APSS 2026

3RD INTERNATIONAL CONGRESS
OF THE AFRICAN PHYTOMEDICINE SCIENTIFIC SOCIETY

25 - 29 October 2026

The Capital Zimbali, Durban, South Africa

Theme

"Nature's Pharmacy: Science, Standards, and Sustainability – Integrating Global Ethnobotanical Knowledge for Modern Healthcare."

ABSTRACT BOOK

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WELCOME FROM CONGRESS CHAIRPERSON

Dear Colleagues and Friends,

It is with great enthusiasm and heartfelt gratitude that I welcome each and every one of you to the 3rd International Congress of the African Phytomedicine Scientific Society (APSS 2026), held here in the coastal paradise of Zimbali, Durban, South Africa. After the resounding success of our previous congresses, it is truly an honour to gather once again - this time on the warm shores of KwaZulu-Natal, a region that embodies the perfect harmony between anature, culture, and innovation.

Durban, affectionately known as eThekwini, is a city steeped in history and diversity. It is home to the proud Zulu nation, whose traditions, resilience, and deep-rooted respect for medicinal plants continue to inspire our scientific endeavours. This vibrant city has long been a meeting point of cultures - African, Indian, and European - each contributing to its rich diversity of healing practices, cuisine, and creativity.

The theme of APSS 2026, "Nature's Pharmacy: Science, Standards, and Sustainability – Integrating Global Ethnobotanical Knowledge for Modern Healthcare", reflects our shared commitment to honouring traditional knowledge while embracing modern science.

For centuries, African medicinal plants have been at the heart of community healthcare, offering remedies derived from the wisdom of our ancestors. Today, our responsibility as researchers and innovators is to ensure that these plants - and the knowledge systems they represent - are not only preserved but elevated through scientific validation, ethical collaboration, and responsible commercialisation.

I would like to extend my deepest appreciation to the APSS Executive Committee, board members, the Local Organising Committee, and our generous sponsors and partners, whose dedication has made this congress possible. Your collective efforts in coordinating logistics, facilitating international collaborations, and ensuring a memorable experience for our delegates have been nothing short of outstanding.

This year, we are delighted to welcome over 200 delegates, representing 20 countries, alongside 200 scientific presenters and 9 exhibitors, who will be sharing their innovations and breakthroughs throughout the congress. Over the next few days, I encourage you to learn from one another, share your experiences, and build collaborations that will continue long after this event ends. Let's make these sessions not only about science, but also about connection, creativity, and community.

And of course, don't forget to enjoy all that Durban has to offer - its beaches, its flavours, and its people. As we say in Africa, "I am because we are" - and that spirit of ubuntu is what makes this gathering so special. Once again, welcome to APSS 2026 in Zimbali, Durban!

May our time together be filled with insightful dialogue, impactful discoveries, and cherished connections that continue to strengthen the global legacy of African phytomedicine.

With our warmest regards

Prof. Namrita Lall
APSS Congress 2026: Congress Chairperson

Dr. Salmina Mokgehle and
Prof. Nceba Gqaleni
APSS Congress 2026: Congress Co-Chairpersons

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Plenary Lectures

26 October 2026 | 11:45 – 12:05

Preclinically Developing Product Nkabinde for Clinical Trials for HIV Management: The Journey so Far

Prof Nceba Gqaleni PhD
University of KwaZulu-Natal, Durban, South Africa. Africa Health Research Institute, Durban, South Africa

Abstract

Background: Despite antiretroviral therapy's success in managing HIV-1, challenges of affordability, toxicity, and latent viral reservoirs persist, particularly in sub-Saharan Africa. Product Nkabinde (PN)—a traditional herbal formulation—was developed through a traditional healer-academic partnership as a potential adjunctive HIV therapy. We present the preclinical journey toward clinical trial readiness.

Methods: Anti-HIV-1 activity of aqueous PN extracts was evaluated using TZM-bl cells and PBMCs infected with subtype B and C viruses, with luciferase and p24 ELISA readouts. Latency reversal potential was assessed in J-Lat cell models via GFP expression. Combination effects with ARVs (AZT, raltegravir, maraviroc, amprenavir) and LRAs (panobinostat, SAHA, TNF-α) were examined. Cytotoxicity was evaluated in healthy PBMCs. Regulatory preparations, including patent filing and toxicity studies conducted through the SAMRC Primate Unit, have been completed.

Results: PN demonstrated potent, dose-dependent inhibition of HIV-1 subtype B (93%) and C (96%) in TZM-bl cells, with sustained p24 suppression over 11 days in PBMCs. Combination with raltegravir and AZT enhanced suppression to 98.7% and 99%, respectively ($p<0.05$), with no antagonism. PN showed minimal latency reversal (≤1.3%), whereas G.S alone induced 26.1% reactivation in J-Lat A2 ($p=0.0001$), enhanced to 87.2% with TNF-α. Cytotoxicity was low, with >90% cell viability maintained. A patent has been filed, and preclinical toxicity coordination is underway.

Conclusion: Product Nkabinde exhibits potent anti-HIV-1 activity against both major subtypes, a favourable safety profile, and potential as an adjunct to ART. Current efforts focus on completing regulatory-required toxicity assessments to enable progression to Phase I clinical trials. This work exemplifies a successful model of indigenous knowledge translation through rigorous science, advancing locally-relevant HIV therapeutics for Africa.

27 October 2026 | 09:00 – 09:30

Ethnoveterinary Use and Biological Evaluation of Medicinal Plants Used for Goat Health in Zimbabwe

Dr Anderson Munengwa PhD[1,2], Dr Emmanuel Nyahangare PhD[3], Dr Prosper Jambwa PhD[3], Dr Alban Mugoti PhD[2], Dr Stephen Mandara PhD[2], Ms Melody Dzviti MSc[2], Dr Nation Chikumba PhD[2], Professor Lyndy McGaw PhD[1]
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Abstract

The Zimbabwean livestock sector is significantly affected by parasitic and infectious diseases compromising animal health and productivity. Livestock keepers rely extensively on traditional ethnoveterinary practices, including use of medicinal plants for prevention and management of animal diseases. This study integrated ethnoveterinary knowledge with a comprehensive in vitro evaluation of selected medicinal plant species commonly used in goat healthcare in Zimbabwe. Plant-based complementary medicines used to manage goat ailments across four districts were documented through questionnaire-based ethnoveterinary surveys. In total 160 remedies were recorded, comprising 75 plant species from 34 families and 401 use-reports. Cassia abbreviata was the most frequently cited species.

Five frequently used species, Euclea divinorum, Kigelia africana, Senna singueana, Cassia abbreviata and Erythrina abyssinica, were selected for evaluation of antibacterial, antibiofilm, antioxidant, anti-lipoxygenase, anthelmintic and cytotoxic activities. Standardised methodologies were employed, including serial microdilution and crystal violet staining for antibacterial and antibiofilm activities, free-radical scavenging assays for antioxidant activity, the ferrous oxidation–xylenol orange (FOX) assay for anti-lipoxygenase activity, GFP-tagged stress-reporter Caenorhabditis elegans models for anthelmintic activity, and the tetrazolium-based MTT reduction assay for cytotoxicity. Acetone extracts of S. singueana and E. abyssinica had pronounced biological activities across all assays. Extracts exhibited noteworthy anthelmintic activity, with E. divinorum showing the greatest nematicidal efficacy. Extracts of E. divinorum also activated stress-response pathways distinct from those targeted by levamisole, a commercially used anthelmintic. Furthermore, C. abbreviata extracts disrupted normal nematode oviposition. Combined plant extracts markedly enhanced nematicidal activity, especially the combination of E. divinorum and E. abyssinica.

Overall, several medicinal plants employed in traditional goat primary healthcare possess significant biological activities across multiple therapeutic targets. These findings support the systematic selection and pharmacological evaluation of ethnoveterinary medicinal plants as a promising strategy for identification of novel bioactive compounds and development of new veterinary plant-based therapeutics.

27 October 2026 | 14:00 – 14:30

Targeted Photodynamic Therapy of Cancer and Cancer Stem Cells Using Green Nanoparticles, Natural Photosensitisers, and Antibody Conjugates

Prof Heidi Abrahamse PhD
University of Johannesburg, Johannesburg, South Africa

Abstract

Cancer remains a leading cause of morbidity and mortality worldwide, with lung, breast, colorectal, and melanoma cancers accounting for a significant proportion of cancer-related deaths. Despite advances in surgery, chemotherapy, radiotherapy, and targeted therapies, treatment efficacy is often compromised by systemic toxicity, multidrug resistance, tumor recurrence, and the persistence of cancer stem cells (CSCs), which drive metastasis. Photodynamic therapy (PDT) has emerged as a promising minimally invasive treatment modality that utilizes light-activated photosensitisers (PSs) to generate reactive oxygen species (ROS), leading to selective tumor destruction. Natural photosensitisers of plan origin, including curcumin, berberine, hypocrellin, hypericin, and pheophorbide-a (PPBa), have attracted considerable interest owing to their biocompatibility, low toxicity, and potent anticancer properties.

Recent advances in nanotechnology have enabled the development of multifunctional nano-phytoformulations that enhance the solubility, stability, bioavailability, and tumor-targeting capabilities of these natural compounds. Liposomal and gold nanoparticle-based delivery systems have demonstrated improved cellular uptake, controlled drug release, and enhanced photodynamic efficacy in both two-dimensional and three-dimensional tumor models. Studies in lung (A549), breast (including triple-negative breast cancer), colorectal, and melanoma cancer cells have shown that nano-encapsulated natural PSs significantly reduce cell viability, inhibit proliferation, and induce apoptosis through ROS-mediated mitochondrial dysfunction and activation of intrinsic apoptotic pathways. Importantly, these nanoformulations have also demonstrated the ability to target and eradicate cancer stem cell populations, thereby addressing a major challenge in cancer treatment. Collectively, the integration of natural photosensitisers with advanced nanocarrier systems represents a promising strategy for enhancing PDT efficacy against diverse cancers and CSCs. These findings support the continued development of green nanotechnology-based PDT platforms as innovative, targeted, and less toxic therapeutic approaches for improved cancer management.

Keywords: Photodynamic therapy; nanoparticles; natural photosensitiser; drug delivery; cancer; stem cells

28 October 2026 | 08:50 – 09:20

Myrothamnus flabellifolia: Getting to Know the Plant Behind the Phytochemicals

Prof Jill Farrant PhD
University of Cape Town, Cape Town, South Africa

Abstract

Myrothamnus flabellifolia has long been used by traditional healers for its medicinal and spiritual properties, its name in many dialects being “awake from the dead”. This is derived from its properties to seemingly die in drought, but come to life immediately after rain, earning the common name resurrection bush. In reality this plant can lose 95% of its water without dying, a rare feat commandeered by only 0.09% of Angiosperms. A significant reason why this plant survives this extreme stress is due to the phytochemicals it accumulates during desiccation, which in turn are responsible for its medicinal properties. In this presentation, I will outline the unique physiological and biochemical characteristics of M. flabellifolia that enable it to survive extreme environments (desiccation, heat and freezing) and postulate why its phytochemistry has regenerative properties. I will illustrate its potential worth to our bioeconomy and outline the pitfalls facing its commercial use.

29 October 2026 | 08:50 – 09:20

From Biodiversity to Bioactive Leads: Integrating Natural, Artificial and Human Intelligence in Natural Product Drug Discovery

Dr Phanankosi Moyo, Prof Vinesh Maharaj
University of Pretoria, Hatfield, Pretoria, South Africa

Abstract

Natural products remain an exceptional source of chemical diversity for drug discovery, but the enormous biological and chemical space represented by plant biodiversity presents a fundamental challenge: where should we search, which molecules should we prioritise, and how can promising natural-product scaffolds be efficiently developed into improved leads? At the University of Pretoria Biodiscovery Centre, we are addressing these questions through a collaborative discovery platform that integrates ethnobotanical knowledge, unbiased biological screening, analytical chemistry, artificial intelligence (AI) and human scientific reasoning.

Complementary strategies are used to interrogate plant biodiversity. Ethnobotany-guided selection exploits traditional medicinal knowledge to prioritise species with plausible therapeutic potential, whereas unbiased screening allows biological activity itself to reveal unexpected candidates. Random screening of the natural-product library against Epstein–Barr virus nuclear antigen 1 (EBNA1), for example, identified numerous active extracts, fractions and compounds, including hits from comparatively underexplored plants.

AI provides an additional layer of prioritisation. Word embedding-based virtual screening was developed to interrogate large volumes of scientific literature and identify promising antiplasmodial plants from a repository of approximately 10,000 African medicinal plant species. Experimental validation confirmed strong activity in predicted candidates, including Dovyalis afra, an underexplored species. Computational approaches are subsequently being extended to metabolomics and chemotaxonomic analyses to prioritise bioactivity-associated molecular features, and to AI-assisted selection of natural and synthetic compounds for anticancer screening.

This iterative interaction between nature intelligence, artificial intelligence, and human intelligence transformed a validated natural-product scaffold with an NF54 IC50 of 34 nM into a synthetically accessible candidate exhibiting an IC50 of 10 nM and a selectivity index greater than 2900.

Collectively, these studies demonstrate that ethnobotanical knowledge, serendipitous experimental discovery, AI and human expertise are not competing approaches but complementary forms of intelligence. Their integration across plant selection, biological screening, chemical profiling, compound prioritisation and lead optimisation provides a powerful framework for translating African biodiversity into experimentally validated bioactive molecules and future therapeutic leads.

Keynote Lectures

26 October 2026 | 13:40 – 14:00

From Bioactivity to De Novo Structure Elucidation: An Integrated MicroED Workflow for Natural Product Discovery

Dr. Lewis Marquez PhD, Dr. Ella Vardeman PhD, Dr. William Crandall PhD, Mr. Marco Caputo, Ms. Diandre Slusarek, Dr. Cassandra Quave PhD
Emory University, Atlanta, United States

Abstract

Natural products remain a critical source of drug leads, yet the path from biological activity to molecular identification is often slowed by labor-intensive purification and structure elucidation workflows. We have established an integrated discovery platform that combines bioassay-guided fractionation, mass spectrometry, and microcrystal electron diffraction (MicroED) to accelerate characterization of bioactive metabolites directly from complex natural product mixtures.

Plant extracts are separated by semi-preparative HPLC to generate fraction libraries that are systematically distributed across parallel analytical pipelines. Replicate fraction sets are subjected to biological screening, LC–MS/MS profiling, and MicroED evaluation, allowing biological activity, chemical composition, and structural information to be linked at the fraction level. Bioactive fractions are prioritized through assay-driven analysis and examined for the presence of microcrystalline material suitable for diffraction studies. Structures are subsequently determined using a Rigaku XtaLAB Synergy-ED platform, reducing reliance on repeated purification cycles.

The platform supports scalable investigation of chemically diverse natural product collections and is readily adaptable to plant, fungal, and marine-derived samples. Applications in antimicrobial and anti-inflammatory discovery will be highlighted, including screening against Candida albicans, Gardnerella vaginalis, and cyclooxygenase-2 (COX-2). This approach establishes a streamlined route from biological activity to molecular structure and expands the capacity for rapid identification of pharmacologically relevant natural products.

26 October 2026 | 13:40 – 14:00

From Medicinal Plants to Multitarget Therapeutics: Integrating Artificial Intelligence, Metabolomics, and Computational Drug Discovery

Dr Yannick Nuapia
University of Limpopo, Polokwane, South Africa

Abstract

Medicinal plants represent a rich yet underexplored source of structurally diverse compounds for therapeutic discovery. However, translating complex phytochemical profiles into validated drug candidates remains challenging. This keynote presents an integrated pharmaceutical discovery framework combining mass spectrometry, scaffold analysis, machine learning, molecular docking, molecular dynamics simulations, ADMET prediction, and biological validation to accelerate natural-product drug discovery.

Drawing on recent investigations of Ceratonia siliqua and Moringa oleifera, the presentation demonstrates how artificial intelligence can connect plant metabolites and their molecular scaffolds with biological activities and therapeutic targets. Scaffold-based analysis of 253 compounds identified in C. siliqua associated phenolic and terpenoid frameworks with antioxidant activity, monoterpenoid and cyclohexane-based structures with antimicrobial effects, and heterocyclic and imide-containing scaffolds with cytotoxicity. A stacked ensemble machine-learning framework subsequently enabled virtual screening for dual EGFR/HER2 inhibitors as potential colorectal cancer therapeutics. Computational predictions were supported by molecular docking and experimental evidence showing selective cytotoxicity of C. siliqua extract against HCT116 colorectal cancer cells.

The same data-driven strategy was applied to M. oleifera metabolites to identify dual DPP-IV/SGLT2 inhibitors for type 2 diabetes. The ensemble models demonstrated strong independent predictive performance, while docking, pharmacokinetic assessment, and molecular dynamics simulations prioritised N,α-L-rhamnopyranosyl vincosamide as a promising dual-target scaffold. Vitexin, homoorientin, and lariciresinol-4-O-β-D-glucopyranoside were also identified as promising candidates.

It will also consider how open data, explainable models, and laboratory partnerships can reduce discovery costs and advance promising computational hits towards preclinical development and translation. Together, these studies illustrate a transition from descriptive phytochemical profiling to predictive, mechanism-informed, and experimentally guided pharmaceutical research.

27 October 2026 | 10:00 - 10:20

Assessing the Antifungal Activity and Synergistic Potential of Selected Medicinal Plant Extracts against Economically Important Phytopathogens

Miss Sibahle Mswane[1,2], Dr Bernard Mabotja[1], Dr Tomi Adetunji[1,2], Prof Rasheed Adeleke[2], Prof Stephen Amoo[1,2]
[1]Agricultural Research Council – Vegetable, Industrial and Medicinal Plants, Pretoria, South Africa. [2]Unit for Environmental Sciences and Management, North-West University, Potchefstroom, South Africa

Abstract

Fungal pathogens are responsible for significant pre- and post-harvest crop losses, necessitating the development of sustainable alternatives to synthetic fungicides. This study investigated the in vitro antifungal activity of selected medicinal plants traditionally used for plant disease control, with emphasis on the efficacy of combined plant extracts and their phytochemical basis. Twenty plant species were extracted using water and acetone, yielding forty crude extracts that were evaluated against twelve economically important fungal pathogens, including Fusarium, Aspergillus, and Alternaria species. Antifungal activity was determined using a microdilution assay, whilst phytochemical profiling was conducted using UPLC-QTOF-MS. Acetone extracts exhibited stronger antifungal activity (MIC < 1 mg/mL) than aqueous extracts, despite lower extraction yields. Notably, Solanum campylacanthum, Carica papaya, Kniphofia uvaria, and Mangifera indica demonstrated broad-spectrum activity against multiple pathogens. Binary combinations of selected acetone extracts enhanced antifungal efficacy, with several exhibiting synergistic or additive interactions. Combinations such as Carica papaya + Kniphofia uvaria and Mangifera indica + Solanum campylacanthum inhibited a wider range of pathogens than individual extracts. LC–MS analysis tentatively identified over 300 secondary metabolites, predominantly phenolics, flavonoids, and terpenoids, which are likely responsible for the observed bioactivity and synergistic effects. These findings highlight the potential of strategically combined medicinal plant extracts as effective, eco-friendly antifungal agents for crop protection. The study provides a foundation for the development of plant-based biopesticides and underscores the importance of understanding phytochemical interactions to enhance efficacy and sustainability in agricultural disease management.

27 October 2026 | 10:00 - 10:20

Liposomal Nanoformulations of the Alkaloid and Chlorophyll Derivative Photosensitiser in Photodynamic Therapy for Cancer

Prof Blassan George PhD
University of Johannesburg, Johannesburg, South Africa

Abstract

Cancer remains a major global health challenge, with breast and lung cancers among the most frequently diagnosed malignancies and leading causes of cancer-related mortality worldwide. Conventional treatment modalities, including chemotherapy and radiotherapy, are often limited by poor specificity, systemic toxicity, and the emergence of drug resistance. Consequently, the development of targeted and less toxic therapeutic strategies remains a priority. This study investigated a green-synthesized nanoformulation comprising gold nanoparticles (AuNPs) encapsulated in liposomes and loaded with the photosensitiser pheophorbide-a (PPBa) and berberine (BBR) for photodynamic therapy (PDT) against triple-negative breast cancer (MDA-MB-231) and lung cancer (A549) cells. Gold nanoparticles were synthesized using plant-derived phytochemicals and incorporated into liposomes to enhance stability, biocompatibility, and cellular uptake. Characterization confirmed successful synthesis of the nanoformulation, with particle sizes ranging from 61 to 67 nm and diverse nanoparticle morphologies. In vitro studies demonstrated preferential accumulation of nanoparticles within cancer cell organelles, particularly mitochondria. Treatment with the nanoformulation resulted in significant dose-dependent cytotoxicity, as evidenced by increased lactate dehydrogenase (LDH) release and reduced ATP-dependent cell viability. Mechanistic investigations revealed enhanced reactive oxygen species (ROS) generation, disruption of mitochondrial membrane integrity, and activation of intrinsic apoptotic pathways, leading to programmed cell death. These findings highlight the potential of this plant-based nanoformulation as an effective targeted photodynamic therapeutic platform for breast and lung cancers. The observed anticancer activity supports further preclinical evaluation and development of this nanotechnology-based approach as a promising alternative for improved cancer treatment.

