujen by the Deori, and Rohi (Buhra Mod) by the Sonowal tribe of Assam. These alcoholic beverages have been traditionally used for therapeutic purposes, primarily in the treatment of conditions like diarrhea, urinary tract infections (UTI), fever, and cough etc.

The focus of the present study is the identification of plant materials utilized in their production. Additionally, this study delves into a comparative analysis of the alcohol content of these beverages. The purpose of this analysis is to assess the suitability of these traditional beverages for the treatment of the aforementioned diseases, shedding light on their potential medicinal benefits. The findings underscore the importance of preserving and further investigating these age-old practices, as they hold promising potential for improving public health and promoting the conservation of traditional knowledge in Assam.

Keywords:

Ethnic alcoholic beverages, Mishing tribe, Deori tribe, Sonowal tribe, Apong.

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GREEN SYNTHESIS OF ZINC OXIDE NANOPARTICLES BY USING ALTERNANTHERA DENTATA, THEIR CHARACTERIZATION AND IN-VITRO EVALUATION OF THEIR ANTI-UROLITHIATIC ACTIVITY

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Abstract:

The synthesis of nanoparticles using environmentally friendly methods has gained considerable attention due to their broad range of potential applications and eco-friendly nature. This study specifically focuses on the green synthesis of Zinc Oxide Nanoparticles (ZnO-NPs) using Alternanthera dentata, a medicinal plant known for its therapeutic properties. The primary objective is to explore the anti-urolithiatic activity of this plant. The synthesized ZnO-NPs are characterized using Fourier transform infrared spectroscopy (FTIR) and Zeta Potential analysis. In addition, in-vitro evaluations for anti-urolithiatic activity, such as nucleation assay, aggregation assay, and single gel diffusion techniques were conducted. The research encompasses a comprehensive analysis of the synthesized ZnO-NPs and their potential application in combating urolithiasis. The findings contribute to the understanding of green synthesis methodologies and the utilization of A. dentata as a promising source for the production of ZnO-NPs with potential therapeutic properties against urolithiasis.

Keywords:

Green synthesis, Zinc Oxide Nanoparticle, Anti-Urolithiasis activity.

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DESIGNING A CONTROLLED RELEASE TRANSDERMAL PATCH FOR WOUND HEALING USING NATURAL RESOURCES

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Abstract:

This study explores the therapeutic potential of a plant sourced from traditional remedies used by diverse ethnic communities in India and beyond. Pogostemon benghalensis have multifaceted applications, ranging from antiseptics, and aphorisms, to addressing various skin problems. Additionally, they find utility in aromatherapy, snakebite relief, gastrointestinal disorders, cough, hemorrhage, malaria, vomiting, food poisoning, and stomach problems. Notably, in Assam, this plant is consumed postpartum as a vegetable known for its restorative properties. The plant under investigation is rich in bioactive compounds such as Linalool, Ocimene, and Pinene, known for their anti-inflammatory properties. The study delves into the plant's phytochemical composition, including Alkaloids, flavonoids, and Steroids. The primary objective is to assess the in vitro anti-inflammatory activity of the plant extract and to develop a Transdermal Patch loaded with the plant leaves extract. Comprehensive analyses including FTIR, and HPTLC, were conducted to characterize the plant material. Ethanol extracts from the leaves were incorporated into the Transdermal Patch, and its efficacy was

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evaluated. The study bridges traditional knowledge with modern pharmaceutical applications, shedding light on the therapeutic potential of the investigated plant.

Keywords:
Anti-inflammatory, Transdermal Patch, FTIR, HPTLC.

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IN-SILICO DESIGN OF m-HYDROXYBENZOIC ACID SUBSTITUTED 1,3,5- TRIAZINE DERIVATIVES AS ANTI-ALZHEIMER'S AGENTS

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Abstract:

Dementia is one of the leading neurodegenerative disorder which normally occur in older people, but due to certain reason, cases of dementia have been increasing in youth also. Alzheimer is a progressive neurodegenerative disorder which is characterised by dementia or irreversible memory loss. It can be occurred due to aggregation of β-amyloid (Aβ) along with development of neuritic plaque, aggregation and hyperphosphorylation of microtubule associated tau proteins, neurofibrillary tangles (NFTs) and breakdown of acetylcholine. Inhibition of breakdown of acetylcholine molecule can result in lowering of memory loss as acetylcholine itself act as nootropic agents. Around 200 molecules were designed by considering m-hydroxybenzoic acid and n-propylamine as fixed substituents on 1,3,5-triaizine. Molecules were refined based on molecular properties, ADMET and toxicity and best molecules were subjected to molecular docking. After analysing all the ligand-receptors interaction, pharmacophore containing morpholine, m-phenylenediamine, allylamine and benzimidazole substituents shows highest binding affinity with acetylcholinesterase and may act as possible ligand for acetylcholinesterase inhibitors. Based on their binding energy, best 10 compounds were selected and proceed for synthesis in lab. Synthetic scheme

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comprises of three step reaction which is begin with Cyanuric chloride and subsequent substitution by desired substituents.

Keywords:
Alzheimer's disease, Acetylcholinesterase, Butyrylcholinesterase, In-silico studies, Molecular docking, Triazine.

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DEVELOPMENT OF CURCUMIN AND ITS DERIVATE-BASED NANOFORMULATION FOR ALZHEIMER'S DISEASE: A SYSTEMIC REVIEW

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Abstract:

The development of new medicines is aimed at preventing diseases or conditions without suitable therapeutic product availability, reducing side effects, improving quality of life, and shrinking the cost of healthcare systems. For many years, natural products have been acting as a source of therapeutic agents and have shown a beneficial impact in the field of drug discovery and development. Natural products have a wide range of diversity of multidimensional chemical structures, meanwhile, the utility of natural products as biological function modifiers has also gained considerable attention. Curcumin is a natural compound that possesses various biological properties which may aid in preventing Alzheimer's disease. Alzheimer's disease is one of the most rapidly growing neurodegenerative disorders with a huge impact on elderly populations. At present there is no such effective treatment available to cure Alzheimer's disease. But where the conventional treatment shows its cons, nanoparticles run the play. Curcumin being a potential drug in most of the targeted diseases may prove effective in Alzheimer's disease too. Therefore, to combat the drug delivery associated limitation nanoformulation can be used. Applying nanotechnology to the delivery of the drug to the blood-brain barrier (BBB) may be beneficial. The present article attempts to describe the role and effectiveness of curcumin using nanoparticles as

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a carrier, to improve the limitations associated with the treatment and management of neurodegenerative diseases such as Alzheimer's.