27 October 2026 | 10:00 - 10:20

Linking Behavior to Bioactivity: Pharmacological Validation of Animal Medication in Chimpanzees, Mountain Gorillas and Elephants

Dr. Fabien Schultz PhD[1,2], M.A. Kandace Baez[1], M.Sc. Max Schultze[2,1], M.Sc. Henrike Wurm[1,2], Dr. Dan Redfearn[3], Dr. Godwin Anywar[1,4], Prof. Dr. Leif-Alexander Garbe[2], Dr. Elodie Freymann[5,1]
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Abstract

Non-human animals, including chimpanzees, orangutans, and African elephants, engage in sophisticated self-medicative behaviors, selectively consuming plants, minerals, and other natural substances to prevent and treat ailments. These behaviors reveal the potential existence of Non-Human Traditional Ecological Knowledge (NHTEK), where ecological and medicinal understanding is transmitted across generations. Studying these practices offers a unique opportunity to bridge ethnopharmacology and behavioral animal ecology, enhancing our understanding of the evolutionary and ecological foundations of medicine use. This presentation explores how ethnopharmacological methodologies—traditionally applied to human medicinal systems—can be adapted to investigate animal self-medication. By combining behavioral observations, ethnobotanical collection, and pharmacological laboratory analysis, we assess therapeutic relevance of substances consumed by animals. We integrate results from laboratory investigations of chimpanzee and mountain gorilla self-medication in Uganda. These studies involved screening more than 250 extracts derived from over 80 plant, insect, and fungal species identified through behavioral observations. Extracts were subjected to a comprehensive pharmacological assay panel including anti-inflammatory, antibacterial, antiplasmodial, and antinematodal tests, alongside cytotoxicity and chemical characterization. Many extracts demonstrated significant bioactivity across multiple assays, supporting the hypothesis that non-human apes selectively ingest biologically active substances with potential therapeutic effects. Our case studies from African elephants in the Mount Elgon region of Kenya demonstrate targeted use of 35 plant species and mineral resources, paralleling human traditional remedies, and reveal behaviors such as maternal transfer of medicinal knowledge. Recognizing NHTEK raises ethical and conservation challenges, including protecting animal-identified medicinal resources from overexploitation, ensuring access, and establishing mechanisms for reciprocal benefit when commercial applications arise. We propose a transdisciplinary safeguarding framework integrating conservation biology, ethnopharmacology, and environmental governance to maintain ecological integrity and support One Health initiatives. By situating zoopharmacognosy within cultural, historical and ecological contexts, this approach highlights non-human knowledge systems, promotes interdisciplinary collaboration, enabling sustainable drug discovery and biodiversity conservation.

28 October 2026 | 10:00 – 10:20

Decoding Traditional Medicines through Integrated Computational Biology and Experimental Pharmacology

Dr. Anil Pawar Ph.D., Ms. Shivani Kalokhe
School of Health Sciences and Technology, Dr. Vishwanath Karad MIT World Peace University, Pune, India

Abstract

The utilization of traditional medicines for the prevention and treatment of many diseases is centuries-old. Yet the incorporation of these medicines into modern medicine is difficult due to the complexity of the multicomponent nature of herbal medicine and the lack of knowledge regarding their molecular mechanisms. Multi-omics approaches, systems pharmacology, bioinformatics and computational biology are recent scientific advancements that provide robust means to elucidate such mechanisms. The combination of High-Resolution Liquid Chromatography-Mass Spectrometry (HR-LCMS)-based phytochemical profiling, network pharmacology, protein-protein interactions analysis, pathway enrichment analysis, molecular docking, molecular dynamics simulation and experimental validation makes possible the discovery of bioactive phytoconstituents, molecular targets, signal transduction pathways and biological networks responsible for the pharmacological activities of traditional medicines. This approach is exemplified by a case study on Vasadi Kadha and helps to elucidate how the herbal formulation exerts hepatoprotective effects by modulating inflammation, oxidative stress, metabolic pathways and xenobiotic detoxification.

28 October 2026 | 10:00 – 10:20

Lemongrass [Cymbopogon citratus (Poaceae)] Inhibits Follicular Atresia and Improves Ovarian Dynamics by Modulating Ghrelin and Leptin Production in Rats with Letrozole-Induced Polycystic Ovary Syndrome

Mr Vanis Slauvers Akago MSc[1], Pr Marie Alfrede Mvondo PhD[2], Pr Sefirin Djiogue PhD[1]
[1]University of Yaounde 1, Yaounde, Cameroon. [2]University of Ebolowa, Ebolowa, Cameroon

Abstract

Polycystic ovary syndrome (PCOS) accelerates ovarian follicular depletion through atresia. This study investigated the therapeutic potential of aqueous (AE) and hydroethanolic (HEE) extracts of Cymbopogon citratus in mitigating hyperandrogenism-induced ovarian damage (specifically ferroptosis, apoptosis, and oxidative stress) in a rat model of PCOS.. PCOS was induced by oral administration of letrozole (1 mg/kg/day for 21 days), followed by treatment with AE or HEE (100, 200, or 400 mg/kg/day for 20 days), using metformin (200 mg/kg) as a reference.. The results showed that HEE contains a higher proportion of bioactive compound classes and has a strong iron-reducing power. In PCOS animals, C. citratus decreased serum testosterone levels [maximum effect (37.10%; $p < 0.0001$) obtained with HEE 100] and increased estradiol levels [maximum effect (56.15%; $p < 0.0001$) obtained with AE 200]. An increase in serum ghrelin levels [maximum effect (129.38%; $p < 0.0001$) obtained with AE 400] and a decrease in leptin levels [maximum effect (43.85%; $p < 0.0001$) obtained with AE 400] were observed. In the ovaries, C. citratus decreased Fe2+ levels [maximum effect (31.57%; $p < 0.01$) obtained with HEE 200], caspase 3 [maximum effect (24.47%; $p < 0.05$) obtained with HEE 400] and oxidative stress markers [SO2: maximum effect (30.57%; $p < 0.01$) obtained with AE 200; MDA: maximum effect (23.28%; $p < 0.05$) obtained with AE 100], and increased antioxidants [Catalase: maximum effect (29.99%; $p < 0.05$) obtained with HEE 100]; GSH: maximum effect (42.37%; $p < 0.01$) obtained with HEE 200]. C. citratus also decreased cystic and atretic follicles, and promoted follicle growth and ovulation. In conclusion, C. citratus extracts are capable of protecting ovaries from the harmful effects of PCOS. HEE proved to be more effective against ferroptosis and apoptosis of follicular cells.

28 October 2026 | 13:40 – 14:00

Safety Considerations in Phytomedicine: Herb–Drug Interactions Involving Açaí and Kratom

Professor Angela Calderon Ph.D.
Auburn University, Auburn, United States

Abstract

The expanding use of botanical dietary supplements (BDS) in phytomedicine has heightened concerns regarding their safety when taken concurrently with prescription drugs. Açaí (Euterpe oleracea Mart.) and kratom (Mitragyna speciosa Korth.) are widely consumed for perceived cardiovascular, anti-inflammatory, and psychoactive benefits. Despite their ethnopharmacological relevance, comprehensive evaluations of herb–drug interaction risks remain limited, particularly for patients receiving therapies with narrow therapeutic indices.

This work addresses key safety considerations associated with herb–drug interactions involving açaí and kratom, focusing on açaí-associated cardiovascular liability and kratom-mediated modulation of antiretroviral therapy (ART) metabolism.

A multidisciplinary experimental approach was employed using standardized botanical extracts and commercial BDS. Cardiovascular safety of açaí was assessed in human endothelial cell models by measuring cell viability, nitric oxide signaling, and angiogenic function following co-exposure with pharmaceutical agents. Kratom interaction potential was evaluated in primary human hepatocytes by quantifying cytochrome P450 (CYP) enzyme expression following exposure to kratom alkaloids and representative ART drugs using quantitative polymerase chain reaction. In parallel, metabolism-based interaction risks of açaí were assessed using CYP cocktail inhibition assays across major FDA-recommended isoforms. Untargeted LC-MS metabolomics, combined with chemometric analysis and Random Forest machine-learning models, were applied to prioritize bioactive constituents contributing to CYP inhibition.

Açaí-containing preparations produced enhanced endothelial toxicity and functional impairment in combination treatments, supporting vascular injury as a plausible mechanism underlying reported cardiovascular adverse events. Several açaí extracts exhibited moderate to potent CYP2C9 inhibition, with machine-learning models enabling prioritization of putative inhibitory compounds. Kratom and its primary alkaloid, mitragynine, significantly induced CYP3A4 expression at higher concentrations, suggesting potential reductions in ART exposure and therapeutic efficacy.

Collectively, these findings underscore critical safety considerations in phytomedicine and emphasize the need for mechanistically informed clinical guidance to mitigate herb–drug interaction risks.

28 October 2026 | 14:00 – 14:20

Nanofabricated Plant Essential Oils against Skin Infection Caused by Trichophyton mentagrophytes

Ms. Arati Yadav M.Sc., Ms. Monisha Soni M.Sc., Mr. Kishor Kumar Paul M.Sc., Dr Abhishek Kumar Dwivedy PhD
Department of Botany, Institute of Science, Banaras Hindu University, Varanasi, India

Abstract

Introduction: Over the years, systemic antifungal drugs, such as azoles, have played a major role in treating skin fungal infections (dermatophytosis). However, long-term/ inappropriate use of these drugs often leads to drug resistance, which forces us to develop more effective topical treatments against dermatophytosis. Plant essential oils (EOs) are proven multicomponent antifungal agents that control fungal growth across diverse systems with a low risk of resistance development. In this study, we have encapsulated Melissa officinalis L. essential oil (MOEO) into chitosan nanoemulsion (MOEO-CsNm) through ionic gelation technique, and the encapsulated MOEO in gel form was evaluated against skin infections caused by Trichophyton mentagrophytes in a guinea pig model.

Results: Geranial and Z-citral were the primary components of MOEO as revealed through GC-MS analysis. The SEM, AFM, XRD, and FTIR, characterisation of MOEO-CsNm confirmed spherical morphology and successful encapsulation of MOEO. The antifungal efficacy of MOEO, MOEO-CsNm, and imidazole against T. mentagrophytes was recorded as minimum inhibitory concentration (MIC), which were 0.16, 0.08, and 0.5 µL/mL, respectively. Furthermore, MOEO-CsNm damaged the plasma membrane of T. mentagrophytes, causing leakage of intracellular ions, DNA, and proteins. MOEO-CsNm exhibited potential antioxidant activity with an IC50 value of 3.25 µL/mL. The anti-dermatophytic efficacy of MOEO-CsNm was also confirmed during In vivo studies on guinea pigs (Cavia porcellus L.). Topical application of MOEO-CsNm nanoemulgel completely treated T. mentragrophytes infection within 15 days and stimulated skin regeneration at the infection site. Furthermore, the healing was confirmed through histopathological studies of the infected skin tissues.

Conclusion: The findings suggest chitosan-based Melissa officinalis L. essential oil nanoemulsion as a potential, novel, and natural therapeutic agent for topical treatment of dermatophytosis caused by T. mentagrophytes.

Keywords: Melissa officinalis essential oil, Nanoemulsion, Nanoemulgel, Anti-dermatophytic activity, Trichophyton mentagrophytes, Guinea pigs

28 October 2026 | 14:20 – 14:40

Preclinical Models for the Pharmacological Characterization of Nature-Based Medicines: From Ethnobotanical Knowledge to Evidence-Based Healthcare

PD Dr. Cica Vissiennon
Leipzig University, Medical Faculty, Institute for Medical Physics and Biophysics, Leipzig, Germany. Repha GmbH Biologische Arzneimittel, Langenhagen, Germany

Abstract

Nature-based medicines represent a globally significant therapeutic resource, yet their pharmacological mechanisms and active constituents remain incompletely characterized. Bridging the gap between empirical ethnomedicinal use and evidence-based application requires tailored preclinical systems that capture the biological complexity of both the therapeutic agents and the target tissue. Applying a reverse pharmacology approach (from clinically documented efficacy to mechanistic elucidation) we have established a hierarchical in vitro and ex vivo model portfolio for the pharmacological characterization of natural products and traditional herbal formulations, with a focus on inflammatory bowel disease (IBD) and gastrointestinal pathophysiology.

Preclinical characterization encompassed (i) co-culture cell models of the inflamed intestinal mucosa (Caco-2/HT29-MTX monolayers with LPS-activated THP-1 macrophages) for quantification of mediator release and transepithelial electrical resistance (TEER); (ii) patient-derived tissue slice cultures from endoscopic biopsies (ePDTC), preserving native mucosal architecture, resident immune populations and patient-specific disease features in IBD; and (iii) bioassay-guided fractionation of myrrh resin (Commiphora myrrha) using gradient fractionation and centrifugal partition chromatography, coupled with TEER-based activity screening of fractions and purified compounds.

Co-culture studies confirmed anti-inflammatory and barrier-stabilizing activity of myrrh, with effects on pro-inflammatory mediator release and epithelial permeability. In ePDTC from IBD patients, budesonide reproduced its established pharmacological profile, thus validating model responsiveness. Preliminary data indicates anti-inflammatory and immunomodulatory activity of herbal extracts in patient-derived tissue, including modulation of cytokine release and macrophage polarization towards a regulatory phenotype. At the compound level, bioassay-guided fractionation identified germacrane- and guajantype sesquiterpenes as primary barrier-active constituents of myrrh, providing a structural basis for the observed clinical efficacy.

Tailored in vitro and ex vivo platforms, from co-culture to patient-derived tissue, provide complementary, translational tools for pharmacological profiling of nature-based medicines. Integration with bioassay-guided fractionation enables simultaneous validation of clinical use and identification of mechanism-defining active compounds, advancing the evidence-based development of phytotherapeutics for chronic inflammatory conditions.

28 October 2026 | 14:40 – 15:00

The Role of Intellectual Property Protection in Unlocking the Value of Indigenous Knowledge and Medicine Plants

Adv. Lawrence Baloyi
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Abstract

Africa possesses a rich heritage of indigenous knowledge systems (IKS), biodiversity and traditional medicinal practices that have sustained communities for generations. In South Africa, indigenous knowledge of medicinal plants presents significant opportunities for scientific research, pharmaceutical innovation, entrepreneurship and economic development. However, this potential remains underutilised, while concerns regarding biopiracy, misappropriation, inadequate recognition and the inequitable sharing of commercial benefits persist.

This keynote lecture examines the role of intellectual property (IP) protection in unlocking the scientific, social and economic value of indigenous knowledge and medicinal plants while safeguarding the rights and interests of indigenous communities. It explores the opportunities and limitations of conventional IP mechanisms, including patents, trademarks and trade secrets, particularly in protecting collectively held and intergenerational knowledge that does not always fit within traditional intellectual property frameworks.

With particular reference to South Africa and the broader African context, the lecture considers the legal and policy frameworks governing traditional knowledge, access to biological resources, prior informed consent and fair and equitable benefit-sharing. It further highlights the role of universities, research institutions, government and industry in establishing ethical partnerships that translate indigenous knowledge into commercially viable products and sustainable economic opportunities.

The lecture argues that intellectual property protection must extend beyond securing exclusive commercial rights to include recognising indigenous knowledge holders, preserving cultural heritage and ensuring equitable participation in the benefits arising from commercialisation. It concludes that an integrated approach combining legal protection, responsible research, effective institutional governance and meaningful community engagement can position indigenous knowledge and medicinal plants as strategic assets for African innovation, public health, entrepreneurship and economic transformation.

29 October 2026 | 10:00 – 10:20

From Underutilised Indigenous Trees to Climate-Resilient Food Systems: Unlocking the Potential of Mimusops zeyheri

Dr Christeldah Mkhonto[1], Dr Luambo Ramarumo[1], Dr Wilfred Mbeng[1], Dr Peter Tshepiso Ndlhovu[1,2], Dr Salmina Mokgehle[3,2]

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Abstract

Indigenous fruit trees are underutilised plant resources with significant potential to support diversified and climate-resilient food systems in southern Africa. As climate variability, biodiversity loss and growing pressures on food and nutrition security intensify, there is an urgent need to identify and develop locally adapted biological resources that can contribute to more resilient and diversified food systems. Mimusops zeyheri (Milkwood) is one such indigenous fruit tree. Despite its traditional importance, the biological diversity, nutritional value, physiological adaptation, and domestication potential of M. zeyheri remain poorly characterised.

This keynote synthesises a multidisciplinary body of research investigating the biological diversity, traditional utilisation, nutritional potential, physiological performance and domestication prospects of M. zeyheri across contrasting environments in Vhembe District, Limpopo, and Ehlanzeni District, Mpumalanga, South Africa. The study integrates indigenous knowledge with ecological, morphological, sensory, physiological, nutritional, and chloroplast DNA analyses to provide a comprehensive understanding of this underutilised species.

The findings demonstrate substantial traditional knowledge and utilisation of M. zeyheri, including its use as a food resource and in ethnomedicinal practices. Variation in morphological and sensory characteristics between and within populations points to the existence of potentially valuable traits for selection and future domestication. Nutritional investigations further highlight the contribution of the species to dietary diversification, while water-use studies provide insight into its physiological performance under contrasting environmental conditions. Molecular analysis, with approximately 75% sequencing success, further revealed genetic differentiation among populations, including two major genetic lineages and rare haplotypes such as LP3, MP9 and MP10. These findings highlight the importance of conserving geographically and genetically distinct populations while providing a foundation for identifying plant material of interest for future propagation, selection and domestication research. The genetic findings also reinforce the need to avoid a narrow focus on domestication at the expense of conserving the species' existing genetic diversity.

The broader message emerging from this work is that underutilised indigenous trees should not be viewed simply as neglected food resources, but as strategic biological assets within climate-resilient and biodiversity-sensitive food systems. Unlocking their potential requires an integrated approach that connects indigenous knowledge with contemporary ecological, nutritional, physiological and genetic sciences.

The keynote will therefore highlight a pathway from indigenous knowledge and biodiversity → scientific characterisation → conservation and selection → domestication and value addition → resilient food and livelihood systems. Future research should strengthen this pathway through population mapping, propagation and domestication, phytochemical and nutritional characterisation, value-addition, and long-term ecological and genetic monitoring. Such an approach can reposition M. zeyheri and other indigenous fruit trees from being underutilised resources to becoming meaningful components of sustainable food, nutrition and rural development strategies in southern Africa.

Keywords: Mimusops zeyheri; indigenous fruit trees; indigenous knowledge; food and nutrition security; climate resilience; biodiversity; genetic diversity; domestication; sustainable food systems

29 October 2026 | 10:00 – 10:20

BioProducts Value Chains in South Africa: Integrating Biodiversity, Traditional Knowledge, and Innovation for Inclusive Socio-Economic Impact

Dr Dashnie Naidoo-Maharaj PhD[1,2], Mr Mampa Mashaphu[3], Prof Ashwell Ndhlala PhD[4], Dr Monica Mwale PhD[5], Dr Bongiwe Mcata PhD[6], Dr Salmina Mokgehle PhD[6]

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Abstract

South African biodiversity, together with the historic centuries of indigenous knowledge systems, forms the foundation of an emerging bioeconomy centred on natural products, medicinal plants, and bio-based innovations. The BioProducts value chain in South Africa spans multiple sectors, including traditional medicine, complementary medicine, cosmetics, nutraceuticals, and functional foods, with increasing demand in both local and international markets. The development of BioProducts value chains relies on the integration of biodiversity conservation, sustainable harvesting or cultivation, scientific validation, product development, and market access. Historically, indigenous communities and traditional healers have safeguarded knowledge on the use of medicinal plants, which is increasingly being recognised through regulatory frameworks such as Access and Benefit Sharing (ABS). These frameworks aim to promote equitable benefit-sharing while supporting ethical biotrade and biodiversity conservation. Collaborative efforts among government, researchers, industry, and communities have led to notable successes, including the commercialisation of indigenous products such as rooibos, honeybush, and buchu, demonstrating the sector's potential to generate livelihoods and drive innovation. However, significant challenges remain, including unsustainable harvesting, limited cultivation and processing capacity, regulatory complexities, and unequal participation of communities in higher-value segments of the value chain. Gaps in research translation, market access, and stakeholder coordination further constrain sector growth. This presentation highlights the different BioProducts value chains in South Africa, identifying key challenges and opportunities. It emphasises the need for integrated, inclusive approaches that strengthen partnerships, support community involvement, and align policy, research, and industry efforts. Strengthening these value chains can enhance sustainable development, support biodiversity conservation, and improve livelihoods across South Africa.

29 October 2026 | 10:00 – 10:20

Oncology Medicinal Plants and Their Nutraceutical Values in Africa: A Comprehensive Overview and Case Study of Kigelia africana and Spathodea campanulata

Dr Alice Nabatanzi PhD[1], Prof Namrita Lall PhD[2], Prof Lyndy McGaw PhD[2]
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Abstract

The escalating burden of oncology-related pathologies across Sub-Saharan Africa necessitates an urgent exploration of indigenous therapeutic resources as both medicinal agents and functional foods. While African flora is a recognized reservoir of bioactive metabolites, there is limited synthesis regarding the dual role of these plants in disease prevention and management. This study provides a comprehensive evaluation of the anti-proliferative potential of key African plant species, with a particular focus on the ethnobotanical landscape of Uganda as a primary reference point. A dual-phase methodology was employed, beginning with a systematic review of the phytochemical profiles of pan-African plants with oncological relevance. This was followed by a laboratory-based ethnopharmacological study conducted in South Africa on two high value indigenous plant species: Kigelia africana (Sausage tree) and Spathodea campanulata (African Tulip tree). Laboratory procedures involved aqueous and organic extraction, colorimetric assays for total phenolic and flavonoid content, and MTT assays to evaluate in-vitro cytotoxic activity against malignant cell lines. The findings reveal that extracts from both species demonstrate significant dose-dependent inhibition of cancer cell proliferation, with Kigelia africana exhibiting particularly high antioxidant capacity and selective toxicity. These laboratory results validate the traditional use of these species as nutraceuticals in both East and Southern Africa, suggesting that their dietary and medicinal integration provides a measurable biological defense against oxidative stress and oncogenesis. Ultimately, this evidence supports the integration of these medicinal plants into a broader African framework for oncology management, providing a scientific basis for developing standardized, plant-based adjuvant therapies.

Oral Presentations

26 October 2026 | 14:00 – 14:10

Phytochemical Profiling of Ekebergia capensis: Insights into Bioactive Compounds with Neurofunctional Potential

Ms Caroline Mooki[1], Dr Mawande Shinga[2], Prof Oladapo Aremu[1], Prof 'Makhotso Lekhooa[1]
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Abstract

Background: Ekebergia capensis is widely used in ethnomedicine for the management of various ailments and has attracted increasing interest for its potential neurofunctional benefits. This study aimed to characterise the phytochemical profile of E. capensis with neurofunctional effect, using liquid chromatography–mass spectrometry (LC–MS).

Methods: Bark powder of E. capensis was extracted using four solvents of varying polarity (water, methanol, acetone, and dichloromethane). The ultra-high-performance liquid chromatography (UHPLC) system coupled with a SYNAPT XS mass spectrometer was performed using a reverse-phase Waters HSS T3 C18 column (1.8 µm particle size), maintained at 60 ˚C with a runtime of 21 min. Gradient elution was achieved through a binary mobile phase: water (Solvent A) with 10 mM formic acid (pH 2.4) and acetonitrile (Solvent B) with 10 mM formic acid, with a set schedule. Mass spectrometry was carried out using electrospray ionisation (ESI) in both positive and negative modes, covering a mass range of 100–1500 Da with a scan time of 0.2 s. The source temperature was maintained at 120 °C.

Results and discussions: Untargeted LC-MS-based metabolite profiling of E. capensis bark extracts enabled the tentative identification of 23 bioactive secondary metabolites across dual ionisation modes. Caffeic acid and its derivatives were consistently detected across extracts, suggesting strong antioxidant and anti-inflammatory potential. Flavonoids such as didymin and apigenin derivatives, along with lignan compounds, further highlight the capacity of the plant to modulate oxidative stress, inflammatory responses, and neurotransmitter-related pathways.

Conclusion: These findings provide a comprehensive metabolomic fingerprint of E. capensis bark, supporting its ethnomedicinal relevance and highlighting its potential as a source of bioactive compounds for neurological health applications. Further in vitro and in vivo studies are warranted to validate its therapeutic efficacy.

26 October 2026 | 14:00 – 14:10

The Commercialisation of Cosmetic Botanical Actives

Ms Gill Whittington Banda CEO
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Abstract

The global cosmetic industry increasingly demands natural, sustainable, and bioactive ingredients, driving the commercialisation of medicinal plant research. This abstract examines the experience of South African company, Zuplex Botanicals, in transforming ethnobotanical knowledge and laboratory discoveries into marketable cosmetic ingredients. The commercialisation pathway entails critical hurdles. These include stringent regulatory frameworks like the Nagoya Protocol on access and benefit-sharing, strict supply chain traceability, and sustainable sourcing to prevent biodiversity loss while ensuring equitable community partnerships. Furthermore, companies must generate robust in vivo clinical efficacy data to substantiate anti-ageing, antioxidant, and skin-brightening claims amidst sophisticated international competition. Transitioning from bench to market requires substantial investment in new extraction technologies alongside the development of international distribution networks. By bridging the gap between phytochemistry and industrial formulation, the commercialisation of medicinal plants fuels cosmetic innovation. Ultimately, it fosters sustainable economic growth within a high-value green chemistry sector.

26 October 2026 | 14:10 – 14:20

Isolation, Characterisation and Cytotoxicity Investigation of Compounds from Annona muricata:An Integrated in Vitro and Silico Approach

Prof Anke Wilhelm PhD[1], Dr Jennifer Nambooze PhD[1], Dr Abdul Rashid Issahaku PhD[1], Dr Anwar Noreljaleel PhD[1], Dr Marie Kvasnicová PhD[2], Dr Lucie Rárová PhD[2], Prof Susan Bonnet PhD[1]
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Abstract

Annona muricata is a member of the Annonacea family with various therapeutic benefits, including cytotoxic properties. Four cytotoxic compounds were isolated from the ethyl acetate and methanol extracts of the leaves of A. muricata. These extracts showed potent cytotoxicity against MCF7 and HeLa cells, with IC50 ranging from 0.2 – 0.6 µg/mL and 0.4 – 1.8 µg/mL, respectively. Fractions from both extracts were not toxic towards normal human skin cells (BJ). The methanol crude extract demonstrated the best antioxidant activity. Compound 1, (5S)-5-methyl-3-{2,9,13-trihydroxy-13-[(2R)-5-(1-hydroxytridecyl)tetrahydrofuran-2-yl]-4-oxotridecyl}furan-2(5H)-one, was isolated from the ethyl acetate extract and was not previously described. N-phenylacetamide (2), (E)-2-hydroxy-3′,4,4′,6-tetramethoxymethoxyprop-2-en-1-one (3), and (E)-2,3′,4,4′,6-pentamethoxyprop-2-en-1-one (4) were isolated from the methanol extract, 2 and 3 for the first time from this plant. Compounds 1 and 4 had the best cytotoxic activity against MCF7 cells (IC50s 0.0072 ± 0.0007 µg/mL to 0.8 ± 0.1 µg/mL) and HeLa cells (IC50s 0.0094 ± 0.0008 µg/mL to 0.4 ± 0.0 µg/mL). In silico investigation of 1 and 4 showed they bound favourably to the PI3K delta and human placental aromatase enzymes, respectively, characterised by strong hydrogen and hydrophobic interactions. These enzymes have been implicated in the advancement of breast and cervical cancer.

26 October 2026 | 14:10 – 14:20

Therapeutic Potentials of Phytocompounds Isolated from Irvingia gabonensis Stem Bark against Pancreatic Lipase and Protein Glycation Using Computational Approach

Dr. Catherine Otitolaiye PhD[1], Prof. Olusola Elekofehinti[2], Prof. Edward Okello[3], Prof. Iyere Onoagbe[4], Prof. Friday Okonofua[5], Prof Akhere Omonkhua[6]

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Abstract

Hyperlipidemia and protein glycation are two major risk factors contributing to the development of diabetes, obesity, atherosclerosis, and cardiovascular diseases. This study utilized computational modelling approach to investigate the inhibitors of pancreatic lipase and protein glycation from the phytocompounds of Irvingia gabonensis stem bark. Following series of bio-guided fractionation of the ethanol extract on vacuum liquid chromatography, the isolated compounds were characterized via liquid chromatography-mass spectrometry (LC-MS). Seven compounds were identified which were derivatives of gallic acid and ellagic acid. These were subjected to molecular docking against pancreatic lipase and receptor for advanced glycation endproducts (RAGE) using Maestro molecular interface of Schrödinger suites. Five (5) of these compounds demonstrated drug-like and pharmacokinetic properties against pancreatic lipase and protein glycation. The compounds include methyl gallate (C8H8O5, m/z: 183.03), gallic acid (C7H6O5, m/z: 169.01), methyl methylene ellagic acid (C16H10O8, m/z: 329.03), ellagic acid trimethyl ether (C17H12O8, m/z: 345.06), tetramethyl ellagic acid (C18H14O8, m/z: 359.08). These compounds exhibit potent antioxidant, anti-inflammatory, anti-diabetes, anti-carcinogenic, and anti-microbial properties. The predicted IC50 for the isolated compounds against the pancreatic lipase and protein glycation showed promising inhibitory action compared to orlistat (6.607) and aminoguanidine (5.755). The study concludes that the compounds are potential lead candidates against pancreatic lipase and protein glycation, and could be explored further for molecular simulation, in vitro and in vivo activities.

27 October 2026 | 10:20 – 10:30

Phytochemical Characterisation, Antidiabetic Activity and Cell Cycle Arrest by Hydroethanolic Psidium guajava Leaf Extract

Professor Constance Sewani-Rusike PhD, Mr Ntsika Zangqa
iYunivesithi Walter Sisulu, Mthatha, South Africa

Abstract

Psidium guajava L. is widely used in African traditional medicine for the management of diabetes mellitus, yet its broader pharmacological potential remains incompletely characterised. This study investigated the phytochemical composition, antioxidant activity, α-glucosidase inhibitory activity, cytotoxicity and cell cycle effects of a hydroethanolic leaf extract of P. guajava. Fresh leaves collected in the Eastern Cape, South Africa, were extracted using 70% ethanol. Total phenolic and flavonoid contents were quantified using the Folin-Ciocalteu and aluminium chloride methods, respectively. Antioxidant activity was determined using the DPPH radical scavenging assay, while α-glucosidase inhibition was evaluated using the p-nitrophenyl-α-D-glucopyranoside assay. Cytotoxicity was assessed in Vero cells, and cell cycle distribution was analysed in MCF-7 breast cancer cells following 48-hour exposure to the extract. The extract contained high levels of total phenolics (1224.34 ± 44.23 µg GAE/mg extract) and flavonoids (153.70 ± 12.76 µg QE/mg extract). Potent antioxidant activity was demonstrated with a DPPH IC_{50} of 57.41 ± 2.61 µg/mL, while moderate α-glucosidase inhibition was observed (IC_{50} = 266.63 ± 7.31 µg/mL), supporting the traditional use of the plant in diabetes management. Cytotoxicity testing showed minimal toxicity at lower concentrations, with reduced cell viability observed at 125 and 250 µg/mL. Flow cytometric analysis demonstrated accumulation of MCF-7 cells in the S phase following treatment, indicating induction of cell cycle arrest and suggesting antiproliferative activity. These findings demonstrate that P. guajava leaf extract possesses multiple complementary bioactivities attributable to its rich phytochemical composition. The combined antioxidant, α-glucosidase inhibitory and antiproliferative properties support its potential as a promising source of multifunctional bioactive compounds for future development of plant-derived therapeutics targeting metabolic disorders and cancer.

Key words: Psidium guajava; antidiabetic activity; cell cycle arrest; medicinal plants

27 October 2026 | 10:20 – 10:30

Enhancing Chlorin e6 Photodynamic Therapy with Green-Synthesized Silver Nanoparticles in Three-Dimensional Breast Cancer Spheroids

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Abstract

Breast cancer remains a major cause of cancer-related mortalities among women worldwide, which calls for more effective therapeutic strategies. Photodynamic therapy (PDT) has emerged as a promising minimally invasive treatment modality that incorporates a photosensitizer, light and molecular oxygen to generate reactive oxygen species (ROS), leading to cancer cell destruction. However, limitations such as incomplete tumour eradication and resistance due to a complex tumour microenvironment necessitate the development of combinational approaches. This study investigates the therapeutic efficacy of combining chlorin e6 (Ce6)-mediated PDT with green-synthesized silver nanoparticles (AgNPs) in three-dimensional (3D) breast cancer spheroids. Breast cancer spheroids were used because they closely resemble many aspects of in vivo tumours such as cellular interactions, gradients and treatment responses observed in vivo. Following spheroids generation, cells were incubated with Ce6, AgNPs or a combination of both agents prior to light irradiation. Cellular viability, spheroid morphology and treatment-induced cell death were assessed to determine the efficacy of the combined therapy. The green-synthesized AgNPs were used as a secondary therapeutic agent owing to their inherent anticancer properties, ability to induce oxidative stress and potential to enhanced PDT-mediated ROS generation. The combination therapy significantly exerted greater antitumor activity compared to either monotherapy. Ce6-PDT and AgNPs treatment inhibited spheroid growth, disrupted its initial structural and reduced cell viability. These inhibitory effects were attributed to synergistic interaction between PDT-induced oxidative damage and AgNP-mediated cytotoxicity, resulting in increased cellular stress and tumour cell death. Furthermore, the use of green synthesis methods provides an eco-friendly and biocompatible approach for nanoparticle generation. Overall, the findings indicate that green-synthesised AgNPs can significantly enhance Ce6-mediated PDT in breast cancer spheroids. This suggests considerable potential for these nanoparticles as adjuvants agents to enhance PDT and address limitations of classical PDT.

27 October 2026 | 10:20 – 10:30

Investigating Underutilized Southern African Orphan Crops for Nutraceutical Supplements

Mr Brandon Alston, Dr Marco De Canha, Professor Namrita Lall
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Abstract

Southern African orphan crops remain underexplored despite their potential as sustainable and nutritionally valuable resources. The development of nutraceutical products from these crops is increasingly important, given their capacity to provide bioactive compounds and essential micronutrients that support health promotion and disease prevention. This study investigated the bioactive and nutritional properties of selected indigenous plant samples (coded AC, AG, Cmac, Cmet, FS, and SN). Ethanolic extracts prepared from the stems and leaves were evaluated for safety, chemical composition and nutraceutical potential. Cytotoxicity was assessed against RAW 264.7 murine macrophage and HepG2 human hepatoma cell lines to establish baseline safety profiles. Extracts that exhibited low cytotoxicity (IC_{50} > 400 µg/mL) were further evaluated for potential herb–drug interactions using a cytochrome P450 (CYP450) enzyme model. Bioactivity was evaluated using targeted key nutraceutical pathways. Nootropic potential was assessed via acetylcholinesterase (AChE) inhibition, where one lead sample (AG) demonstrated dose-dependent inhibitory activity. Vasodilatory potential was evaluated using an angiotensin-converting enzyme (ACE-1) inhibition assay, with multiple samples (AC, AG, Cmet, and SN) exhibiting significant dose-dependent responses. Anti-inflammatory activity of selected leads was determined through modulation of nitric oxide production and TNF-α levels in vitro. Nutritional content of lead samples quantified macro- and micronutrient content to assess dietary relevance. Preliminary findings indicate that these orphan crops exhibit favourable safety profiles alongside promising biological activity , supporting their potential as sustainable and functional nutraceutical ingredients and advancing the scientific validation of indigenous knowledge systems.

27 October 2026 | 10:30 – 10:40

Biological Validation of Areka Ya Makgoma Herbal Concoction Cancer Healing Properties Towards Colorectal and Breast Cancer

Ms Kamogelo Millicent Mmereke MSc, Dr Adewale Oladipo pHd, Prof Thanyani Pandelani pHD, Prof Harry Ngwangwa pHD, Prof Tracy Masebe pHD
UNISA, Johannesburg, South Africa

Abstract

The South African herbal concoction, Areka Ya Makgoma, comprising seven indigenous medicinal plants, is traditionally used to treat various ailments, including cancer. This study aimed to biologically validate cancer healing properties claims by a local traditional healer, was achieved by assessing cytotoxic and mechanistic effects of the concoction and its individual plant components on colorectal and breast cancer cell lines. In vitro screening against HCT-116 and MCF-7 cell lines, compared with non-cancerous lung fibroblast cells, revealed significant anticancer activity. M. glauca and H. oddoratissimum are one of the extracts that were highly selective towards cancer cells. Other potent extracts included methanolic O. paniculosa and E. burkei, and acetonic and methanolic J. erythropoda. However, the complete herbal concoction exhibited low selectivity, suggesting potential systemic toxicity when the plants are combined. Microscopic evaluation showed a transition from monolayer growth to cellular aggregation upon treatment. Fluorescence imaging revealed nuclear deformation into distinct lobes. Furthermore, the extracts demonstrated the capacity to disrupt cell membrane integrity, specifically inducing cytotoxicity in cancer cells while maintaining minimal impact on healthy MRC-5 cells. The anticancer mechanism appears to be driven by enhanced oxidative and inflammatory responses. Treatment led to a marked increase in nitric oxide production and elevated reactive oxygen species levels in both cancer lines. The extracts selectively induced elevated nitric oxide and reactive oxygen species levels in cancer cells while exhibiting low cytotoxicity and minimal membrane integrity disruption in normal cells, indicating cancer-specific redox-mediated biological activity. Apoptosis analysis confirmed that this oxidative stress led to programmed cell death, specifically triggering early apoptosis in HCT-116 cells and late apoptosis in MCF-7 cells. These results provide strong biological evidence supporting the traditional use of these plants, specifically identifying M. glauca and H. odoratissimum as highly selective leads for further pharmaceutical development against colon and breast cancers.

27 October 2026 | 10:30 – 10:40

Therapeutic Efficacy of a Chlorin e6–Green Gold Nanoparticle–MitoTracker Nanoconjugate for Fluorescence-Guided Photodynamic Therapy of Breast Cancer

Dr Alexander Chota PhD Biomedical Sciences, Prof Heidi Abrahamsse PhD, Prof Blassan George PhD Biotechnology
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Abstract

Dicoma anomala (D. anomala), a flowering plant native to southern Africa, has been traditionally used in medicine to treat stomach disorders, wounds, and respiratory problems. Prior to synthesis, the Zambia Agriculture Research Institute (ZARI) authenticated D. anomala (certificate SR No: 0006064). Here, we demonstrate the anticancer potential of D. anomala as a nanomedicine. Gold salts were used to synthesise D. anomala gold nanoparticles (AuNPs), which were then conjugated with Ce6 and Rhodamine 123. Zeta potential, size, TEM, SEM, and FTIR were used to determine the surface charge, composition, and morphology of the nanoformulations. The chemotoxic and phototoxic effects of AuNPs-PEG-Ce6-Rh against MCF-7 breast cancer cells in PDT were tested. After 24 h, the 50% inhibitory concentration (IC50) was determined using the MTT cell viability assay. Cell death mechanisms were analysed using flow cytometry (Annexin V-FITC-PI staining), mitochondrial membrane potential (MMP) assay, and enzyme-linked immunosorbent assay (cytochrome c). The MTT results showed a dose-dependent decrease in cell viability, including at the IC50 dose. Apoptosis was the most prominent cell death mechanism induced 24 h after treatment. These findings demonstrate the therapeutic potential of biocompatible green synthesised nanoformulations against breast cancer cells in vitro.