Keywords:
Neurodegenerative disorder, curcumin potency, targeted therapy, BBB.

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ROLE OF AMPK IN DIABETES MELLITUS AND ITS RELATED COMPLICATIONS

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Abstract:

In today's era, one of the biggest concerns in both industrialized as well as developing countries is managing diabetic mellitus (DM), whose incidence has increased as a result of lifestyle changes. Hyperglycaemia is one of the main symptoms of type I and type II diabetes, along with additional health issues. The changed gene expression could be the cause of the DM and its related problems. AMP-activated protein kinase (AMPK), an energy sensor, is aberrantly expressed in several diseases, such as DM, cancer, and cardiovascular disease. This review aims to highlight the AMPK's role in DM. In DM the decrease in blood glucose levels is achieved by inducing AMPK signalling, which is essential for lowering hyperglycaemia. Additional research reveals the significance of AMPK signalling in enhancing insulin sensitivity for the treatment of diabetes patients. Overexpression of AMPK also has the advantage of shielding β cells from stress and cell death, which is essential in preventing type I diabetes. Furthermore, the overexpression of AMPK facilitates the many metabolic processes that the body goes through. AMPK signalling regulates cell autophagy and mitophagy as well as the body's metabolism of proteins, lipids, and carbohydrates. Moreover, AMPK can improve retinopathy, neuropathy, nephropathy, hepatopathy, and

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cardiovascular disease associated with diabetes mellitus. To provide such protective benefits, AMPK signalling interacts with multiple molecular pathways, such as NOX4, PI3K/Akt, PGC 1α, and NF-κB. As a result, providing treatments that target AMPK might be helpful for improving DM.

Keywords:
Diabetes Mellitus, AMPK Signalling, AMPK, Neuropathy, Nephropathy, Retinopathy, Cardiopathy,

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EXPLORING THE VERSATILITY OF TARO STARCH AS A PROMISINGBIOPOLYMER IN THE PHARMACEUTICAL AND FOOD INDUSTRIES

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Abstract:

Colocasia esculenta L. Schott (Taro) is a tropical tuber crop mainly cultivated due to it edible starchy corm. According to many studies, taro flour has a high carbohydrate content, a high water absorption capacity, a lower protein content, and a higher foaming capability than other flours.In the pharmaceutical sector, taro starch has shown potential as a pharmaceutical excipient, offering advantages such as good binding properties, controlled drug release, and biocompatibility. Its compatibility with various drug formulations and its ability to modulate drug release kinetics make it a valuable component in tablet and capsule manufacturing, enhancing drug stability and bioavailability. Furthermore, the usage of novel starch has grown in recent years because to the low cost, plentiful availability, and biodegradability of taro starch, which aligns with the rising need for green pharmaceutical products. In the food industry, taro starch serves as an excellent thickening, gelling, and stabilizing agent due to its high amylopectin content. It enhances the texture and mouth feel of various food products, ranging from sauces and soups to bakery items and dairy products. Taro starch also contributes to gluten-free and clean label trends, making it suitable for consumers with dietary restrictions. This abstract reviews the recent advancements in taro starch research, highlighting its potential as a versatile biopolymer in pharmaceutical and food applications. It emphasizes the need for further studies to

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explore its physicochemical properties, processing techniques, and industrial scalability. The utilization of taro starch can not only drive innovation in these sectors but also promote sustainability and reduce the reliance on synthetic polymers, aligning with the global push for more environmentally friendly practices.

Keywords:

Colocasia esculenta, Taro Starch, Nutritional value, Biopolymer, Biodegradability

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BIOTECHNOLOGY FOR HUMAN HEALTH AND WELFARE

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Abstract:

Biotechnology has emerged as a transformative force in advancing human health and welfare. This multidisciplinary field harnesses the power of living organisms and biological processes to address a wide array of challenges, from combating diseases to ensuring sustainable agriculture and environmental conservation. This abstract provides a concise overview of how biotechnology has revolutionized healthcare, agriculture, and the environment, ultimately improving the quality of human life. In the realm of human health, biotechnology has revolutionized the way we diagnose, treat, and prevent diseases. Genetic engineering has enabled the development of advanced pharmaceuticals, such as monoclonal antibodies and gene therapies, offering new hope for previously incurable conditions. Precision medicine, driven by genomics and personalized treatments, has tailored healthcare to individual genetic profiles, enhancing therapeutic outcomes and reducing side effects. Moreover, biotechnology has played a pivotal role in vaccine development, as seen in the rapid response to global pandemics like COVID-19. The ability to engineer and manufacture vaccines at an unprecedented speed has saved countless lives and underlined biotechnology's essential role in public health. In agriculture, biotechnology has contributed to increased crop yields and reduced reliance on harmful pesticides. Genetically modified (GM) crops have been developed to withstand pests, diseases, and adverse environmental conditions

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,ensuring food security for a growing global population. Biotechnology also aids in the development of drought-resistant and nutrient-enriched crops, addressing malnutrition and promoting sustainable agriculture practices. Beyond healthcare and agriculture, biotechnology has had a significant impact on environmental conservation. Bioremediation techniques use microorganisms to detoxify contaminated environments, making polluted sites habitable again. The production of biofuels and biodegradable plastics helps reduce the carbon footprint, mitigating climate change and advancing a greener, more sustainable future.

In conclusion, biotechnology has become an indispensable tool for enhancing human health and welfare. It has not only revolutionized healthcare, with groundbreaking therapies and rapid vaccine development but also improved agriculture and environmental practices. The potential of biotechnology continues to expand, offering promising solutions to the most pressing challenges facing humanity. As we look ahead, harnessing the power of biotechnology will remain critical in shaping a healthier, more prosperous, and sustainable world for all.

Keywords:

Biotechnology, Genetic engineering, Human Health And Welfare

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HARNESSING VIRTUAL INSIGHTS: MOLECULAR MECHANISMS TO ELEVATE MUNGBEAN'S DROUGHT RESISTANCE

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Abstract:

Abiotic stresses such as drought and salinity account for a significant loss in the yields of agricultural crops. Mung Bean (*Vigna radiata L.*) is an annual green legume mainly found in Asia and an important crop of many agricultural systems. Although mung bean are generally considered tolerant against limited water supply, low water availability at certain stages drastically reduces both its quality and yield. Primarily, drought stress adversely affects several of its morpho-physiochemical properties which impede the growth of the plant. Hence, development of sustainable approaches which could enhance mung bean's tolerance to drought through integration with appropriate farming practices needs to be carried out. Although the target gene was retrieved from the NCBI database, no sequence similarity was found which led to homology modeling. The template structure of known protein having PDB ID: 5T9P has been identified as the best hit. MD stimulations were performed to evaluate the stability and conformational changes of the proposed model at different time scales. Prediction of the motifs present in the modeled protein was carried out using the Motif Search tool from Genome.net. ABA mimicking ligands play an important role in physiological responses and improve tolerance to drought stress. The preliminary screening studies of ABA analogs that mimic ABA actions were carried out using Density

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Functional Theory Analysis (DFT). The association of both the ligands and the modeled protein were performed using molecular docking and molecular dynamics stimulation studies. The present study aims to identify conformational dynamics of the selected ligands with the modeled protein that can increase mung bean's susceptibility to drought stress.