Keywords: breast cancer; Dicoma anomala; nanotechnology; apoptosis; photodynamic therapy

27 October 2026 | 10:30 – 10:40

From Tradition to Therapy: Chemical Profiling Reveals a Reservoir of Antimicrobial Agents in Ethnoveterinary Medicine

Ms. Ndzalama Shikwambana[1,2], Prof. Lyndy McGaw[1], Prof Stephen Amoo[2], Dr Nqobile Masondo[2]

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Abstract

Mycobacteria are a class of bacterial organisms which can be difficult to treat due to their slow growing nature, among other reasons. Pathogenic mycobacterial strains can occasionally cross species barriers, infecting a range of animal hosts as well as humans. As medicinal plants contain bioactive compounds with multi-targeted antimicrobial potential, the study aimed to tentatively identify the presence of antimicrobial compounds in plants used for ethnoveterinary medicine (EVM). Five plants documented in EVM - Artemisia afra, Bulbine frutescenc, Colophospermum mopane, Peltophorum africanum and Senna italica - were analysed for antimicrobial, anti-inflammatory, cytotoxicity activity and metabolite profiling. The viability of Bovine dermis cells that were treated with 1.0 mg/ml S. italica and C. mopane aqueous extract was greater than 50 %, while the ethanolic extracts of P. africanum and B. frutescens exhibited no toxicity (LC50 > 1 mg/ml) and good selectivity index for microbial pathogens. The ethanol extracts were highly active against Mycobacterium smegmatis (minimum inhibitory concentration, MIC = 0.16 – 0.31 mg/ml). The ethanol extracts of P. africanum and C. mopane also exhibited good 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) scavenging activity (EC50 = 15.87 ± 6.43 µg/ml and 31.39 ± 1.07 µg/ml, respectively). Quercetin and kaempferol derivatives, which are known potent antimicrobial agents, were tentatively identified in A. afra and S. italica using ultra-performance liquid chromatography – mass spectrometry (UPLC-MS). Myricetin, tentatively identified in P. africanum, is a highly potent antimicrobial compound. The results strongly support medicinal plants as a source of antimicrobial compounds for managing bacterial diseases in animals.

27 October 2026 | 10:40 – 10:50

Acute and Sub-Acute Toxicity of Selected Medicinal Plant Species Used in the Treatment of Malaria by Indigenous Communities of Tororo District, Eastern Uganda in Wister Rats

Prof. John R.S Tabuti PhD, MSc, BSc[1], Dr. Alice Nabantanzi PhD, MSc, BSc[1], Dr. Samuel Bakerc Obakiro PhD, MSc, BSc[2], Dr Abdul Walusansa PhD, MSc, BSc[1], Dr Cissy Nambejjae MSc, BSc[3], Mr. Michael R Mutyaba BPharm, MSc[4], Mr. Timothy Omara MSc, BSc[1,5], Prof. Paul Waako PhD, MSc, MBChB[2], Dr Godwin Anywar PhD, MSc, BSc[1,6]

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Abstract

Various medicinal plants especially Gymnanthemum amygdalinum (Delile) Sch.Bip., Warburgia ugandensis Sprague, and Abrus precatorius L. are widely used by local communities in the management of malaria and febrile illnesses in Eastern Uganda. However, little is known about their safety and effects of both short- and long-term use. The aim of this studywas to assess the acute oral toxicity, hematological effects, and histopathological changes associated with aqueous, ethanolic, and methanolic leaf extracts of the three species in Wistar rats. Toxicity assays were conducted in accordance with the standard guidelines of the Organization for Economic Cooperation and Development 423 (OECD, 2001) and the ARRIVE guidelines for the care and use of laboratory animals in scientific research. Haematological analysis was performed using an automated haematology analyzer to examine various parameters including red blood cell, haemoglobin, haematocrit, mean corpuscular haemoglobin concentration, mean corpuscular volume, mean corpuscular hemoglobin, total white blood cells, and differential leukocytes and platelets were measured. Single oral doses up to 5000 mg/kg body weight were administered, and animals were monitored for 14 days. The extracts of V. amygdalina, W. ugandensis, A. precatorius were well tolerated by the animals. The was no mortality or severe clinical toxicity was observed. There were no observable signs of acute toxicity effects like restiveness, seizures or dizziness after the administration of 5000 mg/kg indicating LD_{50} values greater than 5000 mg/kg for all extracts. Histopathological evaluation revealed mild to moderate gastric mucosal lesions and occasional mild renal or hepatic alterations. Hematological indices displayed modest shifts in red and white blood cell parameters without evidence of hematotoxicity. The findings suggest that extracts of the three species are practically non-toxic in acute settings and support their continued traditional ethnomedicinal use. Further studies should assess sub-chronic toxicity and examine the pharmacological implications of observed hematological modulation.

27 October 2026 | 10:40 – 10:50

Cannabis sativa Nanoemulsions from KwaZulu-Natal as Promising Plant-Based Therapeutics for Cervical Cancer: An in Vitro Study

Mr Sanele Mhlungu[1], Mr Michael Laws[2], Professor Malcom Steinberg[1,3], Professor Motshedisi Sebitloane[4], Dr. Mlungisi Ngcobo[1], Professor Nceba Gqaleni[1,5]

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Abstract

Introduction: Cervical cancer remains a major global health burden, particularly in low- and middle-income countries, where over 85% of related deaths occur. Cannabis sativa has gained increasing attention for its potential anticancer and antioxidant properties. This study investigated the cytotoxic, apoptotic, and antioxidant effects of Cannabis sativa oil extracts and nanoemulsion formulations from Richmond, KwaZulu-Natal, against cervical cancer cell lines.

Methods: Full-spectrum C. sativa oils (CS-1 and CS-2) were extracted using cold ethanol and formulated into nanoemulsions (NE-1 and NE-2). Nanoemulsions were characterised for stability, particle size, and zeta potential using a Zetasizer. Cytotoxicity was assessed in SiHa and HeLa cancer cell lines, and in non-malignant HEK293 cells, using the CellTiter-Glo assay. Apoptosis and oxidative stress were evaluated using caspase 3/7 activation, intracellular glutathione (GSH) depletion, and Annexin V/PI staining. Statistical analyses were performed using one-way ANOVA ($p < 0.05$).

Results: Both nanoemulsions demonstrated stable particle characteristics (<200 nm, PDI < 0.3) with no phase separation over 30 days. Cannabis oils and their nanoemulsions exhibited dose-dependent cytotoxicity, with NE-1 showing the greatest potency and selectivity (IC_{50} = 3.87 µg/mL; SI = 7.53) against SiHa cells. Caspase-3/7 activity increased significantly across treatment groups, with NE-1 inducing early and strong activation between 6–12 hours. GSH depletion was most pronounced in SiHa cells, indicating enhanced oxidative stress. Annexin/PI analysis confirmed apoptosis as the predominant mode of cell death, with minimal necrosis.

Conclusion: Cannabis sativa nanoemulsions significantly enhanced the anticancer efficacy of crude cannabis oils by improving bioavailability, promoting oxidative stress, and activating caspase-dependent apoptosis in cervical cancer cells. These findings highlight the potential of plant-based nanoformulations as novel therapeutic strategies for cervical cancer. Further molecular pathway and in vivo studies are warranted to validate these outcomes.

27 October 2026 | 10:50 – 11:00

Antigonococcal Activity and Cytotoxicity of Three Ziziphus Mill. (Rhamnaceae) Plant Species Indigenous to South Africa

Prof Emmanuel Tshikalange

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Abstract

Species of the genus Ziziphus (Rhamnaceae) are widely used in South African traditional medicine to treat ailments, including sexually transmitted infections such as gonorrhea. This study evaluated the in vitro antigonococcal activity and cytotoxicity of three indigenous species: Ziziphus mucronata, Z. rivularis, and Z. zeyheriana. Roots, stem bark, and leaves were collected, air-dried, powdered, and sequentially extracted with n-hexane, dichloromethane, ethyl acetate, ethyl acetate:methanol (1:1 v/v), and methanol. Traditional decoctions were also included for comparison. Antigonococcal activity was determined using a broth microdilution assay against Neisseria gonorrhoeae (ATCC 49226), with ciprofloxacin as a positive control. Cytotoxicity was assessed on L6 rat skeletal myoblast cells using podophyllotoxin as a reference. Active extracts were further profiled using ^{1}H NMR-based metabolomics and GC-MS to identify bioactive compound classes and constituents. Overall, Z. rivularis and Z. zeyheriana showed stronger antigonococcal activity than Z. mucronata. Of all extracts tested, 12.5% exhibited high activity, 33.3% moderate activity, and 54.1% were inactive. Metabolomic analyses revealed aliphatic, alcohol, carboxylic acid, and aldehyde compounds associated with activity. Key constituents detected included hexadecanoic acid, phytol, codeine, and betulin. Hexadecanoic acid likely contributed directly to antibacterial activity, while phytol, betulin, and codeine may provide indirect anti-inflammatory effects relevant to symptom alleviation. These findings support the traditional use of Z. mucronata for gonorrhea and report, for the first time, antigonococcal activity for Z. rivularis and Z. zeyheriana. The results highlight these species as promising sources of bioactive compounds and warrant further phytochemical and pharmacological investigation.

27 October 2026 | 10:50 – 11:00

Rosemary-Derived Gold Nanoparticles Loaded with Pheophorbide-a for EpCAM-Directed Photodynamic Therapy in Caco-2 Colorectal Cancer Cells

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Abstract

Colorectal cancer (CRC) remains a significant global health burden, with disease recurrence and therapeutic resistance primarily attributed to cancer stem cells (CSCs). Photodynamic therapy (PDT) offers cytotoxicity through the generation of photosensitiser-mediated reactive oxygen species (ROS); however, efficacy against CSC subpopulations remains limited. EpCAM, a cell surface biomarker overexpressed in CRC and CSCs, represents a therapeutic target. Nanobioconjugate was developed by integrating Salvia rosmarinus-derived gold nanoparticles (SrAuNPs), Pheophorbide-a (PPBa) photosensitiser, and EpCAM monoclonal antibodies (Emab) using EDC/NHS coupling chemistry. Physicochemical characterisation of the Emab-SrAuNPs-PPBa construct was performed using UV-Vis spectroscopy, transmission and scanning electron microscopy (TEM/SEM), Fourier-transform infra-red spectroscopy (FTIR), and dynamic light scattering with zeta potential analysis (DLS/ZP). Biological evaluation was conducted in Caco-2 CRC cells, $CD24^{+}/CD133^{+}$ CSC subpopulations, and WS1 normal fibroblasts. Cellular uptake and subcellular localisation were assessed using fluorescence microscopy and flow cytometry. Using 660 nm laser irradiation at a fluence of 5 J/cm^2, PDT was performed, followed by the quantification of cell viability using ATP bioluminescence, MTT colorimetric assays, and complemented by morphological analysis. Physicochemical characterisation confirmed the successful conjugation, colloidal stability, and structural integrity of the nanobioconjugate. Cellular uptake studies demonstrated preferential internalisation in Caco-2 cells and CSC subpopulations, with reduced uptake in WS1 fibroblasts. Irradiation induces intracellular ROS generation, apoptosis, and morphological changes consistent with photodynamic cell injury. Both ATP and MTT assays revealed significant cytotoxicity in CRC cells and CSCs, with relative sparing of normal fibroblasts. Emab-SrAuNPs-PPBa demonstrates targeted, eco-friendly, and effective PDT activity against CRC cells and CSC subpopulations. This platform offers a promising and strategy for overcoming CSC-driven therapeutic resistance in CRC by synergising green nanoparticle synthesis, antibody-mediated tumour targeting, and PPBa's photodynamic potency. These findings contribute to the growing field of nanotheranostics and align with the principles of nature-derived pharmacological innovation.

27 October 2026 | 10:50 – 11:00

Nutritional and Vitamin Composition of Monsonia burkeana Plants from Four South African Locations

Dr Sandile Ngwenya PhD in Agriculture[1,2], Prof Lyndy McGaw[3], Prof Fhatuwani Mudau[4,2]
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Abstract

African cultures have been utilizing medicinal plants as important sources of nutrients for health and well-being. Among these plants is Monsonia burkeana (special tea), valued for its medicinal and nutritional properties. This study aimed to evaluate the nutritional composition of special tea harvested from four areas in South Africa and to quantify the plant's mineral and vitamin contents. Nutrient composition was assessed for 24 elements using inductively coupled plasma mass spectrometry (ICP-MS), while six vitamins were quantified in shade-dried samples from Lanseria using high-performance liquid chromatography (HPLC). The study detected 19 elements across the sample set, though concentrations of thallium (Tl), selenium (Se), bismuth (Bi), and cobalt (Co) were below quantification limits in some location-drying method combinations. Notably, in the Sekhukhune samples, aluminium (Al) was the predominant element, accounting for 93.94% in freeze-dried material and 75.29% in shade-dried material. Conversely, Ca was the most abundant element in samples from Brits, Lanseria, and Rietondale, with values of 85.93 and 46.09, 54.19 and 52.55, and 35.87 and 30.67 under freeze- and shade-drying, respectively. Overall, freeze-dried samples consistently had higher nutrient concentrations than shade-dried samples. Six vitamins were also identified in M. burkeana, with vitamin B3 (29.51 mg/g) and vitamin B1 (12.97 mg/g) occurring at higher concentrations than the other vitamins, and vitamin B6 presenting at less than 0.05 mg/g. Nutritional composition varied minimally across locations, indicating that special tea is a reliable source of essential nutrients. Moreover, the presence of key vitamins further suggests its potential contribution to human health and nutritional well-being.

27 October 2026 | 11:00 – 11:10

Cytotoxicity and Wound Healing Efficacy of Makomo Herbal Extracts on Rat Fibroblast and Human Keratinocyte Epithelial Cells

Mr Carl Mateta MSc[1,2], Mr Siboniso Sithole MSc[3], Prof Nceba Gqaleni PhD[3], Dr Mlungisi Ngcobo PhD[3], Prof Nicholas Midzi PhD[2], Prof Exnevia Gomo PhD[1]

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Abstract

Introduction: Medicinal plants are major reservoirs of important biologically active compounds. Considering myths such as "natural is safe", safety and efficacy evaluation becomes critical in research and development of these medicinal plants. Fibroblasts and keratinocytes are pivotal in evaluation of activitiy of wound healing products.

Aim: This study determined in-vitro wound healing effect of four leaf and bark extracts of Makomo, a Zimbabwean herbal plant, on fibroblasts (CFRK-RMC) and keratinocyte (HaCaT) cells.

Methods: Makomo bark and leaves were harvested, air-dried, and ground to powder before hot water and methanol extraction. Cell viability and proliferation were evaluated using the ATP assay and wound healing effects evaluated using in-vitro scratch assays. The collagen deposition assay kit was used to evaluate the effects of Makomo extracts on deposition of collagen in treated fibroblasts.

Results: Cell viability decreased with increasing concentrations, regardless of extract or solvent type. The 10% growth inhibition concentrations (EC10) for fibroblasts in water extract were 13µg/ml and 64µg/ml ($p \geq 0.01$) for leaf and bark extracts, respectively. The IC10 values for HaCaT were determined at 44µg/ml and 37µg/ml, respectively. All extracts improved fibroblast proliferation at sub-IC10 concentrations with the methanol extracts of both the leaf and bark significantly accelerating fibroblast proliferation. Significant HaCaT cell line proliferation was achieved by the water and methanol leaf extracts, respectively. The leaf water extract and bark methanolic extract inhibited collagen deposition consistently in the first 24hours, which was comparable to allantoin.

Conclusion: Makomo extracts showed dose dependent and extraction method dependent cytotoxicity and proliferative effect in treated fibroblasts and keratinocytes. Both dose and time of exposure independently influence cell proliferation in the scratch assay. Leaf extracts were consistently effective, with significant differences from the negative control and no significant difference from the positive control in both in vitro wound healing and collagen deposition.

27 October 2026 | 11:00 – 11:10

Computational Elucidation of the Multi-Target Mechanism of Action of Compounds from South African Selected Medicinal Plants against Colon and Breast Cancer

Ms Kamogelo Millicent Mmereke MSc, Dr Adewale Oladipo pHd, Prof Thanyani Pandelani pHD, Prof Harry Ngwangwa pHD, Prof Tracy Masebe pHD

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Abstract

Traditional drug discovery often relies on extensive, resource-heavy wet-lab experiments. This study employs computational network pharmacology to accelerate establishment of anti-cancer activity pure compounds isolated from seven diverse medicinal plants. This provides a streamlined pipeline for drug lead discovery. Putative protein targets for the isolated compounds were predicted using SwissTargetPrediction and rigorously validated via the UniProt database. To visualize and analyze the complex interplay between compounds and biological systems, a comprehensive compound–target–pathway network was constructed using Cytoscape, with topological analysis performed via the cytoHubba plugin to identify high-degree hub nodes. The resulting network identified a central PI3K/AKT–MAPK core (specifically involving MAPK3/1, PIK3CA/CB, and AKT1) regulated by EGFR. Notably, high-degree phytochemicals (catechin, epigallocatechin, gallocatechin, procyanidin B1/B2, and gallic acid) mapped directly to PAM/MAPK, MMP2, MMP9, VEGFA, PGF, PTGS1, and EGFR. Key hub proteins identified include ESR1 and HSP90, which are central to endocrine and proteostatic signaling. Pathway enrichment analysis revealed significant involvement in cancer-related pathways, estrogen signaling, and PD-1/PD-L1 immune checkpoint regulation. These findings support the multi-target potential of these phytochemicals in addressing endocrine resistance and RTK-addicted tumors. The study provides a mechanistic rationale for exploring kinase-endocrine-immunotherapy combinations, highlighting the power of silico modeling in narrowing the gap between plant-based chemistry and clinical oncology.

27 October 2026 | 11:00 – 11:10

Preserving Ethnoveterinary Knowledge: A Survey on Medicinal Plants Used for Animal Healthcare Management in KwaZulu-Natal Province, South Africa

Mr Peter Mohlake[1,2], Dr Ntebo Lion[2], Prof Adeyemi Aremu[3], Prof Stephen Amoo[1], Dr Nqobile Masondo[1]

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Abstract

Despite the significant losses caused by livestock diseases, livestock production remains extremely essential for rural livelihoods and food security. With regards to treatment and management of livestock conditions, many South African communities still rely on traditional medicine and practices due to the rurality and limited access to modern veterinary healthcare. Indigenous knowledge and practices are threatened by the declining number of knowledge holders, biopiracy, and the rate of urbanization. Hence, it is imperative to document and preserve indigenous knowledge and traditional practices before their decline is rendered irreversible. In the current study, we recorded indigenous knowledge and practises in the uMzinyathi and King Cetshwayo Districts of KwaZulu-Natal Province, South Africa. Engagement with smallholder farmers, traditional healers and community members with experience in livestock rearing was done through interviews using semi-structured questionnaires. A total of 137 plant species were recorded, with commonly cited species including Aloe spp., Volkameria glabra, and Euphorbia triangularis. Leaves (65%) were the most frequently used plant parts, followed by roots (11%), stem (8%), bark (7%), rhizomes (5%) and whole plant (4%). The primary preparation methods included maceration (49%) and decoctions (46%) followed by powder (2%), paste (2%) and use of fresh plants (1%). The commonly treated diseases included diarrhoea (31%), flu/cough (13%), worms (10%), Coryza, stomach illnesses, and womb cleansing at 9% each. The recorded findings highlight the evidence and significance of ethnoveterinary knowledge used in animal healthcare especially in rural areas. Furthermore, the knowledge draws focus on the potential availability of plant based candidates for product development and the positive cascading effects for community upliftment through facilitated intercommunity knowledge transfers to ensure sustainable and cost-effective animal healthcare solutions alongside the development of new medicinal products.

27 October 2026 | 11:10 – 11:20

Evaluation of the Essential Oils of Heteropyxis Spp. against Trichophyton rubrum

Miss Bianca Diedericks[1], Dr Anna-Mari Kok[1], Prof Namrita Lall[1,2,3]

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Abstract

Dermatophyte infections, particularly those caused by Trichophyton rubrum (T. rubrum), remain a significant global health concern due to their persistence and the limitations associated with current antifungal therapies. Plant-derived essential oils offer a promising avenue. This study investigated the antifungal properties, safety profile and potential mechanisms of action of essential oils from Heteropyxis species. The essential oils were characterised using gas chromatography-mass spectrometry (GC-MS). Their antifungal activity was evaluated against T. rubrum, Trichophyton mentagrophytes and Microsporum gypseum. Across all fungal species tested, the essential oils displayed inhibitory effects within the range of 500–1000 µg/mL. In combination with griseofulvin (MIC=2 µg/mL), a positive drug-control, the most active essential oils produced additive effects (MIC of essential oils = 250 µg/mL; MIC of griseofulvin = 1 µg/mL) against T. rubrum, indicating no antagonism and suggesting potential compatibility for combination therapies. The cytotoxicity of the essential oils were assessed in human keratinocyte (HaCat) cells and chitin-stimulated macrophage-like (U937) cells, where all samples exhibited comparatively low cytotoxicity (range of IC_{50} values = 345-625 µg/mL), with IC_{50} values substantially higher compared with the control, Actinomycin D (IC_{50} values = 0.0047 ± 0.000056 µg/mL and 0.044 ± 0.0034 µg/mL, respectively). Evaluation of the mechanism of action revealed that the essential oils inhibited fungal chitinase activity by approximately 57–66%, pointing towards interference with fungal cell wall maintenance and remodelling processes. Ongoing investigations are focused on further elucidating the mechanism of action through alkaline phosphatase activity as well as assessing the modulation of inflammatory responses. Overall, the findings highlight the antifungal potential of the essential oils of Heteropyxis spp., having low cytotoxic potential and a mechanism that indicates disruption of fungal cell wall dynamics, supporting their further exploration as complementary therapeutic candidates.