Keywords:

Drought stress, *Vigna radiata*, ABA analogs, Virtual screening

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ENHANCING HERBAL MEDICINE WITH NANOTECHNOLOGY

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Abstract:

Since ancient times, medical professionals and patients across the world have acknowledged the superior medicinal value and less side effects of herbal medicines when compared to modern medications. For the continuous distribution of Phytotherapeutic components, a scientific method is needed to improve patient compliance and decrease the need for recurrent administration. Creating novel drug delivery systems (NDDS) for components found in herbs is a crucial tactic in accomplishing this objective. NDDSs not only minimize the need for repeated administration, thereby improving compliance, but they also enhance therapeutic value by reducing toxicity and increasing bioavailability. Nanotechnology presents an innovative solution in this regard. The application of nanoscale drug delivery systems to herbal medicines presents a substantial opportunity to augment their effectiveness and alleviate the drawbacks related to plant-based treatments. As a result, it is crucial to incorporate nanocarriers as NDDS into conventional medical systems, particularly when it comes to treating numerous chronic illnesses.

Keywords:

Herbal medicines, Nanotechnology, Drug delivery systems, Phytotherapeutic components

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NANOMEDICINE AND IMAGING: REVOLUTIONIZING HEALTHCARE

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Abstract :

Nanomedicine has emerged as a promising paradigm for targeted drug delivery, offering unprecedented opportunities to enhance therapeutic efficacy while minimizing systemic side effects. The synergistic combination of imaging such as X-ray, ultrasound, etc., along with nanotechnology enables real-time tracking of nanocarriers, elucidating their biodistribution, pharmacokinetics, and targeting efficiency in biochemical and medical research. The main objective of this presentation is to highlight the key potentials and provide a comprehensive study of the pivotal role of imaging modalities such as magnetic resonance imaging (MRI), positron emission tomography (PET), single-photon emission computed tomography (SPECT), fluorescence imaging, etc., in advancing nanomedicine for drug delivery applications and emphasizing their significance in optimizing drug delivery systems. An extensive literature survey was carried out through various databases like Google Scholar, Pubmed, ScienceDirect, etc. to support this presentation. The synthesis of imaging and nanomedicine holds great promise for revolutionizing drug delivery, providing a deeper understanding of therapeutic interventions at the molecular and cellular levels, and ultimately improving patient outcomes. The amalgamation of imaging modalities with nanotechnology not only enhances our understanding of nanocarrier behavior but also paves the way for the next generation of targeted and patient-specific therapeutic interventions, marking a paradigm shift toward precision medicine.

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NANOPARTICLES IN MUSCLE DEGENERATION TREATMENT: A COMPREHENSIVE REVIEW

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Abstract:

Muscle degeneration disorders resulting from genetic mutations and nerve injuries are diverse and can affect various aspects of the neuromuscular system, leading to conditions that impact muscle function, movement, and overall health. The review is focusing on the three rare diseases that are caused by gene mutations and nerve injury, they are Duchenne muscular dystrophy, Spinal muscular atrophy, Gastrocnemius muscular atrophy. As drug transporters, nanoparticles have proven to offer enormous potential for enhancing the chemical properties of the pharmaceuticals they carry. Over the last ten years, numerous studies and clinical trials have demonstrated that the use of nanotechnology-based therapies greatly improves biomedical efficacy and versatility, particularly when used to treat uncommon blood, neurological, and cardiovascular conditions. Particularly, because nanoparticle-based systems for drug delivery can cross both the blood-brain and blood-cerebrospinal fluid barriers—both of which normally prevent both internal and external substances from entering the central nervous system—they are especially useful in the case of neurological illnesses. So, in this review we will study the various nanoparticles like Br-ApoE (K→A)-PMO, liposome that are conjugated with Antisense oligonucleotides (ASO) and some Fe3O4 nanoparticles are coated with Omega fatty acids which have shown promising treatment in various degeneration of muscles.

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GREEN SYNTHESIS OF SILVER NANOPARTICLES USING *Potentilla fulgens* ROOT EXTRACT AND EVALUATION OF ITS ANTI-DIABETIC FOOT ULCER ACTIVITY: MECHANISTIC ROLE OF CONNECTIVE TISSUE BIOMARKERS IN HEALING PROCESS

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Abstract :

Microwave synthesis of silver nanoparticles (AgNPs) accelerates production, aligns with bioeconomy principles, promotes green nanotechnology and sustainable practices. The present study seeks to synthesize AgNPs using Potentilla fulgens (AgNP-PF) root extract by incorporating eco-friendly microwave-assisted green synthesis approach. AgNP-PF synthesis was evaluated by reacting 5mg of PF with 3mM AgNO3 in a microwave synthesizer at temperatures ranging from 40-60°C and synthesis times from 30sec to 10min. Synthesized AgNP-PF was characterized by UV-visible, FTIR, XRD, SEM and Zeta sizer/potential. The biosynthesized AgNP-PF was loaded into a topical carbopol gel and investigated for anti-diabetic foot ulcer potential in experimental rats. Results revealed that the stabilized AgNP-PF was synthesized at 40°C in just

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30-60 sec. The formation of AgNP-PF was confirmed by colour change to brown demonstrating the UV absorption at λmax 437.5. The size distribution of AgNP PF showed Z-average at 294.9 with a zeta potential peak of -28.9. XRD analysis confirmed the crystallinity, whereas SEM revealed the formation of spherical shape nanoparticle of AgNP-PF. FTIR analysis revealed the presence of fingerprinting range of AgNP at 3213 cm-1, 1607 cm-1, and 1231 cm-1. The anti-diabetic foot ulcer potential of the formulated topical AgNP-PF gel when compared to control group showed significant ($p<0.05$) effect in contracting the ulcerated wound, thus suggesting its potential for DFU treatment.