27 October 2026 | 11:10 – 11:20

Deciphering the Mechanistic Basis of Symplocos racemosa in PCOS through Integrated Systems Pharmacology and Multi-Scale Computational Analysis

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Abstract

Background: Polycystic Ovary Syndrome (PCOS) is a complex endocrine and metabolic disorder characterized by hyperandrogenism, insulin resistance, and chronic inflammation. While Symplocos racemosa (Lodhra) is traditionally used in Ayurvedic medicine for female reproductive health, its molecular mechanisms remain poorly defined. This study utilizes an integrated systems pharmacology and multi-scale computational framework to decode the therapeutic basis of S. racemosa in PCOS.

Methods: Differentially expressed genes were identified from transcriptomic datasets (GSE34526, GSE137684, GSE106724) using GEO2R and R/Bioconductor. Protein-protein interaction networks were constructed via the STRING database and analyzed using Cytoscape to isolate key hub genes. Functional enrichment through DAVID identified regulatory axes. Phytochemical targets of S. racemosa were predicted using SwissTargetPrediction and ChEMBL and mapped against PCOS-associated genes. Molecular docking was performed via the FlexX algorithm within the LeadIT platform to evaluate binding affinities. The structural stability and dynamic behavior of top-ranked complexes were validated through 100 ns Molecular Dynamics simulations using Desmond. Binding free energies were quantified using the MM/GBSA method. Finally, DFT calculations were performed to investigate the electronic reactivity of the lead phytoconstituents.

Results: Analysis identified central hub proteins (CYP17A1, AR, INSR) as primary nodes linking endocrine, metabolic and inflammatory signaling. Molecular docking revealed that phytoconstituents of S. racemosa exhibit high binding affinity toward these targets. Desmond MD simulations and PLIP confirmed that the complexes maintain stable RMSD, RMSF, RoG and H bonds values. MM/GBSA calculations validated strong thermodynamic stability. The DFT-derived descriptors confirmed the high bioactivity and chemical reactivity of the identified compounds.

Conclusion: Our findings suggest that Symplocos racemosa exerts its therapeutic effects through a synergistic, multi-target modulation of the metabolic and reproductive axes. By bridging systems-level networks with quantum-scale analysis, this study provides a robust mechanistic foundation for the use of Lodhra as a natural product-based intervention for PCOS.

27 October 2026 | 11:10 – 11:20

Nutritional and Chemical Composition of Moringa oleifera Flowers and Its Potential to Alleviate Malnutrition and COVID-19 Symptoms

Dr Sandisiwe Maposa PhD Botany[1], Dr Gloria Aderonke Otunola[2], Prof Anthony Afolayan[1], Prof Lisa Buwa-Komoreng[1]

[1]University of Fort Hare, Alice, South Africa. [2]National Open University of Nigeria, Abuja, Nigeria

Abstract

A balanced diet may play an essential role in maintaining general well-being by controlling chronic infectious diseases. Balanced diets including vitamins and micronutrients may also be beneficial in preventing or managing various infectious diseases. This study evaluated the nutritional composition, vitamins, minerals, and anti-nutrients content of Moringa oleifera flowers using ALASA methods and ICP-OES technique. Proximate analysis revealed that total ash was 8.82%, fat 3.48%, protein 23.52%, moisture 8.915%, dry matter 91.09%, crude fibre 12.828% and carbohydrates 42.44%. High acid detergent fibre (ADF), vitamins (A, C, and E), neutral detergent fibre (NDF), and minerals were also observed the in Moringa oleifera flowers. Saponin was the highest anti-nutrient (20.66±11.54%), followed by oxalate (18.53±1.944%) and alkaloids (10.85±3.77%) with phytic acid (2.89±0.67%) the least. High contents of potassium (2975±63.09), manganese (3.5±0), copper (0.9±0), and zinc (4.8±0) necessary for fighting infections were present. This study shows that Moringa oleifera flowers are immensely rich in vital nutrients that are of great importance to health and metabolism and have the potential to prevent malnutrition and boost immunity to prevent infectious diseases like COVID-19.

27 October 2026 | 11:20 – 11:30

Purple Nôti (Vitex negundo) and Purple Tolsi (Ocimum tenuiflorum): Isolation and Identification of an Anthocyan from Two Sacred Plants of Hindouism in Reunion

Scientific Manager Stéphane Savriama[1], Responsible for Extractoteca Gary Mares[2], Manager of MicroScan Lab Dimitri Koshel[3], Student Youcha Bana[4]

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Abstract

Nôti and Tolsi are two sacred plants in Hinduism rituals In Reunion Island. As « The boundary between worship and therapy is, in these practices, quite indistinguishable » (Jean Benoist;1993), both plants are also use in Reunionese traditional medicine. Therefore, nôti is known as « sarvaroganivarini » and tolsi is known as « queen of herbs » as they have numerous medicinal properties. The two plants share an additional specific characteristic: they each occur in a green and a purple form. The sole difference between the two forms is the pigment responsible for the purple coloration. Does the same molecule confer colour to both plants? What type of molecule is it? In order to answer these questions, we extracted and isolate the purple pigment of the two plants, performed a general chemical characteristion by spectroscopy FTIR and determined the chemical structure by UHPLC. Extraction was performed using ultrasound-assisted maceration, in a mixed solvent composed by 70% ethanol, 30% of water and 1% of fuming hydrochloric acid. The pigment was isolated using a Puriflash system with a C18 reversed-phase column. Finally, we obtain some anthocyan characteristic of the specimen of the plants.

27 October 2026 | 11:20 – 11:30

Nutritional and Antimutagenic Properties of Selected Fruit Species from Limpopo, South Africa

Miss Mokgadi Gwangwa PhD Candidate (Paraclinical Sciences)[1], Prof Lyndy McGaw[2], Dr Nndivhaleni Masevhe[3], Dr Nqobile Masondo[1], Dr Esam Elgorashi[1,2]

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Abstract

Cancer is a leading cause of death globally and a growing public health concern in South Africa, with cases expected to rise significantly by 2030. The aim of this research is to use a novel approach that combines investigations on nutritional values of wild fruits and their protective effects against mutagens that may cause cancer. Nutritional analysis revealed high levels of antioxidants, particularly vitamins A and E, which contribute to genomic stability and protection against oxidative stress. Essential minerals such as zinc and copper support antioxidant enzyme systems, reinforcing the health benefits of these fruits. Mimusops zeyheri and Grewia microthyrsa displayed the highest nutritional recommended daily intake (RDI) among the fruits sampled, with RDI reaching 2.8% and 2.1%, respectively. Using the Ames test TA98 and TA100 strains, none of the fruit extracts were genotoxic, supporting their safety for human consumption and supporting their continued use in traditional diets. More importantly, Berchemia discolor, Parinari curatellifolia, and Mimusops zeyheri demonstrated strong antimutagenic properties ranging from 45%- 53%, indicating their ability to reduce DNA damage associated with mutagenesis and carcinogenesis, which is consistent with their protective effects. This highlights their promise as sources of bioactive compounds for drug development.

Importantly, cytotoxicity assays confirmed that the extracts are largely non-toxic, strengthening their potential for safe therapeutic application. In conclusion, this research highlights the potential of African wild fruits as functional foods and promising candidates for natural drug discovery. Their integration into health systems and commercialization strategies could support innovation, promote wellness, and contribute to sustainable use of indigenous plant resources

27 October 2026 | 11:30 - 11:40

The Isolation of Antimetastatic Compounds from an Understudied South African Plant Species from the Combretaceae Family, against Triple-Negative Breast Cancer

Ms Samantha Loggenberg PhD[1], Dr Danielle Twilley PhD[1], Prof Namrita Lall PhD[1,2,3]

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Abstract

Literature highlights a gap in antimetastatic therapeutics against triple negative breast cancer, as most treatments are indiscriminate towards cancerous and noncancerous cells and are ineffective at fully eradicating dormant micrometastases in circulation, leading to potential recurrence. Medicinal plants from the Combretaceae family have yielded promising antimetastatic compounds, notably combretastatins. Despite this, a South African species from this family (plant X) remains underexplored in cancer research, despite emerging evidence supporting its antimetastatic activity in in vitro models. This study aimed to conduct bioassay-guided fractionation of the ethanolic leaf extract of X, yielding nine fractions from the bioactive chloroform partition (F1–F9), which were evaluated for antiproliferative, and antimigratory inhibition against the triple-negative breast cancer cell line (MDA-MB-231). The extract and two active fractions (F5 and F6) demonstrated minimum inhibitory concentration (IC50) values of 60.74 ± 6.85, 18.74 ± 2.41, and 9.56 ± 0.23 µg/mL, respectively, against MDA-MB-231 cells. Further analysis by scratch assay revealed that at 10 µg/mL, X extract and fractions F5 and F6 significantly inhibited cell migration ($p < 0.01$) compared to untreated controls (20.00 ± 5.39, 28.00 ± 6.74 and 43.42 ± 7.13 % migration inhibition, respectively), with F5 and F6 showing statistical similar activity ($p > 0.05$) to the positive drug control, Taxol (35.20 ± 2.07% inhibition at 5 µg/mL). Ultra-performance liquid chromatography–mass spectrometry (UPLC-MS) will be conducted to purify and characterize bioactive compounds from F5 and F6. These compounds will be further evaluated for their antiproliferative effects against MDA-MB-231 cells (compared to MCF-7 nonmetastatic cancerous, and MCF-10A noncancerous, breast cells), and regulation of CD82 metastatic suppressor protein expression, a novel drug target. Additionally, their efficacy in inhibiting in vitro intravasation using an organ-on-a-chip model and in vivo angiogenesis using the ex ovo yolk-sac membrane (YSM) assay will be assessed to determine their potential to target multiple processes associated with breast cancer metastasis.

27 October 2026 | 11:30 - 11:40

Formulated Prototype Product with Active Ingredients of Essential Oils as Phyto-Nematicides on Mortality, Viability and Egg-Hatch Ability of Root-Knot Nematode J2 Larvae

Dr M.C Khosa1, Mr N Mkhwanazi1,2, Prof Z Dube3, Prof T.A Mokoka4, Mr J Senabe5, Dr B Gom6, Prof S.O Amoo7, Prof P.W Mashela8, Prof L.J McGaw4

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Abstract

The effect of a formulated prototype product with the active ingredients of single and blended essential oil phytonematicides on the mortality and egg-hatch ability of the J2 nematode larvae of Meloidogyne incognita, M. enterolobii or M. javanica was tested. A 100 µl suspension of distilled water containing 100 ±20 freshly collected J2 or eggs was added to each well containing 100 µl of formulated prototype products (concentrations ranged from 2 000 ppm to 16 ppm). The treatments were assigned in triplicate to the wells in a completely randomized design with six wells representing replications per treatment. The mortality and egg-hatch assays were terminated after 24-, 48-, 72-h and 7-, 14- and 21- day exposure times, respectively. Both bioassays were repeated once. All formulated prototype products 1-14 treatments with their active ingredients of single, blended essential oil phyto-nematicides resulted in a significant ($P \leq 0.05$) increase in J2 mortality of M. incognita, M. enterolobii and M. javanica from 70-116% after 24-, 48- and 72-h exposure time compared with a solution of dH2O (negative control) treatments. Egg hatching bioassays showed similar results. The observed efficacy of the EOs prototypes provides evidence of the potential usefulness of these EOs in integrated nematode management (INM).

27 October 2026 | 11:30 - 11:40

Ethnoveterinary and Botanical Use in Livestock Health Management: A Survey from Amathole District, Eastern Cape Province

Ms. Xoliswa Phumla Pearl Bawa Miks[1,2], Dr. Kutullo Nick Shai PhD[2], Dr. James Lwambi Mwinga PhD[2], Prof. Nqobile Andile Masondo PhD[1], Prof. Adeyemi Oladapo Aremu PhD[2]

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Abstract

Ethnoveterinary practices and the use of botanicals are important therapeutic approaches for preventing and managing livestock ailments. Despite the widespread use, indigenous knowledge in livestock healthcare remains insufficiently documented. The study explored the use of plants for livestock management in the Amathole district, Eastern Cape Province. A semi-structured interview and snowballing technique were used to recruit and collect data from 470 participants. Two ethnobotanical indices, use value (UV) and relative frequency citation (RFC), were used for quantitative analysis. A total of 132 plant species were documented. The plants with the highest RFC were Aloe broomii Schonland (0.5), Teucrium trifidum Retz. (0.1), and Vachellia karroo (Hayne) Banfi & Galasso (0.07). Additionally, the UVs of the listed plants were Aloe broomii Schonland (0.02), Teucrium trifidum Retz. (0.02), Vachellia karroo (Hayne) Banfi & Galasso (0.01). The most cited health conditions included bile (39%), diarrhoea (12%), worms (12%), while constipation (2%) was the least mentioned. Leaves (73%) and bark (13%) were the most used plant parts in preparing remedies. The common preparation methods were maceration (59%) and decoction (36%). The findings highlight the extensive knowledge that remain relatively underutilised in livestock health management in Eastern Cape while stressing the need for conservation of this heritage and associated plants for their sustainable use. Ethnoveterinary medicine thus supports livestock health, preserves indigenous knowledge systems, promotes sustainable rural livelihoods, and provides a basis for pharmacological research.

27 October 2026 | 11:40 - 11:50

The in Vitro Toxicological Screening and Phytochemical Characterization of Markhamia obtusifolia (Baker) Sprague

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Abstract

Medicinal plants are widely used in traditional medicine due to their pharmacological and therapeutic properties, largely attributed to the presence of bioactive secondary metabolites. However, these compounds may also pose toxicological risks depending on dosage and the time of exposure. Evaluating the safety profiles of medicinal plants alongside their biological activity is essential for their safe therapeutic application. This study investigated the in vitro cytotoxicity, genotoxicity and phytochemical composition of Markhamia obtusifolia, previously reported to exhibit strong antifungal activity against mycotoxigenic fungal strains.

Methanolic leaf extracts of M. obtusifolia were evaluated for cytotoxicity against African green monkey kidney (Vero) and Human colorectal adenocarcinoma (Caco-2) cells using the 3-(4,5-dimethylthiazolyl-2)-2,5-diphenyltetrazolium bromide (MTT) assay. Genotoxicity was assessed in Vero cells with the micronucleus test. Phytochemical profiling and compound identification were performed using gas chromatography time-of-flight mass spectrometry (GC-ToF-MS) and liquid chromatography time-of-flight mass spectrometry (LC-ToF-MS). The extract showed no significant cytotoxicity in Vero cells at the highest tested concentrations (500 µg/ml) and no cytotoxic effects in Caco-2 cells at 250 and 500 µg/ml. However, genotoxic effects were observed in Vero cells at 500 µg/ml. Phytochemical analysis revealed the presence of phenolic glycosides, coumarins, flavonoids, and hydrolysable tannins as major constituents, which may contribute to the observed activities. These findings highlight the importance of comprehensive toxicity evaluation when validating medicinal plants for therapeutic use.

27 October 2026 | 14:30 - 14:40

More than Just a Pretty Shade: The Potential for Medicinal Plants Traditionally Used in Dyeing to Generate Dual-Function Textiles

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Abstract

Pigments have been at the forefront of chemistry since the dawn of human civilization. The widespread use of synthetic dyes propagates ecological damage as compounds with known toxic effects leach into freshwater systems. Historically, pigments and dyes were crafted from plants, fungi, insects, and molluscs. Interest in medicinal plants and herbal remedies has grown, endeavoring to contribute to the advancement of medicine. Integrating the concepts of natural dyes and medicinal plants forms the focus of the present study: exploring the potential of dye-yielding plants to impart their medicinal properties to textiles, thereby promoting sustainable skin health. Plants were selected based on documented medicinal and dyeing uses. Ethanolic, acetonic, and aqueous extracts of six plants were evaluated.

Ethanolic Maclura pomifera (MPE) demonstrated the greatest antibacterial activity against both Staphylococcus aureus (ATCC 25923) and Cutibacterium acnes (ATCC 6919) with a minimum inhibitory concentration (MIC) of 12.5 µg/mL. Of the aqueous extracts, Combretum molle (CMW) had the best antibacterial activity (MIC of 62.5 µg/mL against S. aureus). Cytotoxic activities were also noted for MPE against MeWo and HaCaT cell lines, with half-maximal inhibitory concentrations (IC50s) of 9.68 ± 0.18 and 5.36 ± 0.52 µg/mL, respectively. Conversely, CMW demonstrated moderate to weak cytotoxicity with IC50s of >400 and 90.37 ± 16.11 µg/mL against the same cell lines. This trend was echoed in the ZFET evaluation of these extracts, whereby MPE showed the greatest total burden, followed by aqueous M. pomifera and CMW. Five of six aqueous extracts demonstrated remarkable wash and perspiration fastness, with the exception of MPW.

These results suggest that C. molle is a lead candidate for downstream antimicrobial textile development, whereas M. pomifera is suited for medicated textile pipelines. Subsequent investigation should screen the phytochemicals responsible for the biological activities and evaluate the conference of activity to dyed textiles.

27 October 2026 | 14:30 - 14:40

From Tradition to Evidence: Medicinal Plants Used for Childhood Diseases in the Ehlanzeni District, Mpumalanga Province, South Africa

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Abstract

Recent studies indicate that about 80% of people globally depend on medicinal plants for healthcare, especially in rural areas where these plants offer affordability and fewer side effects than conventional medicines. Medicinal plants contain phytochemicals such as alkaloids, saponins, and tannins, contributing to their therapeutic properties and supporting local economies through commercialization by traditional health practitioners. In Mpumalanga Province, South Africa, many rural communities use these plants for various health issues. However, limited research exists regarding their use for childhood diseases in the region. This study aimed to document medicinal plants used for treating childhood diseases in the Ehlanzeni District, Mpumalanga Province. Data was gathered from online sources, including Google Scholar and Science Direct, using keywords such as cytotoxicity, indigenous knowledge, medical ethnobotany, phytochemicals, and traditional medicine. Inclusion criteria involved studies examining medicinal plants within Mpumalanga Province, specifically for children aged 0 to 18 years. The study identified 38 plant species from 30 families used for treating 23 childhood diseases. The Fabaceae family was the most common, with roots frequently utilized. Decoction was the primary preparation method, and oral administration was the prevalent route. The research found that 12 of the 38 plants used in Ehlanzeni District for childhood diseases have not been scientifically examined for phytochemical properties. Only 31 of the plants have confirmed antibacterial effects, with five showing strong potency (MIC <15 µg/ml). Furthermore, 25 plants were evaluated for antifungal activity, with Acokanthera oppositifolia being the most effective (MIC 3.9 µg/mL against Candida albicans). Additionally, 25 plants have been investigated for their cytotoxic effects, with Agapanthus africanus exhibiting significant potency, particularly against SBC-3 cells (IC50 3.7 ± 0.033 µg/mL). The limited scientific validation of phytochemical profiles and biological effects of certain plants highlights the need for further research in this area.

27 October 2026 | 14:40 - 14:50

Evaluation of Phytochemicals, Antioxidant, Antimycobacterial Activity and Anti-Virulence of Selected Medicinal Plants against Mycobacterium smegmatis

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Abstract

The escalating global threat posed by multidrug-resistant tuberculosis (TB) has created an urgent need to explore alternative treatment options beyond conventional antibiotics. This study investigated the polyphenolic content and the antioxidant, antimycobacterial, and anti-virulence activities of selected medicinal plants traditionally used to treat TB and related symptoms. Total phenolics, tannins, and flavonoids were quantified using colorimetric assays. Antioxidant capacity was assessed via DPPH and ferric-reducing power assays. Antimycobacterial activity against Mycobacterium smegmatis was evaluated using broth micro-dilution, growth kinetics, cell constituent leakage, and respiratory chain dehydrogenase inhibition assays. Anti-virulence effects were examined using crystal violet biofilm and swarming motility assays. Among the tested plants, Tarchonanthus camphoratus exhibited the highest concentrations of polyphenolic compounds and, alongside Combretum hereroense, demonstrated strong antioxidant activity. Notably potent antimycobacterial effects (MIC = 0.16 mg/mL) were observed with extracts from Senecio macroglossus, Nerium oleander, and Tetradenia riparia. These extracts not only delayed the onset of exponential bacterial growth but also induced significant membrane damage and impaired metabolic processes essential for bacterial survival. In contrast, Tabernaemontana elegans showed the least activity, with MIC values exceeding 2.5 mg/mL. Additionally, most plant extracts reduce motility by 12–100% and effectively inhibit early-stage biofilm development. In conclusion, polyphenol-rich extracts from these selected medicinal plants exhibit promising dual antimycobacterial and anti-virulence activities against M. smegmatis. These findings highlight their considerable potential as valuable starting points for the future development of new, multi-target therapeutic strategies to combat drug-resistant tuberculosis.

27 October 2026 | 14:40 - 14:50

Review of Ethnopharmacology, Phytochemistry, Pharmacology, and Toxicity of Vachellia (Acacia) Species in Eastern and Southern Africa

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Abstract

The Vachellia (Acacia) species are plants of significant medicinal value, increasingly intriguing researchers. Recently, Acacia species native to Africa have been reclassified into two distinct genera: Vachellia and Senegalia. These species of Vachellia (Acacia) have been traditionally used in medicine for various purposes, including the treatment of conditions such as high cholesterol, diabetes, cancer, gingivitis, mouth sores, and pharyngitis. This review aims to comprehensively review and document the traditional uses, pharmacology, phytochemical analysis, and toxicity of Vachellia species in the regions of eastern and southern Africa. Scientific literature search was conducted to analyse the traditional uses, pharmacological effects, phytochemical composition, and cytotoxic potential of the Vachellia (Acacia) from databases such as PubMed, Scopus, and Google Scholar, spanning studies from 1993 to 2024. Extracts of Vachellia (Acacia) species are being promoted as alternative treatments for chronic diseases and inflammation, contingent on confirmation of cytotoxicity levels and standardisation of medicinal extracts for commercialisation. Vachellia species were found to contain secondary metabolites such as flavanol and flavone glycosides, aglycones, flavan-3-ols, flavan-3,4-diols, and (epi)-catechins containing galloyl moieties and functional hydroxyl groups. The studies conducted on Vachellia species revealed that they possess diverse pharmacology, including cytotoxicity, antioxidant, antiplasmodial, antibacterial, antifungal, and antiviral activities. Further research is essential to elucidate the precise mechanisms of action and assess the safety and efficacy of these extracts in vivo. Vachellia species shows potential as a medicinal resource, comprehensive understanding and rigorous study of its toxicity profiles are imperative to ensure its safe utilization. Keywords: Ethnobotany, Ethnopharmacology, Medicinal plants, Vachellia, Acacia, Cytotoxicity

27 October 2026 | 14:40 - 14:50

Evaluation of Wound Healing and Anti-Inflammatory Activities of a Cannabis sativa–Infused African Traditional Medicine Product from KwaZulu-Natal, South Africa

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Abstract

Product Shezi (PS) is a polyherbal African traditional medicine formulated from six known South African medicinal plants and used to promote wound healing in KwaZulu-Natal, yet it lacks scientific validation. We evaluated the in vitro wound-healing–relevant and anti-inflammatory activities of a freeze-dried aqueous PS extract in fibroblast (FR), keratinocyte (HaCaT) and macrophage models. Cytotoxicity was determined using an ATP-based viability assay to derive IC_{50} and IC_{10} values, and nontoxic concentrations were used for efficacy assays. The scratch-wound assay and ATP-based proliferation measurements were used to quantify wound closure and proliferative responses, respectively. Collagen deposition in cell-associated and secreted fractions was quantified using a collagen assay. The anti-inflammatory effects in lipopolysaccharide (LPS)-stimulated macrophages using the Griess reagent system and a prostaglandin E_2 (PGE_2) ELISA. PS showed comparable cytotoxicity in HaCaT (IC_{50} - 21.08 µg/mL; IC_{10} - 3 µg/mL), FR cells (IC_{50} - 23.68 µg/mL; IC_{10} - 5 µg/mL) and macrophages (IC_{50} - 32.47 µg/mL; IC_{10} - 10 µg/mL). At 1–5 µg/mL, PS significantly enhanced scratch closure and proliferation in both FR and HaCat cells relative to untreated controls ($p<0.05$), whereas collagen deposition was not significantly altered in FR. In LPS-stimulated macrophages, PS produced a non-significant inhibition of nitric oxide ($p>0.05$), while significantly reducing PGE_2 levels ($p<0.05$) over 24 hours of treatment. These in vitro findings indicate that PS enhances wound-healing–relevant cellular responses and may attenuate the production of inflammatory mediators. Further studies should delineate growth-factor and inflammatory signaling pathways and validate efficacy in appropriate in vivo wound models.

27 October 2026 | 14:50 - 15:00

Application of 1H NMR and GC – MS Metabolomics to Dereplicate Antimalarial Constituents from Pappea capensis Eckl. & Zehy. (Sapindaceae) Twigs

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Abstract

The discovery of novel antimalarial compounds from medicinal plants is often hindered by the time-consuming and labour-intensive isolation of known phytoconstituents. Metabolomics combined with multivariate data analysis offers a rapid approach for profiling complex plant extracts, dereplicating known compounds, and prioritizing potentially novel bioactive constituents. This study evaluated the application of 1H NMR- and GC-MS-based metabolomics for discriminating phytochemical profiles associated with antiplasmodial activity in Pappea capensis (Sapindaceae) twig extracts. Crude extracts were prepared using dichloromethane, aqueous methanol, and water, followed by chromatographic fractionation. Twenty-five fractions obtained from the active and inactive extracts were subjected to 1H NMR and GC-MS analysis. The resulting datasets were evaluated using principal component analysis (PCA) and orthogonal partial least squares discriminant analysis (OPLS-DA). PCA did not clearly discriminate fractions according to antiplasmodial activity; however, OPLS-DA generated distinct clustering between selective and non-selective fractions. The 1H NMR-derived OPLS-DA model demonstrated robust predictive performance ($R^2 = 0.812$; $Q^2 = 0.611$; CV-ANOVA $p = 0.007$), whereas the GC-MS model showed evidence of overfitting ($R^2 = 0.990$; $Q^2 = 0.385$; $p = 0.74$). Contribution analysis of the 1H NMR data indicated that aliphatic and terpenoid-related signals contributed substantially to the discrimination of antiplasmodial fractions. GC-MS profiling tentatively identified several constituents, including octasiloxane, β-amyrin, pentadecanone, 3-O-methyl-glucose, and tetradecane. Overall, 1H NMR metabolomics demonstrated greater potential for predicting antiplasmodial activity, while GC-MS complemented the approach through the tentative identification and dereplication of phytoconstituents. The combined approach provides a useful strategy for prioritizing unknown constituents for further isolation and characterization.

27 October 2026 | 14:50 - 15:00

Computer-Aided Identification of Bacterial Transcription Initiation Inhibitors: Paving the Way for Next-Generation Antibiotics

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Abstract

Computational drug discovery approaches have been widely implemented in recent years, reducing development costs and accelerating the introduction of effective and safe drugs to the market. These approaches have contributed to the discovery of clinically approved drugs, including the β-lactamase inhibitor Vaborbactam. This is particularly important given the growing global threat of antimicrobial resistance, which continues to compromise the effectiveness of existing antibiotics. RNA polymerase (RNAP) is a crucial bacterial enzyme responsible for transcription, the first step of gene expression. It is highly conserved among prokaryotes but less conserved across other domains of life, making it an attractive target for selective broad-spectrum antibiotics.In this study, advanced computational tools were used to screen naturally derived compounds against bacterial RNAP and characterise the molecular and structural mechanisms of promising candidates. The approaches included molecular docking, molecular dynamics simulations and post-dynamics analyses, protein–protein interaction analysis, binding energy calculations, and Kd prediction. Three compounds, Pinobanksin-3-O-acetate, Chrysin, and Pinobanksin, were accommodated within a previously uncharacterised binding site located entirely on the beta subunit near sigma interface residues. Their binding energies were −34.49, −32.66, and −21.55 kcal/mol, respectively. Molecular dynamics simulations confirmed stable binding of all candidates, while structural analyses revealed conformational changes in switch regions 3 and 4, which regulate cleft opening for DNA loading. In the unbound system, sigma–beta interaction energy was −10.8 kcal/mol with a predicted Kd of 11 nM. Ligand binding weakened this interaction to −7.3, −8.4, and −8.7 kcal/mol, with corresponding Kd values of 4700, 740, and 430 nM, respectively. Stronger ligand binding correlated with greater disruption of sigma–beta interaction. Overall, the findings identify potential bacterial RNAP inhibitors and suggest a previously uncharacterised mechanism for inhibiting transcription initiation through disruption of sigma–beta binding, distinct from previously reported sigma–beta-prime interference. Ligand-induced conformational changes in switch regions 3 and 4 further suggest an allosteric effect on cleft dynamics, providing a structural basis for next-generation antibiotics.

27 October 2026 | 14:50 - 15:00

A Comparative Evaluation of Mafura Butter as a Potential Substitute for Shea Butter in Cosmetics

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Abstract

The increasing demand for sustainable, locally sourced plant-based lipids has led to the exploration of alternatives to established ingredients like shea butter. This preliminary study evaluates the physicochemical properties and phytochemical profiles of Mafura butter (Trichilia emetica) from Northern KwaZulu-Natal (KZN) as a potential substitute for shea butter (Vitellaria paradoxa) in cosmetic formulations. Standard physicochemical analytical methods were used to assess key parameters, including saponification value, iodine value, peroxide value, acid value, and free fatty acids (FFA). The results indicate that Mafura butter possesses properties comparable to shea butter, with both showing suitable characteristics for cosmetic applications that can be further enhanced through refining. Notably, Mafura butter has higher melting points (35–42 °C) than shea butter (31–36 °C), suggesting a firmer texture. The acid values decreased to 0.1–1.0 mg KOH/g for shea and 0.5–2.0 mg KOH/g for Mafura, while FFA content was reduced to below 1% in both, implying enhanced stability. Peroxide values were lowered to ≤5 meq O_2/kg for shea and ≤6 meq O_2/kg for Mafura, indicating improved oxidative resistance. Moisture content was minimised to ≤0.1%. Both saponification (170–200 mg KOH/g) and iodine values (40–70 g I_2/100 g) remained within acceptable ranges. The phytochemical profiles of both butters reveal similar bioactive compounds, providing antioxidant, anti-inflammatory, and skin-conditioning effects. While shea butter shows slightly higher antioxidant potential, Mafura butter offers better barrier-repair properties. Despite some phytochemical reduction during refining, key functional compounds are retained. Overall, Mafura butter is a viable alternative to shea butter, with superior saponification characteristics, making it particularly suitable for solid cosmetic products. This study highlights Mafura butter's potential to enhance the regional bioeconomy, import replacement and its role in sustainable personal care formulations.

27 October 2026 | 15:00 - 15:10

Comparative Evaluation of Aqueous and Ethanolic Extracts of Hypericum aethiopicum against Staphylococcus aureus and Pseudomonas aeruginosa: Impact of Extraction Solvent on Antimicrobial Efficacy

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Abstract

Background: The emergence of multidrug-resistant (MDR) bacteria, particularly methicillin-resistant Staphylococcus aureus (MRSA) and Pseudomonas aeruginosa, has renewed interest in plant-derived antimicrobials. Hypericum aethiopicum (Unsukumbili) is used traditionally for skin infections, but the influence of extraction solvent on its bioactivity remains poorly defined.

Objective: To compare the antibacterial activity of aqueous versus ethanolic extracts of H. aethiopicum against MRSA (ATCC 29213) and P. aeruginosa (ATCC 27853) using disc diffusion, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) assays.

Methods: Fresh and dried leaf extracts were prepared using water and 95% ethanol. Antimicrobial activity was assessed via modified Kirby-Bauer disc diffusion. MIC and MBC were determined by serial broth dilution. Vancomycin and amikacin served as positive controls.

Results: Ethanolic extracts produced mean inhibition zones of 26 mm against both organisms, while aqueous extracts showed no activity (0–4 mm). MIC was achieved at a 1:8 dilution for ethanolic extracts, with MBC confirming bactericidal action. No statistically significant difference was observed between simple maceration and complex pharmacopoeial extraction methods ($p > 0.05$).

Conclusion: The antimicrobial principle of H. aethiopicum is ethanol-soluble and effective against Gram-positive and, notably, Gram-negative pathogens. Aqueous extraction is ineffective. Simple maceration suffices for initial screening, reducing research costs.

Keywords: Hypericum aethiopicum, MRSA, Pseudomonas aeruginosa, antimicrobial resistance, disc diffusion, minimum inhibitory concentration, plant extraction.

27 October 2026 | 15:00 – 15:10

Curating Innovation for Inclusive Commercialisation: The Role of the Innovation Curator in Advancing Publicly Funded Intellectual Property in South Africa's Indigenous Plants-Based Cosmetics Sector

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Abstract

South Africa's national system of innovation has generated a significant stock of publicly funded intellectual property in indigenous plants-based skin health, personal care and cosmetics. Yet many of these knowledge assets remain weakly translated into validated products, scalable enterprises and inclusive market opportunities. This paper advances the concept of the innovation curator as a critical intermediary actor in addressing this commercialisation gap. Unlike conventional technology transfer roles that often emphasise disclosure, protection and licensing, the innovation curator assembles, interprets and coordinates diverse capabilities across the innovation value chain: scientific validation, indigenous knowledge governance, intellectual property management, regulatory readiness, product formulation, manufacturing partnerships, market positioning, investment mobilisation and benefit-sharing. Using South Africa's emerging indigenous plants-based cosmetics sector as an illustrative domain, the paper argues that successful commercialisation of publicly funded IP requires more than linear transfer from research institutions to firms; it requires active curation of knowledge, relationships, risks and value propositions within a fragmented ecosystem. The paper situates this role within the country's policy architecture for publicly financed research and development, indigenous knowledge protection, bioeconomy development and local industrialisation. It further shows how an innovation curator can help reconcile multiple imperatives: protecting community-held knowledge, enabling ethical access to biodiversity-linked innovation, de-risking early-stage technologies, supporting small and medium enterprises, and building market-ready product pipelines. The analysis contributes to technology and innovation scholarship by conceptualising commercialisation as a socio-technical orchestration process rather than a narrow transaction. It proposes that innovation curators can strengthen absorptive capacity, reduce coordination failures and improve the prospects of inclusive, locally anchored commercial success. The paper concludes that, for indigenous plants-based cosmetics, the innovation curator is not merely a broker between science and market, but a strategic ecosystem builder capable of transforming publicly funded IP into sustainable economic, social and cultural value.

27 October 2026 | 15:00 - 15:10

Discovery of Natural Hair Care Cosmeceutical Ingredients from Salix mucronata through Metabolomic Profiling and Computational Studies

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Abstract

Cosmeceuticals are bioactive ingredients incorporated into cosmetic formulations to deliver therapeutic benefits beyond basic cosmetic functions, including hair growth promoting agents such as 5α-reductase inhibitors used in hair care products. Most commercial hair care products are formulated with synthetic ingredients, which have raised concerns due to potential adverse effects such as hair dryness, scalp irritation, flaking, dandruff, follicular damage, and allergic reactions. Hair follicle miniaturisation and hair loss are also associated with increased levels of dihydrotestosterone (DHT) and oxidative stress, which disrupt hair follicle homeostasis. Consequently, plant-derived metabolites are gaining increasing attention as safer alternatives to synthetic ingredients. This study aimed to identify potential natural cosmeceutical ingredients from the South African medicinal plant Salix mucronata Thunb. Plant material collected from the University of Pretoria Botanical Gardens was dried, ground, and extracted using a dichloromethane: methanol (1:1) solvent mixture. Extracts were evaluated for their inhibitory activity against 5α-reductase, a key enzyme involved in DHT formation. Untargeted metabolite profiling was conducted using UPLC-QTOF-IMS/MS. To assess the potential bioactivity and bioavailability of the detected metabolites (naringenin, gentisoyl glucoside, 1-O-feruloyl-β-D-glucose, kaempferol, eriodictyol, and taxifolin), in silico virtual screening was performed using molecular docking and Quantitative Structure-Activity Relationship (QSAR) modelling. Comparative molecular docking scores ranged from -8.5 to -9.6 kcal/mol. Notably, eriodictyol (-9.5 kcal/mol) and taxifolin (-9.6 kcal/mol) demonstrated docking scores comparable to the positive controls, dutasteride (-9.3 kcal/mol) and finasteride (-9.5 kcal/mol). QSAR modelling predicted pIC50 values of 6.98, 6.85, 6.79, 6.64, and 6.55 for naringenin, 1-O-feruloyl-β-D-glucose, kaempferol, eriodictyol, and taxifolin, respectively. These findings provide preliminary scientific support for the potential use of S. mucronata-derived metabolites as natural cosmeceutical ingredients for hair and scalp health. The results highlight the potential of South African medicinal plants as sources of cosmeceuticals for the development of plant-based hair care formulations.

28 October 2026 | Flash presentation

Investigating the Potential Anti-Cancer Effect of a South African Member of the Acanthaceae Family and Its Previously Isolated Compound against Metastatic Prostate Cancer

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Abstract

Prostate cancer is a significant cause of cancer-related deaths worldwide with low and middle-income countries, particularly in Africa, experiencing the highest mortality rates. Prostate cancer is the most common cancer affecting men in South Africa, with a 1 in 16 chance of developing it in their lifetimes. Conventional treatments such as chemotherapy, immunotherapy, and hormone therapy are not easily accessible to many patients due to high costs or limited availability of healthcare resources and trained personnel. Even with treatment significant challenges persist, including severe side effects, recurrence of disease within five years post-treatment and the emergence of multi-drug resistance highlighting the need for safer, more accessible alternatives. This study seeks to contribute to the development of affordable, plant-derived treatments that address the high mortality rates in resource-limited regions. A member of the Acanthaceae family is a promising candidate for bioprospecting in cancer research. It is widely distributed across Africa and thrives in a diverse range of habitats, ensuring accessibility and cultivation potential. The plant also contains a bioactive compound demonstrated to exhibit strong antiproliferative effects against breast and skin cancer cells via G2/M arrest and apoptosis induction. The primary objective of this research is to evaluate the antiproliferative effects of an ethanolic Acanthaceae extract and its isolated compound against human prostate cancer cells line PC3, using HEK293 as a model for their effects on non-tumorigenic cells. This study specifically targets key pathways associated with tumour progression, focusing on the inhibition of vascular endothelial growth factor A (VEGFA) and its receptor (VEGFR2) as well as hypoxia inducible factor-1-alpha (HIF-1a). Results obtained will be presented during the presentation.

28 October 2026 | Flash presentation

Micropropagation, Abiotic Elicitation, in Vitro and in Silico Evaluation of Artemisia afra Jacq ex Willd Leaf Extracts for Antimicrobial Activity against Multidrug-Resistant Pathogens

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Abstract

Artemisia afra a medicinal plant native to Southern Africa, possesses a variety of antibacterial phytochemicals. The aim of this study was to develop a protocol for in vitro micropropagation of A. afra, study the impact of silver nanoparticles (AgNPs) on phytochemical yield, and investigate the in vitro and in silico antibacterial capacities of A. afra extracts. Explants of A. afra were subjected to Sodium hypochlorite (NaOCl, 5%, 4.5%, 4%, 3.5%, and 3%) for (10, 15 and 20 minutes). Shoot induction rate was assessed in MS media with Benzylaminopurine (BAP, 0, and 0.45, 0.90, 1.25, 1.50 mg/mL) combined with kinetin (KIN) (0, 0.025, 0.050, and 0.075, 0.090 mg/mL). In vitro A. afra shoots were elicited with Ag-NPs concentrations 12.5-200 µg/mL. Methanol-Dichloromethane (1:1) leaf extracts were subjected to GC-MS and antibacterial analyses against clinically relevant multi-drug resistant (MDR) bacteria. Molecular docking of ligands and binding proteins was executed using AutoDock Vina. The bacterial proteins selected for anti-quorum sensing analysis were SdiA, LasR, Sar A and AgrA LytTR domain, and were tested against selected terpenes. Exposing explants to 3.5% NaOCl for 20 minutes and culturing on MS with 0.90 mg/L BAP and 0.090 mg/L KIN were recorded as most optimal, after 30 days. The highest number of phytochemicals and shoot proliferation were recorded at 50 µg/mL AgNPs, with terpenes and terpenoids being the most predominant. The most efficient inhibitors against bacterial proteins were Retinol acetate against SdiA, Sar A and AgrA LytTR, and Camphor against Sar A. In conclusion, an efficient protocol for micropropagation of A. afra was developed. The 50 µg/mL Ag-NPs is a potential elicitor of biosynthesis of terpenes and terpenoids. With Retinol acetate and camphor being the most antagonistic terpenes against MDR bacteria, A. afra is a potential source of anti-quorum sensing compounds.