Keywords:

Potentilla fulgens, Silver nanoparticles, diabetic foot ulcer, hydroxyproline, hexosamine, hexuronic acid, histopathology.

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GOLD NANOPARTICLES USED IN CANCER THERAPY: A REVIEW

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Abstract:

Gold nanoparticles (GNPs) are emerging as promising agents for cancer therapy and are being investigated as drug carriers, photothermal agents, contrast agents and radiosensitisers. GNPs have many properties that are suitable for use in cancer therapy. Because of their Enhanced Permeability Retention (EPR) effect, and small size GNPs may penetrate broadly throughout the body, preferring collecting at tumour locations. GNPs have been widely implemented as one of the leading nanomaterials for combinatorial cancer therapy. The applications of GNPs in the most clinically established cancer therapy modalities, including chemotherapy, radiotherapy and a variety of hyperthermia methods. GNPs are effective drug and anticancer agent carriers in biomedical and cancer therapeutic applications, and are among a variety of functionalized nanomaterials such as carbon nanotubes, peptide nanostructures, liposomes, and polymers. Recent advancements in synthetic techniques have improved the surface coating of GNPs with precise control over the particle size, shape, and surface chemistry. This makes gold nanomaterials a much easier and safer drug delivery agent for tumour therapy. In medical applications such as drug delivery and cancer therapy, GNP has emerged as effective radiosensitizers. GNPs can be used as a contrast agent and dosage enhancer in image-guided nanoparticle enhanced radiotherapy by using kilovoltage cone- beam computed tomography. The unique properties of GNPs

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make these nanoparticles very promising as drug carriers, and this area of GNP applications is a rapidly expanding field. This review work focuses on the development, synthesis and application of GNPs used in cancer therapy.

Keyword:
Gold nanoparticles, cancer therapy, radiosensitizers**.**

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NANO VISIONS: REVOLUTIONIZING OCULAR DRUG DELIVERY

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Abstract:

Ophthalmologists and drug delivery researchers have faced numerous anatomical and physiological barriers when it comes to ocular drug delivery. The novel approaches and possibilities of nanoscale medication delivery systems for ocular illnesses are emphasized in this poster. Challenges associated with traditional ocular drug delivery methods, such as limited bioavailability and poor penetration, have prompted the exploration of nanotechnology-based solutions. This poster provides a comprehensive overview of the revolutionary uses of nanotechnology in the field of ocular therapy. We will investigate the possibility of optimizing medication bioavailability, achieving sustained release, and accurately targeting ocular tissues by investigating nanocarriers, nanoparticles, and nano systems. We discuss about various nanocarrier systems, such as liposomes, nanoparticles, and dendrimers, designed to enhance drug bioavailability, prolong drug release, and target specific ocular tissues. It is the combination of pharmaceutical science and nanotechnology that will shape the future of ocular drug administration. This presentation highlights the revolutionary potential of nanotechnology for ocular medication delivery, opening the door to more effective therapies and better patient outcomes.

Keywords:

Ocular drug delivery, Nanotechnology, Revolutionary.

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CURRENT TRENDS IN NANOPARTICLES FOR NEUROLOGICAL DISORDERS: ADVANCEMENTS AND PROSPECTS

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Abstract :

Neurological disorders, such as Alzheimer's disease, Parkinson's disease, and various neurodevelopmental conditions, pose a significant and growing global health challenge, affecting millions of individuals worldwide. In recent years, the application of nanoparticles(NPs) has emerged as a promising and dynamic field to address the intricate nature of neurological disorders. Nanoparticles, with their minute size ranging from1 to 100 nm, offer several unique advantages when it comes to neurological disorders. Their small size allows them to bypass the formidable blood-brain barrier, a critical hurdle in delivering therapeutic agents to the central nervous system. This capability enhances the precision and efficiency of drug delivery to target brain regions, which is crucial for successful treatment. Additionally, NPs can serve as versatile diagnostic tools, enabling improved imaging and monitoring of disease progression. Current trends in NP research are focused on maximizing these advantages to enhance therapeutic outcomes. Multifunctional NPs that combine therapeutic and diagnostic capabilities, such as drug delivery and imaging, are a key focus. Moreover, the development of "smart" nanosystems with tailored surfaces for targeted delivery and controlled release is a prominent trend. Advanced nanotechnologies, including plasmid transfection, polymer-mediated gene delivery, and CRISPR-based therapeutics, are also explored as potential game-changers in the treatment of neurological disorders.

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However, as the field continues to evolve, it is essential to address the long-term safety and potential side effects of NP-based therapies. In conclusion, this review provides an overview of current NP trends in neurological disorder, applications, showing potential for reshaping neurology with novel and effective approaches for common and rare conditions.

Keywords:

Neurological disorders, Nanoparticles, "smart" nano systems, CRISPR.

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DNA NANOPARTICLES AS DRUG DELIVERY SYSTEMS: A REVIEW

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Abstract:

Drug delivery carriers are widely used to improve the solubility, stability, and efficacy of chemical and biomolecular medications. Despite tremendous advancements in this field, developing a perfect carrier with little cytotoxicity, high biocompatibility, and intelligence for targeted controlled release remains a significant issue. Because of DNA molecules' unrivalled self-recognition properties, it is possible to produce a plethora of artificial DNA nanostructures with well-defined shapes and DNA nanodevices with perfectly controlled motions. More recent research has shown that DNA nanostructures have increased permeability to the cell membrane barrier, paving the path for the development of novel nucleic acid drug delivery carriers. Over the last decade, there has been considerable progress in the application of nanotechnology in biological fields such as bioimaging, biodetection, and medication delivery. As a new discipline, DNA nanotechnology provides simple yet strong design approaches for self-assembly of nanostructures with distinct benefits and tremendous potential for improving medication targeting and lowering drug toxicity. In this review, various approaches to the production of DNA nanostructures are addressed. The use of these well-defined DNA nanostructures for precise control in drug delivery is also reviewed.

Keywords:

DNA nanotechnology, drug delivery system, nanomedicine.

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ADVANCES IN DRUG DELIVERY SYSTEM, CHALLENGES AND FUTURE DIRECTION

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Abstract:

The use of free pharmaceuticals in conventional dosage forms typically involves difficulties in hitting the target site at the appropriate dose after or during a correct time period, medication targeting to specific organs and tissues has become one of the century's most important initiatives. Thus, one of the frontiers of research is the hunt for novel drug delivery strategies and novel modes of action. Lipidic, proteic, and polymeric technologies are examples of novel drug delivery systems that offer longer-lasting drug delivery, improved drug distribution inside the body, protection from the hostile environment, and prevention of drug clearance. Novel DDS offer greater advantages when compared to conventional drug delivery systems due to their enhanced performance, automation, precision, and efficacy also. They are made of nanomaterials or miniaturized devices with multifunctional components that are biocompatible, biodegradable, and have high viscoelasticity with an extended circulating half-life. This poster presentation,"Recent advances in drug delivery system" , therefore provides a comprehensive insight into the history and technological advancement of drug delivery systems. It updates the most recent drug delivery systems, their therapeutic applications, challenges associated with their use, and future directions for improved performance and use.

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Keywords:

Novel drug delivery system, Polymeric technologies, nanomaterials, Biocompatible, Biodegradable.

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NANOTECHNOLOGY AND PHARMACOVIGILANCE: SHIELD FOR DRUG THERAPIES

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Abstract:

Nanotechnology has revolutionized the field of pharmacology by enabling the design and development of nanoscale drug delivery system. With their improved bioavailability, fewer side effects and accurate medication targeting, these cutting-edge platforms are attractive option for treating a range of illness. However, as with any novel technology, ensuring pharmacovigilance and drug safety in nanotechnology is also very importance. This abstract offers a succinct summary of pharmacology, pharmacovigilance and drug safety in the context of nanotechnology. Improving drug transport and targeting, nanotechnology presents enormous possibilities for advancing pharmacology. These advantages and safety concerns, however, need to be carefully balanced. Nanoparticles, such as liposomes, micelles and nano particles serve as carrier for drug molecule which are designed to deliver drugs to specific tissue or cells to improve therapeutic efficacy and reducing systemic toxicity or nanotoxicity with improve bioavailability. This can lead to more predictable drug responses and reduced dosing requirements. Also, this targeted approach enhances the therapeutic index of drug. Regulatory agencies play a crucial role in evaluating the safety and efficacy of nanotechnology-based drugs. Pharmacovigilance efforts involve monitoring adverse events, updating safety profiles and ensuring post marketing surveillance. Emerging technologies, such as RNA-based therapeutics and gene

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editing are also being integrated with nanotechnology for more precise treatments. Ongoing research aims to address safety concerns, refine nanoparticle design and improve drug delivery system. To fully utilised nanotechnology in pharmaceuticals, pharmacovigilance and regulatory monitoring requires strict attention in terms of risk assessment at public and intellectual level regarding its benefits and hazards for well-being of human and nature**.**

Keywords:

Pharmacology, Pharmacovigilance, drug safety, nanotechnology, nanotoxicity, therapeutic index, bioavailability, gene editing, RNA-based therapeutics.

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PHARMACOVIGILANCE : A BOON FOR THE PHARMA INDUSTRIES

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Abstract

A crucial and necessary component of drug discovery and development is pharmacovigilance (PV), which calls for a thorough documentation process and close supervision at every stage of the process, including risk management and pre- and post-authorization safety investigations. The volume of data handled increased as a result of the number of reported adverse drug reactions (ADRs). To comprehend pharmacovigilance, a high degree of competence is needed to both defend the product against an inappropriate removal and quickly identify pharmacological dangers. Even though India had its own Pharmacovigilance Program since 2010, adverse events for marketed medications are significantly underreported as a result of numerous shortcomings in the framework for ADR from the perspectives of the pharmaceutical industry, medical professionals, and the general public. There is utmost need for efficient medication approval procedures and thoughtful pre- and post-approval monitoring of the unintended consequences, particularly in India. In response, efforts are being made to improve post-marketing medication safety data collection, integration, and analysis methods. By assessing healthcare professionals' understanding and attitudes on ADR reporting and PV, raising awareness of PV, creating a mechanism for simple reporting, and improving the regulatory framework, there are a number of measures that may be taken to strengthen PV in India. Therefore,

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PV aids in patients' recovery and helps them manage their health as best they can. Industry, drug regulators, physicians, and other healthcare professionals all have a shared obligation to increase PV's contribution to Public Health.

Keywords:

Adverse Drug Reactions, Patient Safety, Pharmacovigilance Programme of India**.**

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FORMULATION AND CHARACTERIZATION OF HYDROGEL CONTAINING GREEN SYNTHESIZED SILVER NANOPARTICLES FROM *Curcuma amada* Roxb. AND EVALUATION OF IT'S WOUND HEALING ACTIVITY

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Abstract:

Introduction: Wound management poses challenges in healthcare, necessitating innovative strategies for faster healing. Natural compounds have gained attention for their potential in this area. This study focuses on a hydrogel incorporating silver nanoparticles (AgNPs) from *Curcuma amada* Roxb. synthesized through green synthesis method. The study aims to explore the wound healing potential of these AgNPs.

Methodology: AgNPs were synthesized using an aqueous extract of *Curcuma amada* Roxb and characterized using UV-Visible spectroscopy, Particle size, Zeta potential, SEM-EDX and FTIR. The hydrogel, containing AgNPs, was evaluated for physical appearance, pH, viscosity, spreadability and in vitro drug release. In vivo studies on an animal model were conducted to assess wound healing activity.

Discussion: The characterized AgNPs displayed distinct spectral and structural features. The UV spectral analysis, maximum absorption was obtained at 432 nm, the particle size of AgNPs was found to be 103.2 nm and zeta potential was found to be -34.7 mV. The result of this study on wound healing activity revealed that the hydrogel significantly increases wound healing effects in treated groups in the excision model. This can be supported by the fact that the greater the rate of

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wound contraction, the better is the efficacy of medication. The wound healing property of the hydrogel may be attributed to the phytoconstituents present in the plant *C. amada*. Therefore this study emphasizes the benefits of eco-friendly synthesis and the potential impact of the developed hydrogel in advancing wound management for better patient compliance.

Keywords:
Green synthesis, wound healing, nanoparticles, *C. amada*, hydrogel.