28 October 2026 | Flash presentation

Protea: The Untapped Therapeutic Potential of This Genus in Southern Africa

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Abstract

The genus Protea (Proteaceae) consists of 107 accepted species, 88 of which are native to Southern Africa. This review evaluates the extent of literature that currently exists on these Southern African species, more specifically, the gap in ethnobotanical bioprospecting and antimicrobial research. A systematic literature search was conducted using databases such as Web of Science and Scopus, of accepted species names and synonyms. Bibliometric analysis revealed that only 62 species had existing literature ($n \geq 1$), predominantly focussed on ecological and evolutionary themes, with limited to no focus on their potential medicinal uses. Consequently, Protea afra (formerly caffra), P. cynaroides, P. gaguedi, P. nitida, P. repens and P. simplex, were the only species with documented uses in traditional medicine. Further analysis of existing literature indicated that some species exhibit significant in vitro antimicrobial activity, while others exhibit in vitro chemotoxicity. Despite these findings, Protea remains greatly underrepresented in pharmacological research, which highlights a significant research gap. This review calls for more targeted ethnobotanical bioprospecting of Protea, especially in Southern Africa where traditional medicine is so prevalent. As well as experimental validation of these uses, to assess the pharmacological potential of this genus.

28 October 2026 | Flash presentation

Ancient Roots, Modern Treatments: Anti-Inflammatory and Wound Healing Potential of Selected African Orphan Crops

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Abstract

Chronic inflammation and impaired wound healing represent significant global health concerns. While non-steroidal anti-inflammatory drugs and antibiotics are commonly used, their prolonged use presents adverse side effects and increased anti-microbial resistance, respectively. In many African communities, indigenous orphan crops have been traditionally employed to manage these conditions yet remain under-explored in modern pharmacology. This study aimed to evaluate the anti-inflammatory and wound healing potential of ethanolic extracts from three such crops belonging to the Cucurbitaceae (CUC), Lamiaceae (LAM), and Anacardiaceae (ANA) families.

Cytotoxicity was assessed using human keratinocyte (HaCaT) and human histiocytic lymphoma (U937) cell lines. The half-maximal inhibitory concentration (IC_{50}) for HaCaT cells, IC_{50} values were 310.85 ± 0.63 µg/millilitre (CUC), 211.5 ± 4.14 µg/mL (LAM), and >400 µg/mL (ANA), indicating low cytotoxicity. For the U937 cells, IC_{50} values were 223.07 ± 8.57 µg/millilitre (CUC), 266.76 ± 9.98 µg/mL (LAM), and >400 µg/mL (ANA), indicating low cytotoxicity. Wound healing was evaluated using a scratch assay on HaCaT cells, measuring cell migration as an indicator of tissue regeneration. All three ethanolic extracts suggested potential wound repair activity; at 25 µg/mL, percentage wound closures (%) in HaCat cells induced by treatment after 24 hours with cell migration as an indicator were at 62.88 ± 12.75 (CUC), 78.22 ± 4.92 (LAM), and 70.05 ± 1.14 (ANA). For proliferation, percentage wound closures (%) were at 82.44 ± 19.70 (CUC), 81.76 ± 10.53 (LAM), and 91.34 ± 0.57 (ANA). Furthermore, the anti-inflammatory potential of these selected orphan crops was evaluated through their ability to inhibit Toll-like receptor-4 (TLR4), a key mediator of the body's inflammatory response. Further investigation through in vitro and in vivo models is essential to elucidate the underlying mechanisms of action. Such research will facilitate the development of effective plant-based therapies while promoting the sustainable utilisation of orphan crops.

28 October 2026 | Flash presentation

Assessing Herbal Remedies Used in South African Traditional Medicine for Biological Activities against Brucella and Mycobacterium Strains

Miss Fulufhelo Mukosi PhD candidate (Paraclinical Sciences)[1,2], Dr Rhulani Makhuvele[1], Ms Grace Matshoga[1], Dr Noma Gcebe[1], Dr Tiny Hlokwe[1], Prof Lyndy McGaw[2], Dr Esam Elgorashi[1,2]
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Abstract

The growing global burden of infectious diseases such as brucellosis and tuberculosis (TB), coupled with the rise of antimicrobial resistance, underscores the urgent need for alternative and sustainable therapeutic strategies. This study explores the bioactive compounds present in selected South African medicinal plants traditionally used to treat infectious diseases. Plant species were investigated for their antimicrobial activity against selected Brucella and Mycobacterium spp. isolated from animal tissues. Antimicrobial screening of nine dichloromethane (DCM) and methanolic extracts was conducted using the disc diffusion method for Brucella spp. and broth microdilution assays for Mycobacterium spp. Out of 9 methanolic plant extracts tested against Brucella strains (B. canis, B. melitensis and B. abortus), only two extracts (Terminalia sericea and Agapanthus africanus) showed good minimum inhibitory concentration of 62.5 and 125 µg respectively. None of the DCM extracts had antibacterial activity. The crude extracts of Agapanthus africanus were also subjected to chemical profiling to identify bioactive constituents. For the antimycobacterial screening, all methanolic extracts tested had good inhibitory activity agains t M. bovis with minimum inhibitory concentrations (MIC) ranging between 500 and 900 µg/ml. Terminalia sericea showed good activity against all 6 tested Mycobacterium strains with the lowest MIC of 0.4 µg/ml, followed by 0.5 µg/ml. Six tested methanol extracts showed good bactericidal activity against M. bovis with MIC = 200 µg/ml for four plants. Following the antibacterial screening, extracts were further evaluated for their safety using genotoxicity (Ames) in vitro assays. No potential mutagenic effects were observed for all methanol plant extracts in both TA98 and TA100 strains. Findings indicate that plant extracts such as Terminalia sericea and Agapanthus africanus exhibit promising antimicrobial activity with no evidence of genotoxicity.

28 October 2026 | Flash presentation

Perinatal Asphyxia Induces Long-Term Behavioral Deficits via Region-Specific Neurochemical Alterations

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Abstract

Perinatal asphyxia causes neonatal brain damage with persistent cognitive deficits, the underlying molecular mechanisms of which remain poorly understood. This study aimed to determine whether long-term cognitive impairments induced by perinatal asphyxia are associated with persistent and specific biochemical alterations in certain brain regions. Pups (10–12 days) were divided into two groups: a sham group and an asphyxia group. Asphyxia was induced by ligation of the left common carotid artery, followed by nitrogen exposure for 15–19 minutes. Forty days, memory, anxiety, and depression, as well as the levels of inflammatory cytokines, neurotransmitter, and oxidative stress were assessed in different brain regions. Perinatal asphyxia impaired weight gain, memory, and mood, and led to increased levels of IL-1β, IL-6, and VEGF in specific brain regions. It also reduced GABA and acetylcholine levels and altered glutamate concentration. Oxidative stress was evident with changes in superoxide, glutathione, catalase, nitrite, MDA, and total protein across the cortex, hippocampus, cerebellum, and amygdala. All these alterations were associated with cell dispersion in the hippocampus. Supported by interregional correlations between inflammatory and oxidative markers, these data suggest that perinatal asphyxia triggers complex biochemical responses involving interactions between different brain regions. These findings highlight the selective vulnerability of certain brain regions to early hypoxic injury, as well as the functional interactions between them. They provide a better understanding of the biological mechanisms underlying behavioral dysfunction and suggest that prolonged targeting of neuroinflammation and oxidative stress could reduce lasting neurological sequelae.

28 October 2026 | Flash presentation

The Importance of Standards in Product Testing: Ensuring Quality, Safety and Market Readiness

Ms Dineo Raphasha, Prof Ashwell Ndhlala
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Abstract

Small, Medium and Micro Enterprises (SMMEs) play an important role in the development and commercialisation of locally manufactured products; however, many emerging manufacturers face challenges in demonstrating product quality, safety and compliance with applicable requirements. Product testing based on recognised standards provides an important mechanism for addressing these challenges and supporting products towards market readiness.

This work highlights the practical application of standards and standardised test methods in assessing the quality, safety and performance of products submitted by SMMEs. Depending on the product category and intended use, testing may include physicochemical properties such as pH, viscosity and moisture content, as well as microbiological quality, stability and shelf life, safety, nutritional composition and product-specific performance assessments. Relevant South African National Standards (SANS), published by the South African Bureau of Standards (SABS), International Organization for Standardisation (ISO) standards and other applicable recognised test methods provide a technical basis for selecting appropriate testing procedures and evaluating product conformity.

Through standardised product testing, potential deficiencies relating to formulation, product stability, microbiological quality, safety, performance and labelling can be identified before products are introduced or expanded into the market. Test results can subsequently guide manufacturers in improving product formulations, manufacturing processes, packaging and labelling, while providing objective evidence to support quality assurance and applicable compliance requirements.

The integration of standards into SMME product development therefore extends beyond laboratory testing and serves as a practical pathway linking product development, quality assurance, consumer protection and market readiness. Strengthening SMME awareness of relevant standards and access to appropriate testing infrastructure can contribute to improved product quality, increased consumer confidence and enhanced competitiveness of locally manufactured products in South African and international markets.

Keywords: Standards; Product testing; SMMEs; SANS; SABS; ISO; Quality assurance; Market readiness

28 October 2026 | Flash presentation

Scratching Beneath the Surface: Medicinal Plants against Malassezia furfur

Ms Chante Van Dijk MSc Medicinal Plant Science, Mrs Namrita Lall Professor
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Abstract

Dandruff (pityriasis capitis) is a common scalp disorder closely linked to the overgrowth of Malassezia furfur, a commensal yeast that becomes pathogenic under conditions of microbiome imbalance and increased sebum production. Current treatments rely on synthetic antifungal agents such as ketoconazole and zinc pyrithione; however, concerns regarding long-term use, potential resistance, and disruption of scalp homeostasis highlight the need for safer, more sustainable alternatives. The current research trends and gaps in the use of South African medicinal plants targeting M. furfur have been documented. Focus has been placed on the antifungal efficacy, anti-inflammatory activity, of selected plants. Based on the literature review, it was found that the key phytochemical groups, including phenolics, flavonoids, terpenoids, tannins, and naphthoquinones, are frequently associated with antifungal activity through mechanisms such as membrane disruption, inhibition of ergosterol biosynthesis, and interference with lipid metabolism. Despite promising findings, notable gaps remain, including limited studies directly targeting M. furfur, poor integration of computational and experimental data, and a lack of standardized extraction and formulation strategies. This review underscores the potential of South African plants and advocates for integrated research approaches to support the development of effective, locally sourced anti-dandruff therapies.

28 October 2026 | 15:00 – 15:10

From Traditional Knowledge to Commercial Products: Navigating the IP Landscape

Dr Joanne van Harmelen PhD
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Abstract

Africa's rich biodiversity and extensive traditional knowledge systems provide an invaluable foundation for phytomedicine research and innovation. However, transforming traditional medicinal knowledge and natural product discoveries into commercially viable products presents unique intellectual property (IP), regulatory, and ethical challenges. Researchers and innovators frequently encounter uncertainty regarding what aspects of phytomedicine can be protected, how to comply with biodiversity and access and benefit-sharing (ABS) requirements, and how to attract investment while ensuring equitable recognition of knowledge holders.

This presentation will explore the interface between traditional knowledge, scientific research, and intellectual property rights in the phytomedicine sector. It examines the distinction between unpatentable discoveries and patentable inventions, highlighting opportunities for protecting innovations relating to extracts, formulations, manufacturing processes, methods of use, and combination products. The presentation also considers complementary IP strategies, including trade secrets, trademarks, and data protection, as part of a broader commercialisation framework.

The author will discuss practical guidance for scientists and innovators seeking to translate phytomedicine research into societal and economic impact. Effective IP management is not merely a legal exercise but a critical enabler of innovation, collaboration, and sustainable commercialisation.

28 October 2026 | 15:10 – 15:20

From Cultivation to Commercialization: Advancing Indigenous Medicinal Plant Value Chains through Sustainable Farming and Phytomedicine Practice in South Africa

Mr Katlego George Kgopotse
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Abstract

The growing global demand for natural health products presents significant opportunities for African medicinal plant producers while simultaneously increasing pressure on wild plant populations. Sustainable cultivation and commercialization of indigenous medicinal plants have therefore become critical components of biodiversity conservation, rural economic development, and healthcare innovation. This presentation shares practical experiences from a South African medicinal plant farming enterprise that integrates Indigenous Knowledge Systems (IKS), regenerative agriculture, phytomedicine practice, and scientific collaboration to develop sustainable medicinal plant value chains.

Through the cultivation, processing, and commercialization of indigenous medicinal plant species, including Artemisia afra, Buddleja saligna, Helichrysum odoratissimum, and Greyia radlkoferi, the enterprise has explored approaches to improve plant quality, ensure sustainable supply, and create market-ready phytomedicine and cosmeceutical products. The work demonstrates how medicinal plant cultivation can reduce pressure on wild harvesting while creating economic opportunities for youth, farmers, and local communities.

Particular emphasis is placed on the role of phytomedicine practitioners as custodians of traditional knowledge and as facilitators of knowledge exchange between indigenous healing systems, scientific research institutions, and commercial markets. The presentation further highlights experiences in product development, value addition, biodiversity stewardship, and partnerships with academic institutions to support evidence-based commercialization of indigenous plant resources.

The findings suggest that integrated medicinal plant farming systems can contribute significantly to biodiversity conservation, local economic development, and the expansion of Africa's phytomedicine sector. Strengthening collaboration among farmers, traditional practitioners, researchers, policymakers, and industry stakeholders will be essential for unlocking the full potential of indigenous medicinal plants within the African bioeconomy.

Keywords: Indigenous Knowledge Systems, medicinal plants, phytomedicine, biodiversity conservation, regenerative agriculture, commercialization, bioeconomy, South Africa.

28 October 2026 | 15:20 – 15:30

Bridging Indigenous Knowledge Systems and Scientific Evidence in African Medicinal Plants: A Systematic Review of Ethnobotany, Phytochemistry, Nutrition, and Sustainability in Mpumalanga, South Africa

Miss Lerato Shongwe Master of Science, Dr Tshepiso Ndhlovu, Dr Salmina Mokgehle
University of Mpumalanga, Mbombela, South Africa

Abstract

Maesa lanceolata, Agave americana, Nidorella resedifolia, and Sclerocarya birrea are African medicinal plant species of significant ethnobotanical, nutritional, and pharmacological importance within Indigenous Knowledge Systems (IKS) in Mpumalanga Province, South Africa; however, their scientific evaluation remains fragmented across disciplines. This study systematically reviewed and analysed peer-reviewed literature to examine relationships between ethnobotanical use, phytochemical composition, nutritional value, and sustainability considerations. Data were synthesised through a structured review approach, focusing on patterns of traditional use, biochemical evidence, nutritional profiling, and ecological dynamics. The findings indicate that all four species are widely utilised for managing infections, inflammation, gastrointestinal disorders, and general well-being, reflecting their continued relevance in community healthcare systems. Phytochemical analyses reveal the presence of bioactive compounds such as flavonoids, tannins, saponins, and terpenoids, broadly consistent with reported medicinal applications. However, most studies rely on in vitro assays, reflecting a broader limitation in the predominance of reductionist experimental models that do not adequately capture the complexity of biological systems and traditional usage contexts. Notably, Maesa lanceolata is reported in cultural practices related to gender determination, highlighting an underexplored sociocultural dimension of medicinal plant use that extends beyond conventional biomedical applications. Nutritional evidence is uneven: Sclerocarya birrea shows high vitamin C content and dietary potential, while other species remain insufficiently characterised. Sustainability assessments show that species subjected to bark and root harvesting face greater ecological pressure, despite being classified as of least concern. The review highlights a critical gap in the lack of integrated analytical frameworks linking ethnobotanical knowledge with biochemical, nutritional, and ecological evidence. Addressing this gap requires interdisciplinary, context-sensitive research approaches, improved translational frameworks, and community-engaged conservation strategies to support the sustainable use of African medicinal plant resources.

28 October 2026 | 15:30 – 15:40

Beyond the Clinic Walls: Leveraging the Cultural Authority of Traditional Healers in Non-Communicable Disease Healthcare for Men

Dr Ziningi Jaya PhD
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Abstract

Background: In South Africa, men's health-seeking behaviour is significantly influenced by cultural perceptions of masculinity, medical mistrust, and a preference for care provided by Traditional Health Practitioners (THPs). While formal primary healthcare (PHC) facilities are often perceived as feminized spaces, THPs remain the primary custodians of health for men in rural and underserved areas. Despite this high level of trust, THPs are frequently excluded from the diagnostic cascade for non-communicable diseases (NCDs), leading to late-stage clinical presentations and poor health outcomes in men.

The Perspective: This paper advocates for a shared-care diagnostic cascade that leverages the cultural authority of THPs to improve NCD screening among men. Utilizing the Real-time connectivity, Ease of specimen collection, Affordable, Sensitive, Specific, User-friendly, Rapid and robust, Equipment-free, Deliverable (RE-ASSURED) framework, we propose a model where THPs act as diagnostic intermediary. In this role, THPs are involved in identifying early clinical signs and facilitating the administration of Point-of-Care (POC) diagnostic tools within a culturally familiar environment.

Discussion: We explore how the success of decentralized infectious disease models used for human immunodeficiency virus (HIV) and tuberculosis (TB) can be translated to chronic NCDs, such as urological, metabolic, and cardiovascular conditions, by shifting the diagnostic site from the clinic to the traditional surgery. We discuss the implementation of standardized referral approaches to ensure quality control and examine the THP's role in providing the support necessary for long-term treatment adherence. This involvement moves the THP beyond a simple referral source to an active partner in the biomedical surveillance loop.

Conclusion: To achieve the goals of National Health Insurance and health equity, we must integrate the existing community infrastructure of traditional medicine. This perspective provides a methodological roadmap for involving THPs in the co-creation of diagnostic pathways that are not only technologically robust but also culturally resonant for men.

28 October 2026 | 15:40 – 16:00

From Root to Shelf: A Regulatory Pathway for African Botanical Ingredients, from Ethnobotanical Knowledge to Finished Cosmetic Products Made in Africa, for Africa

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African Cosmetic Regulatory Intelligence (ACRI) Pty Ltd, Johannesburg, South Africa

Abstract

Africa holds a remarkable share of the world's plant diversity and a living body of traditional knowledge, yet the value created from that knowledge is often captured elsewhere. Raw material leaves the continent, extraction and formulation happen abroad, and finished products return at a premium. Promising African research also stalls because the regulatory requirements of the sector in which a plant will be used are rarely built into the research design.

This presentation traces a researched African botanical ingredient from idea, through efficacy validation, to end of life in a finished cosmetic product, with regulation as the thread connecting science, standards and sustainability. It begins with knowledge and access: indigenous knowledge systems legislation, bioprospecting and benefit-sharing regimes, the Nagoya Protocol and its EU codification in Regulation (EU) No 511/2014. It then treats the extract as regulators do, as a chemical substance, addressing chemicals management legislation, GHS classification, INCI nomenclature, specifications and impurities. It examines regulatory screening in ingredient selection, the cosmetic and medicinal borderline, safety assessment of ingredients and finished products, and how efficacy validation turns ethnobotanical evidence into compliant claims. It closes with end of life and the substantiation of sustainability claims.

Using rooibos, a name protected in the EU by its geographical origin, as a case study, the presentation shows how origin, ethical sourcing and sustainability can anchor a brand's positioning and claims strategy, with the regulatory dossier supplying the evidence behind the story.

Finally, it challenges African researchers to design for beneficiation: to ensure that extraction, concentration and formulation take place in Africa, and that products reach African consumers whose familiarity with the underlying traditional knowledge helps them understand and adopt these products more readily.