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PRELIMINARY PHYTOCHEMICAL SCREENING AND IN-VITRO EVALUATION OF ANTI- INFLAMMATORY ACTIVITY OF RHIZOME EXTRACT OF *Hellenia speciosa*

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Abstract:

The ancient South Indian Primitive hill tribes have long employed *Hellenia speciosa,* a known medicinal plant used to treat a variety of diseases. The *Hellenia speciosa* species posses various activities like anti diabetic, anti microbial. The Primary objective of this work is to find out the in vitro anti-inflammatory properties of ethanolic rhizome extract of *Hellenia speciosa*. Pharmacognostical evaluations were performed and Preliminary phytochemical screening was done to reveal the presence of carbohydrates, glycosides, alkaloids, and other substances. The ethanolic rhizome extract of Hellenia speciosa has shown remarkable result in exhibiting inhibition property of denaturation of proteins, and the anti-inflammatory activity was investigated using the human red blood cell membrane stabilization method (HRBC). The ethanolic rhizome extract of *Hellenia speciosa* at 150 µg/ml shows a remarkable result at IC50. The Standard anti inflammatory medication diclofenac sodium has the most remarkable result at IC50 on 150 µg/ml in comparison to the ethanolic extract of *Hellenia speciosa*. The graphical analysis was done to find out the statistical significance of the reported data. After this study, it was confirmed that it has anti-inflammatory activity. So, in the near upcoming future there could be further significant research on it.

Keywords: *Hellenia speciosa*, Anti–inflammatory, Anti – diabetic.

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PHYTOCHEMICAL ANALYSIS, MICROSCOPIC FEATURES AND ANTIOXIDANT SCREENING OF *Entada phaseoloides* (L)Merr. SEED KERNEL

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Abstract:

Entada phaseoloides (L) Merr. (Fabaceae) commonly called as Gila bean(English) is an evergreen woody liana with numerous medicinal benefits. The most valuable part of plant is seed kernel, which has high medicinal values. The objective of the study is to comprehensively investigate the pharmacognostic study of E. phaseoloides seed kernel, with a focus on its potential antioxidant properties in hydroalcoholic extract of *E. phaseoloides* (HAEP). Phytochemical investigations have revealed the presence of phytoconstituents like alkaloids, carbohydrates, proteins, amino acids, flavonoids, glycosides, phenolic compounds, saponins, tannins, and steroid. Also in powder microscopy, features like fibers, calcium oxalate crystals, cell walls, starch granules, raphides, and spiral fibers were identified. HAEP displayed potent antioxidant activity when assessed by superoxide anion radical scavenging and hydrogen peroxide scavenging activity. Thus, this study revealed the antioxidant potential of HAEP with the identification of important phytoconstituents which may be further studied to isolate the important pharmacologically active compound present in these extracts.

Keywords:

Entada phaseoloides, Phytoconstituents, Powder microscopy, Anti-oxidant.

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EXPLORING NEUROPROTECTIVE HERBS FOR ALZHEIMER'S DISEASE MANAGEMENT: A COMPREHENSIVE REVIEW

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Abstract:

Alzheimer's disease (AD) stands as a prevalent neurodegenerative condition affecting the brain, leading to various cellular response disruptions, notably the impairment of cholinergic mechanisms, aggregation of amyloid-beta (Aβ), neuroinflammation, and other interconnected pathways. It remains the most widespread form of dementia, impacting a significant number of individuals worldwide. Despite its prevalence, the exact cause remains elusive, and there are currently no effective medications to halt or cure the progression of AD. The objective of this review is to study traditional herbs and report the potential of herbal products for the prevention and /or treatment of AD. An extensive literature search has been conducted on natural products derived from various sources, particularly plants, to assess their neuroprotective potential in preventing and treating AD. These natural bioactive compounds have shown promise in modulating the pathological molecular mechanisms involved in AD's development. However, many bioactive molecules used in treating AD face challenges such as rapid metabolism, limited solubility, poor blood brain barrier permeability, and low bioavailability. Addressing these limitations requires leveraging nanotechnology and specific carriers designed to enhance the effectiveness of these compounds. Additionally, innovative techniques and approaches, such as employing nanoscience in the delivery of natural products,

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hold significant promise in mitigating the progression of dementia. This review emphasises the potential of natural products, including those found in fruits, spices, nuts, and herbs, which contain essential bioactive compounds capable of preventing and treating various conditions, including AD, with minimal adverse effects. The intrinsic properties of these natural elements underscore their potential to support the prevention and treatment of AD. However, further randomized clinical trials ought to be carried out to provide key evidence of their medical benefits. This study would provide an opportunity for researchers to carry out further studies in this area, especially in drug development**.**

Keywords:

Alzheimer's disease; neurodegenerative; neuroprotective; traditional herbs.

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DEVELOPMENT AND EVALUATION OF MODIFIED ASSAM BORA RICE STARCH NANOPARTICLES BY IMPREGMENTATION OF CURCUMIN FOR ENHANCED DRUG DELIVERY

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Abstract

Curcumin, a naturally occurring polyphenolic compound found in turmeric, has garnered widespread attention due to its potential health benefits. However, its limited solubility and poor bioavailability have driven research efforts towards developing innovative delivery systems to maximize its efficacy. This study introduces a systematic approach for the creation and comprehensive analysis of curcumin-loaded nanoparticles, utilizing Assam Bora rice starch as a biopolymer matrix. The researchers adopted a straightforward nanoprecipitation technique, with a primary emphasis on optimizing critical factors such as the curcumin-to starch ratio and the concentration of stabilizing agents. These optimizations effectively regulated both the particle size and encapsulation efficiency. In the course of this study, the synthesized nanoparticles underwent rigorous characterization through an array of analytical techniques, including Dynamic Light Scattering (DLS), Scanning Electron Microscopy (SEM), Fourier-transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), and X-ray Diffraction (XRD). These analyses yielded valuable insights into the nanoparticles' size distribution, morphology, chemical composition, and structural properties. To assess the potential of these

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curcumin-loaded Assam Bora rice starch nanoparticles for drug delivery applications, the study also explored curcumin's solubility and release kinetics. The findings showcased significantly improved solubility and sustained release of curcumin, underscoring the potential of these nanoparticles as an effective drug delivery system. This research underscores the successful development and thorough characterization of curcumin-loaded Assam Bora rice starch nanoparticles, offering a promising solution to the longstanding challenges of curcumin's solubility and bioavailability. These nanoparticles hold substantial promise for applications in pharmaceuticals, functional foods, and nutraceuticals, enabling the enhanced delivery of curcumin's health-promoting properties. In summary, this study represents a significant step forward in harnessing the potential of curcumin for various health-related applications.

Keywords:

Nanoparticles, Curcumin, Polyphenolic compound, Solubility, Bioavailability, Delivery systems, Assam Bora rice starch, Biopolymer matrix, Nanoprecipitation technique, Particle size, Encapsulation efficiency, DLS, SEM, FTIR, DSC, XRD, Solubility, Release kinetics, Drug delivery, Health benefits, pharmaceutical applications, Functional foods, Nutraceuticals.

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Mikania micrantha KUNTH.: A COMPREHENSIVE REVIEW ON ITS ETHNOBOTANICAL USES, PHYTOCHEMISTRY AND PHARMACOLOGICAL USES

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Abstract:

Since the dawn of human history, herbs have been employed as medicinal agents and medications for a variety of ailments. Due to its broad availability, affordability, and lack of adverse effects, almost 80% of people on the planet still utilise plant-based therapies. *Mikania micrantha* Kunth, commonly known as 'guaco' or 'Japanilata' is an aggressively growing perennial creeper, family tropical plant belonging to the Asteraceae family, extensively used in traditional medicine across the Americas and Asia. Its geographic variety is vast. Despite its medicinal potential, *M. micrantha* is often considered a weed, particularly in India, where awareness of its benefits is limited. Traditional uses of *M. micrantha* span a wide range of ailments, including skin problems, gastrointestinal disorders, inflammation, wound healing, pain, cardiovascular diseases, and respiratory infections. It is employed to treat jaundice, stomach pains, rheumatism, and diarrhea, and its extracts are consumed for alternative medicine in managing conditions like diabetes and hypertension. The plant's phytochemical composition includes alkaloids, flavonoids, saponins, phenolic compounds, tannins, amino acids, and proteins. The methanol extract, in particular, showed high levels of phenols and flavonoids. *M. micrantha* exhibits diverse biological effects, such as anti-inflammatory, analgesic, antibacterial, antiviral, and antiparasitic properties.

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It has been utilized in popular medicine for respiratory illnesses, and its extracts have been used as a poultice for snake bites and skin diseases in certain regions. This plant has a wide range of pharmacological properties, including Antidiarrheal activity, Antimicrobial activity, Antioxidant activity, Cytotoxic activity, Anti-inflammatory activity, Anthelmintic activity, Antihypertensive activity, Antidiabetic activity, Wound healing activity, Analgesic activity, Antidermatophytic Activity, Thrombolytic activity. In conclusion, more research is needed to confirm the many ethnopharmacological claims made about the plant *M. micrantha* and to find as yet unnamed phytoconstituents. Novel bioactive compounds might lead to new avenues for studying the treatment of various illnesses.

Keywords:

*Micrantha micrantha***,** Ethnopharmacology, Antidiarrheal activity, Antimicrobial activity

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DOCKING STUDIES OF ACTIVE CONSTITUENTS OF *Citrus macroptera* AND *Homalomena aromatica* (SPRENG.) SCHOTT. ESSENTIAL OILS AGAINST MOSQUITO ODORANT BINDING PROTEINS

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Abstract:

Background & objectives: Mosquito borne diseases are a major concern globally. Use of mosquito repellents can aid in prevention of mosquito transmitted diseases. However, considering the potential health hazards associated with synthetic repellents, it is necessary to search for eco-friendly natural repellents and identify the mechanism for mosquito repellent activity. Traditionally, *Citrus macroptera* and *Homalomena aromatica* (Spreng.) Schott. extract has been used by the native people of Mizoram as insect repellent. Based on this traditional knowledge, the objectives were set to extract the essential oils from *Citrus macroptera* peel and *Homalomena aromatica* (Spreng.) Schott. rhizomes, and identify their mosquito odorant receptor inhibition potential.

Methods: The oils were extracted using Clevenger's apparatus, and specific gravity, refractive index, and boiling point were evaluated and characterized using Fourier Transform Infrared Spectroscopy (FTIR) and Gas Chromatography-Mass.

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Spectroscopy (GC-MS). Molecular docking studies were performed for the major oil components against Anopheles gambie's odorant binding protein 1 (Agam OBP1) obtained from the Protein Data Bank (PDB id: 3n7h).The docking was done in the CDOCKER module of Discovery Studio's version 3.1. The binding energy was calculated by the 'Calculate Binding Energy' protocol, using CHARMm implicit solvent model.

Results: The study revealed the presence of linalool, limonene, terpinen-4-ol, and α-terpineol in both the oils. From the docking studies, it was found that limonene, linalool, terpinen-4-ol, and α-terpineol have binding energies of -23.096, -57.787, -40.089, and -43.114 kCal/mol respectively as comparable with N, N-diethyl-meta-toluamide (DEET) of -58.179 kCal/mol against Agam OBP1.

Interpretation & conclusion: The encouraging results of these two oils as compared to synthetic mosquito repellent DEET might pave the way for the development of novel herbal mosquito repellent formulations.

Keywords:

Essential oil, Characterization, Odorant binding proteins, Mosquito repellent

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A COMPREHENSIVE REVIEW ON NANOPARTICLES IN THE DEVELOPMENT OF VACCINES

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Abstract:

Nanoparticles offer promising advantages for vaccine development, overcoming traditional limitations. This review explores their various roles, starting with their unique properties for vaccine delivery. It covers different nanoparticle types, such as liposomes and polymeric and inorganic nanoparticles, emphasizing their diverse applications in vaccine design. The review also explains the role of nanoparticles in enhancing antigen stability, immunogenicity, and controlled release, while minimizing side effects. Nanotechnology is becoming increasingly significant in vaccine research, with nanocarrier-based delivery technologies offering the possibility of boosting cellular and humoral immune responses. The incorporation of nanoparticles into vaccination formulations not only increases immunogenicity and antigen storage, but also enables targeted distribution and progressive release. Over the last decade, nanoscale materials such as virus-like particles, liposomes, ISCOMs, polymeric, inorganic nanoparticles, and emulsions have caught the interest of researchers as potential vaccination antigen delivery vehicles capable of stabilizing vaccine antigens and adjuvants. The nanoscale particle size allows for better uptake by Antigen- Presenting Cells, resulting in efficient antigen recognition and presentation. The addition of various targeting moieties to nanoparticle surfaces enables antigens to be delivered to specific receptors on the cell surface, resulting in selective and specific immune responses. This review

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provides a valuable resource for researchers, highlighting the promising applications of nanoparticles in vaccine development by enhancing the efficacy, safety, and versatility of vaccines, nanoparticles have the potential to revolutionize the future of immunization and public health.

Keywords:

Nano-vaccines, Immunogenicity, Liposomes, Antigen Stability.

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A COMPREHENSIVE REVIEW ON BIODEGRADABLE NANOPARTICLES AND ITS APPLICATIONS

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Abstract:

Biodegradable nanoparticles are eco-friendly tools with applications in medicine, agriculture, and environmental remediation. They break down into harmless byproducts, providing a sustainable alternative to traditional materials. This abstract provides an overview of the principles, synthesis methods, and diverse applications of biodegradable nanoparticles. The synthesis of biodegradable nanoparticles involves the use of natural or synthetic polymers, lipids, or proteins. Through techniques like nanoprecipitation, emulsion, and self-assembly, nanoparticles of precise size and shape can be engineered, offering tunable properties for specific applications. Biodegradable nanoparticles are characterized by their ability to degrade under physiological conditions, reducing the risk of long-term environmental pollution.In the field of medicine, biodegradable nanoparticles have gained prominence as drug delivery vehicles. They offer controlled release of pharmaceuticals, improving drug efficacy, minimizing side effects, and enhancing patient compliance. Additionally, these nanoparticles have found applications in imaging, diagnostics, and tissue engineering, revolutionizing the medical landscape.In agriculture, biodegradable nanoparticles play a crucial role in enhancing crop protection, nutrient delivery, and soil remediation. Encapsulating pesticides, fertilizers, or growth-promoting agents within biodegradable nanoparticles can improve their efficiency and reduce the

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Environmental impact associated with conventional agricultural practices. Environmental remediation is another domain where biodegradable nanoparticles have shown promise. These nanoparticles can be used to mitigate pollution by removing contaminants from water, soil, and air. The development of biodegradable nanoparticles have enormous promise in the field of sustainable technology, as they can help to address global concerns in healthcare, agriculture, and environmental sustainability. Their progress contributes to a more environmentally friendly and sustainable future.

Keywords:

Nanoparticles, encapsulation, drug delivery

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TEA LEAVES: ITS QUALITY ASSURANCE AND MEDICINAL VALUE

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Abstract:

Tea is the most common beverage consumed after water in all over the world. Tea leaves contain high medicinal value. The demand for tea free from the consumer, and with the demand for high yield and low labor input, from the producer. The quality checking of tea leaves of Assam at a low cost technique is the need of the hour. Detection of tea leaves quality in the presence of matured leaves, diseased leaves and chemical residue should be checked. In order to identify and prevent tea leaf disease effectively, CNN can be used. The critical processes in this tea leaf disease classification are health monitoring and disease detection.

Keywords:

Tea leaf, quality checking, low cost technology, CNN, disease detection.

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IDENTIFYING NOVEL INHIBITORS OF INFLUENZA A RNA POLYMERASE PROTEIN FROM COMPONENTS OF CITRUS LIMON

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Abstract:

Influenza or flu is an infectious respiratory disease that causes approximately 300,000 human deaths globally per year. Different strain of influenza A can infect large number of people and through antigenic shift and antigenic drift it can leads to pandemic situation. Synthetic drugs and vaccines are available for flu treatment. With growing time M2 inhibitors and neuraminidase inhibitors attains resistance due to various reason like lose fitting or binding site mutation. Because of mutation they attain resistance with time. There is an urgent need for new resistance free drug. Various studies show that RNA-dependent RNA polymerase become promising target protein. Aim of our research is to identify influenza A inhibitor from natural compounds. For this purpose, we select lemon components to determine their inhibitory potential. In this regard we have performed molecular docking of lemon metabolites with RdRp protein proteins. Most of the lemon components show high binding affinity with active site of influenza protein..

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SUBTRACTIVE GENOMIC PROFILING OF *Burkholderia pseudomallei*: IDENTIFYING DRUG TARGETS FOR MELIOIDOSIS THERAPY

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Abstract:

Melioidosis, a disease prevalent in Southeast Asia and northern Australia, is caused by the bacterium *Burkholderia pseudomallei*. Despite the use of antimicrobial treatments, the urgent need for more effective therapeutic options is underscored by persistently high mortality rates. Thus, in the pursuit of antibacterial targets crucial for innovative treatments, the whole proteome of *B. pseudomallei* was retrieved from the NCBI database, along with the entire human proteome. The redundancies within the proteome sequences were removed and subsequently, Blastp was employed to identify homologous proteins The target list was further refined by extracting essential genes from the DEG database using TBlastN. This comprehensive approach resulted in the discovery of 86 sequences, which were then rigorously compared with data from the gut bacteria database. After this filtering process, 17 Swiss-Prot reviewed proteins were retrieved, showing promise as potential drug targets. To ensure a focus on virulence, proteins from diverse Burkholderia strains were selected, and the EMBOSS tool was used to ascertain similarities between these virulent proteins and those found in the DrugBank database. This systematic approach revealed a subset of five proteins expressing an array of essential proteins that play a pivotal role in the survival of *B. pseudomallei*. These proteins are singled out as promising candidates for drug

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development efforts. Through the in silico approach, efficient rapid screening was conducted, leading to the identification of potential drug targets that could revolutionize the treatment of melioidosis. These findings represent a significant step forward in the fight against this deadly disease, although further laboratory characterization will be required to confirm their suitability for therapeutic development. Nonetheless, the research paves the way for the development of promising treatments for melioidosis, offering hope to those affected by this severe infection.

***Keywords*:**

Burkholderia pseudomallei, CD-HIT, BlastP, TBlastN, EMBOSS.

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A REVIEW ON GENETICALLY MODIFIED CROPS (GM CROPS) IN INDIA

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Centre for Biotechnology and Bioinformatics.

Abstract

Genetically modified crops are plants used in agricultural field, the genetic material of which that have been modified using genetic engineering techniques. Such modified crops provide bacterial yield more disease resistance and also provide higher nutritional value. The top five countries GM growth are the USA, Brazil, Argentina, India and Canada, which together account for around 90% of the GM cultivated area. Major GM crops grown worldwide include soybean, maize, cotton, and canola that have insect and herbicide resistance. In India, Bt cotton was the first genetically modified plant to be commercially introduced. In 2014, India Became the world's top cotton producer after surpassing China in production. The adoption of Bt cotton in India increased by 0.6 million hectares of land area to a record 11.6 million hectares by planting the largest ever area of cotton -105,000 hectares more than the previous record cotton area of 12.1 million in 2011. More than 94.0% of global biotech cotton area is located only in five countries include: India, USA, Pakistan, China, and Brazil. India is the world's largest exporter of rice, with sales of 18 million tons of grain (organic rice) in 2020 bringing in Rs. 65,000 crores, with premium basmati accounting for over 25% of the total. The United States and the United Kingdom are the largest importers of basmati rice among the 75 countries that purchase Indian rice; the majority of non-basmati rice is sent to countries like Bangladesh and also in

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Africa. Northeast also contributes to India's overall export of GM crops to other countries like the first ever genetically modified rubber planted in Assam (Guwahati). The plant was developed at the Kerala based research institute of India (RRII). In this review, we will study the production and future prospectives of GM crops.

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