29 October 2026 | 10:20 – 10:30

Harnessing Medicinal Plants for Sustainable Postharvest Protection: A Critical Assessment of Research Endeavors

Miss Thembeni Khumalo PhD[1,2], Dr James Mwinga[1], Prof Sonja Venter[2,3], Prof Stephen Amoo[2,3], Prof Adeyemi Aremu[1], Dr Yardjouma Silue[4]

[1]North-West University, Mahikeng, South Africa. [2]Agricultural Research Council, Pretoria, South Africa. [3]North-West University, Potchefstroom, South Africa. [4]University of Johannesburg, Johannesburg, South Africa

Abstract

Postharvest losses caused by pests and diseases are amongst the major challenges in food production and security. Postharvest chemical treatments such as fungicides and pesticides are used as a strategy to overcome this challenge. However, these synthetic chemicals are associated with some detrimental effects to the environment and crop residues that may be toxic to humans. Therefore, the continuity of food production depends on sustainable plant pest and diseases. One way of sustainably managing pests and diseases is using medicinal plants, which have been used by local farmers for many years and have therefore withstand the test of time for generations. Medicinal plants are natural and easily accessible, making them a suitable solution even for small-scale farmers in rural communities. This review presents the use of medicinal plants as an alternative to postharvest chemical treatments to manage pest and diseases on vegetables and fruits. Scopus and Web of Science databases were consulted, using key search words such as medicinal plants, post-harvest, vegetable, fruit, preparation method, and administration method to retrieve articles published between 2000 and 2026. The inclusion criteria focused on articles written in English and explicit indication of the use of medicinal plants in postharvest pest and disease management, including preparation and administration methods. Following the PRISMA guidelines for selection of articles, 23 articles were found to be eligible for this review. Medicinal plants present potential for natural, safe, cost effective and socially acceptable crop protection from postharvest pests and diseases.

29 October 2026 | 10:20 – 10:30

Efficacy of Medicinal Plants for Colon Cancer

Miss Elizabeth Jean Wildy MSc Medicinal Plant Science, Miss Samantha Rae Loggenberg PhD Medicinal Plant Science, Prof Namrita Lall

University of Pretoria, Pretoria, South Africa

Abstract

Colon cancer is one of the top three cancers affecting South African individuals. Screening is required to detect the cancer, with presenting symptoms including irregular bowel movements (constipation or diarrhoea) and abdominal pain. Literature shows that that insulin-like growth factor II (IGF2), which is overexpressed in colon cancer, is a promising novel drug target.

Many South African populations rely on medicinal plant treatments for colon cancer, however, undiagnosed patients may only treat symptoms, such as dysentery, diarrhoea, and abdominal pain. Therefore, plants traditionally used to treat stomach ailments, and possess predetermined in vitro anticancer potential, were selected for investigation in this study, which included species from the following families; Acanthaceae, Anacardiaceae, Aizoaceae, Asteraceae, Combretaceae, Fabaceae, Geraniaceae, Lamiaceae, Nelumbonaceae, Moraceae, and Myrtaceae. This research aimed to investigate whether extracts of these plants may selectively inhibit colon cancer cell proliferation, migration, IGF2 overexpression, and inhibit in vivo angiogenesis.

Ethanolic leaf extracts were evaluated for their anti-proliferative effects against non-metastatic (HT-29) and metastatic (SW-620) colon cancer cells, and non-cancerous human kidney cell line (Hek293). Lead candidates were selected based on selectivity index (SI) values, greater than 1, obtained from comparing selectivity between SW-620 and Hek293 cells (SI > 1), which included plants from the Acanthaceae (SI = 46.31), Lamiaceae (SI = 17.48), Combretaceae family and Asteraceae families (1<SI<5). Further evaluation of these lead plants against SW-620 cells included synergistic studies in combination with 5-fluorouracil (a conventional chemotherapy for colon cancer), and effect on IGF2 expression. Candidates that displayed lead in vitro bioactivity were subsequently evaluated by ex ovo yolk sac membrane assay for their effect on in vivo angiogenesis. The results from this research may identify novel antimetastatic agents against colon cancer, which specifically target cancer cell proliferation, migration and expression of IGF2, and angiogenesis.

29 October 2026 | 10:20 – 10:30

Mulching Effects on Growth and Essential Oil Composition in Rose Geranium (Pelargonium graveolens)

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Abstract

Rose geranium oil quality is determined by the abundance of key compounds like citronellol, geraniol, and linalool. Climate risks, such as erratic rainfall and high temperatures, increase soil moisture stress, reduce growth, and affect essential oil biosynthesis. Mulching is a low-cost climate-smart practice that can conserve soil moisture, regulate soil temperature, and improve crop productivity. However, its effectiveness depends on the type of mulch used. A study was carried out to evaluate the effects of different mulching materials on rose geranium growth and essential oil composition. A randomised complete block design trial replicated 3 times with five mulching treatments [black plastic, white plastic, grass straw, sawdust, and no mulch (control)] was established. Parameters including plant height, stem diameter, and fresh biomass yield were measured. Essential oils from each treatment obtained through steam distillation were analysed using gas chromatography – mass spectrometry for their composition. Growth data were subjected to a one-way analysis of variance. Fresh biomass yield and oil content and quality were significantly higher under black plastic compared to other treatments. Citronellol, the dominant compound across all treatments was higher under black plastic mulch (28.1%) compared to no mulch (11.1%). Similarly, geraniol concentration was higher under black plastic (2.65%) compared to no mulch (0.41%), indicating a strong linkage between favourable growth conditions and secondary metabolite biosynthesis. High concentrations of citronellol and ester compounds suggest enhanced metabolic flux through monoterpene pathways, which can be influenced by changes in temperature and water availability. Grass and sawdust mulches exhibited intermediate profiles with reduced concentrations of major monoterpenes and esters, while no mulch treatment recorded the lowest values. This study demonstrated that mulching significantly influences the growth and essential oil quality of rose geranium under field conditions.

Keywords: Rose geranium, mulching, chlorophyll content, biomass yield, essential oils

29 October 2026 | 10:30 – 10:40

The Effect of Different Propagation Techniques on the Phytochemical Accumulation in Hypoxis hemerocallidea

Dr Joseph Malele PhD, Dr Khayelihle Ncama PhD, Dr Sbulelo Ncama PhD, Dr Bonga Lewis Ngcobo PhD, Ms Amkele Fortunate Langa Advanced diploma
Durban University of Technology, Durban, South Africa

Abstract

Hypoxis hemerocallidea (Hypoxidaceae) is a highly valued indigenous medicinal plant that is increasingly overharvested and utilized for traditional medicine and pharmaceutical applications. Despite its importance, sustainable and scalable propagation remains a major challenge, particularly for small scale growers. This study investigated the effect of low-cost light spectra on breaking seed dormancy to improve seed germination and corm growth in H. hemerocallidea. The effects of three seed pre-treatments (hot water, 15 min microwave exposure, and smoke water) combined with four LED light regimes (blue, red, red + blue and control) were evaluated following a completely randomized design (CRD) experiment. Percentage germination, germination rate, and mean time germination (MTG) were assessed, while corm cuttings were evaluated for vegetative development including rooting, sprouting, number of leaves, leaf length and biomass accumulation. Both LED lights and pre-treatments significantly affected seed germination, with red and blue light producing faster and higher germination than the control. The shortest MTG was achieved under blue LED light combined with hot water pre-treatment (2.86 days), followed by red light with hot water (3.34 days). For corm cuttings, red LED light significantly enhanced sprouting, leaf development, and biomass accumulation, producing the highest fresh weight (2.81 g) and dry weight (0.33 g). This study demonstrates that LED light can be used as a practical and affordable propagation strategy for H. hemerocallidea, offering an alternative to micropropagation for resource limited growers. The approach has direct implications for conservation, commercial cultivation and reducing pressure on wild populations. Postharvest analyses comparing the antioxidant profiles of propagated and wild harvested plants are in progress.

29 October 2026 | 10:30 – 10:40

Molecular Basis of the Antihyperlipidemic Properties of Two Triterpenoids from a South African Traditional Medicinal Plant

Prof Rebamang Mosa[1], Dr Selepe Mamoalosi[1], Prof June Serem[2], Prof Megan Bester[2], Prof Andy Opoku[3], Dr Musawenkosi Ndlovu[1]

[1]University of Pretoria, HATFIELD, South Africa. [2]University of Pretoria, Prinshof, South Africa. [3]University of Zululand, KwaDlangezwa, South Africa

Abstract

Plant-derived triterpenoids are among the potential lead molecules for the development of new lipid-lowering therapeutics. This study aimed to provide insights into the molecular basis of the hypolipidemic potential of triterpenoids (ARM-2 and RA-5) isolated from Protorhus longifolia stem bark. Employing a combination of in silico predictions and in vitro assays, the interactions between these triterpenoids and key proteins involved in lipogenesis, cholesterol biosynthesis and plasma clearance were investigated. The molecular docking analysis predicted favourable binding affinities of both triterpenoids to HMG-CoA reductase, PPARγ, AMPK and LDL-R. The in vitro results also revealed that both RA-5 and ARM-2 inhibited pancreatic lipase and HMG-CoA reductase activities, albeit at varying degrees of efficacy. Both compounds significantly reduced the accumulation of intracellular neutral lipids in 3T3-L1 and HepG2 cell lines. ARM-2 and RA-5 (each at 100 µM) stimulated LDL uptake in the HepG2 cells by 31% and 39%, respectively. Treatment of the differentiated 3T3-L1 cells with the triterpenoids also increased the activity of the AMPK gene (up to 39%) while significantly decreasing the activities of the SREBP-1, PPARγ, C/EBPα, and HSL genes. The two plant triterpenoids possess properties critical in the potential development of new hypolipidemic drugs.

29 October 2026 | 10:30 – 10:40

Antimicrobial and Cytotoxic Effects of Acetone and Aqueous Extracts of Corchorus tridens, Pterocelastrus echinatus and Terminalia sericea and Their Combinations

Miss Refilwe Kudumela Msc, Dr Thanyani Ramadwa PhD, Dr Neo Mametja PhD, Dr Tracy Masebe PhD

University of South Africa, Johannesburg, South Africa

Abstract

Antimicrobial resistance (AMR) compromises the effective treatment of infectious diseases worldwide, necessitating the development of novel therapeutic strategies. Medicinal plants remain vital sources of new therapies and are frequently used in combination in traditional medicine, suggesting potential synergistic interactions that may enhance therapeutic efficacy. Despite their ethnomedicinal uses, the potential synergistic effects of Corchorus tridens, Pterocelastrus echinatus, and Terminalia sericea remains underexplored. Therefore, this study investigated the antimicrobial and cytotoxic effects of acetone and aqueous extracts of these plants, individually and in combination. Antimicrobial activities were evaluated using broth microdilution assay, and interactions were evaluated using fractional inhibitory concentration index (FICI). Cytotoxicity of individual extracts was evaluated using tetrazolium-based cell viability assays and xCELLigence real-time cell analysis on Vero-E6 and HEK 293 cells. The findings revealed that the individual extracts exhibited antimicrobial activity with MIC values ranging from 0.08 ±0.001 mg/ml to 2.5 ± 0.002 mg/ml, with acetone extracts exhibiting better activity than aqueous extracts. Meanwhile, cytotoxicity evaluation indicated low to moderate toxicity, with LC50 values ranging from 114.82 ± 22.11 to 527.85 ± 4.58 µg/ml, cell index values between 0.56 and 0.85 and Selectivity index values ranging from 0.37 to 3.43. Furthermore, combination studies revealed mostly indifferent interactions (FICI: 1.81-3.94), with occasional antagonism (FICI: 4.02 to 10.92), more frequently observed in acetone combinations. Overall, although individual extracts exhibited notable antimicrobial activity, their combination did not enhance efficacy, possibly due to phytochemical interactions that reduce activity. The findings highlight the importance of scientifically validating traditional combination therapies, as co-administrations does not always result in improved efficacy. Further studies evaluating antibiofilm activity, combination cytotoxicity, mechanisms of action, and metabolite identification are currently underway.

29 October 2026 | 10:40 – 10:50

Propagation, Cultivation and Post-Harvest Technologies for Buddleja saligna

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Abstract

Buddleja saligna extracts have applications in cosmetic products and as anti-proliferative agents. For the supply of plant material, propagation and cultivation are important. Seed germination of B. saligna is good over a variety of temperatures (15-30°C), although germination is faster at higher temperatures. Seeds are very small, and seedlings are fragile and need special care until they are large enough. Cutting propagation rates are low (10%) and slow (2-3 months), making this commercially expensive. Cuttings have a higher survival rate (>80%) when taken in autumn and winter than in other seasons. Cuttings form callus before rooting begins, which explains the slow rooting rate. Currently, propagation of cuttings is difficult, and exploring different avenues is in process. Buddleja saligna grows as small trees or shrubs, and cultivation needs to be explored to establish the yield per tree. Trials have shown that plants can be damaged by cold winds. Although the trees naturally grow in moist conditions, waterlogged clay soils are detrimental to root and plant growth. Plants are sensitive to drought, and high-density planting, along with specific cool, moist weather conditions, can lead to mildew. Studies have confirmed that the best antioxidant and antiproliferative activities were observed during the autumn flowering period. Extracts from younger trees showed significantly higher bioactivity than those from older trees. A trial on pruning and planting density was thus initiated. Pruning would rejuvenate plant material, and preliminary trials indicate that tree pruning stimulates vegetative growth during summer. These trials are ongoing, and confirmation of activity is pending. Shade-dried material showed the best antioxidant and antiproliferative activity, but leaf powder should not be stored for more than 8 months, as activity decreased significantly after 12 months. Although unanswered questions still exist, substantial progress has been made.

29 October 2026 | 10:40 – 10:50

Indigenous Farming Systems in Africa: Practices, Structures, Contributions to Food Security

Miss Peninah Wendy Mulaudzi PhD[1], Dr Silue Yardjouma[2], Mr Maditsi Edwin Otsile[1], Dr Seleke Christopher Tshwene[1], Professor Stephen Oluwaseun Amoo[3,1], Professor Adeyemi Oladapo Aremu[1]
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Abstract

Antimicrobial resistance (AMR) compromises the effective treatment of infectious diseases worldwide, necessitating the development of novel therapeutic strategies. Medicinal plants remain vital sources of new therapies and are frequently used in combination in traditional medicine, suggesting potential synergistic interactions that may enhance therapeutic efficacy. Despite their ethnomedicinal uses, the potential synergistic effects of Corchorus tridens, Pterocelastrus echinatus, and Terminalia sericea remains underexplored. Therefore, this study investigated the antimicrobial and cytotoxic effects of acetone and aqueous extracts of these plants, individually and in combination. Antimicrobial activities were evaluated using broth microdilution assay, and interactions were evaluated using fractional inhibitory concentration index (FICI). Cytotoxicity of individual extracts was evaluated using tetrazolium-based cell viability assays and xCELLigence real-time cell analysis on Vero-E6 and HEK 293 cells. The findings revealed that the individual extracts exhibited antimicrobial activity with MIC values ranging from 0.08 ±0.001 mg/ml to 2.5 ± 0.002 mg/ml, with acetone extracts exhibiting better activity than aqueous extracts. Meanwhile, cytotoxicity evaluation indicated low to moderate toxicity, with LC50 values ranging from 114.82 ± 22.11 to 527.85 ± 4.58 µg/ml, cell index values between 0.56 and 0.85 and Selectivity index values ranging from 0.37 to 3.43. Furthermore, combination studies revealed mostly indifferent interactions (FICI: 1.81-3.94), with occasional antagonism (FICI: 4.02 to 10.92), more frequently observed in acetone combinations. Overall, although individual extracts exhibited notable antimicrobial activity, their combination did not enhance efficacy, possibly due to phytochemical interactions that reduce activity. The findings highlight the importance of scientifically validating traditional combination therapies, as co-administrations does not always result in improved efficacy. Further studies evaluating antibiofilm activity, combination cytotoxicity, mechanisms of action, and metabolite identification are currently underway.

29 October 2026 | 10:40 – 10:50

Evaluating South African Plants for Antidiabetic Properties, Isolating and Identifying Biologically Active Compounds

Ms Nomzamo Msomi PhD chemistry[1,2], Prof Stephen Amoo[1], Prof Vinesh Maharaj[2], Prof Zeno Apostolides[2], Dr Dashnie Naidoo-Maharaj[1,2]

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Abstract

Diabetes continues to be one of the fastest-growing public health challenges globally. Consequently, a large proportion of the African population relies on traditional medicine for the management of diabetes. This highlights the need to evaluate local medicinal plants through ethnopharmacological studies related to diabetes management. Notably, Buddleja saligna, Cadaba aphylla, Crassula muscosa, and Kedrostis nana are among the plant species traditionally used to address diabetes in South Africa. This study aimed to evaluate the anti-diabetic properties of these indigenous plant species and to identify compounds responsible for their biological activity. Dried plant material of B. saligna, C. aphylla, C. muscosa, and K. nana were extracted separately using organic [MeOH: DCM (1:1)] and aqueous solvents. The organic extracts of B. saligna, C. aphylla, C. muscosa, and K. nanawere fractionated using dry-packed solid-phase extraction (SPE), sequentially generating seven fractions for each extract. All extracts and fractions were evaluated in vitro for enzyme inhibitory activity against α-amylase and α-glucosidase. The α-amylase assay employed 3,5-dinitrosalicylic acid (DNSA) to detect reducing sugars, while the α-glucosidase assay used p-nitrophenyl-α-D-glucopyranoside (p-NPG) as the substrate. Acarbose served as the positive control. The results revealed that B. saligna roots and C. muscosa whole plant extracts exhibited notable in vitro α-amylase and α-glucosidase inhibitory activities. Furthermore, crude extracts were evaluated for glucose uptake in L6 myoblast cells at three concentrations (25 µg/mL, 50 µg/mL, and 100 µg/mL), with insulin (10 ng/mL) used as the positive control. K. nana demonstrated significant glucose uptake, reaching 41.1% at 50 µg/mL and 47.7% at 100 µg/mL, compared to 43.5% for the insulin control. Fractions showing promising biological activity were analysed using ultra-performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry (UPLC-QTOF-MS) to tentatively identify bioactive compounds. These findings may lead to the development of standardised antidiabetic plant-based ingredients.

29 October 2026 | 10:50 – 11:00

Effect of Drying Methods on the Chemical Composition of Agro-Wastes as Potential Feed Source for Livestock

Mr Aluwani Nemukula[1], Dr Thamsanqa Mpanza[1], Dr Nqobile Masondo[1], Prof Stanley Gololo[2], Prof Stephen Amoo[1], Dr Ebrahiema Arendse[1]

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Abstract

This study investigated how different drying methods for agro-waste affect its suitability as animal feed. To achieve that, we evaluated the nutritional composition and drying methods of three agro-wastes – brewer's spent grain (BSG), sweet potato peels, and potato peels – as sustainable feed ingredients for small ruminants. Proximate analysis showed BSG to have the highest crude protein (19.63 ± 0.19%), followed by potato peels (11.45 ± 0.09%) and sweet potato peels (7.89 ± 0.26%). Amino acid profiling confirmed BSG as a superior protein source, with high levels of glutamic acid (2.77 ± 0.03 g/100 g), leucine (1.40 ± 0.01 g/100 g), and arginine (1.06 ± 0.01 g/100 g), all of which are compounds of interest in nutraceutical development. Potato and sweet potato peels showed high fiber and ash content, influencing metabolizable energy and digestibility. The drying kinetics significantly affected nutrient retention. For instance, freeze-drying preserved the highest protein levels across all agro-wastes, whereas oven-drying led to elevated neutral detergent fiber (NDF), especially in potato peels (88.26 ± 1.01%). BSG maintained relatively stable NDF levels across all drying treatments (38–43%), indicating minimal structural alteration. Furthermore, total fat content was highest in BSG (5.61 ± 0.01%), making it a reliable energy source. Overall, freeze-drying was effective in preserving essential nutrients; however, oven- and sun-drying remain more practical and cost-efficient for large-scale production. These findings highlight the importance of appropriate processing methods and quality control in the utilisation of plant-based natural resources for feed and related bio-based applications. This ultimately contributes to circular economy goals by lowering feed costs, improving waste management and strengthening food-system sustainability.

29 October 2026 | 10:50 – 11:00

Lobostemon fruticosus Leaf Secondary Metabolite Profile Diversity Across Geographical Locations in the Western Cape

Dr Callistus Bvenura
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Abstract

Lobostemon fruticosus (L.) H. Buek is an indigenous medicinal shrub widely used in traditional medicine in South Africa. This study investigated the phytochemical diversity and chemotypic variation of wild L. fruticosus populations collected from Rhodes Memorial, Doringrivier, and Grootnek fontein in the Western Cape Province. Leaf extracts were analysed using ultra-performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry (UPLC-QTOF-MS), while chemometric analyses including PCA, PLS-DA, and OPLS-DA evaluated metabolite variation among populations. Among the eighteen compounds tentatively identified, Doringrivier samples contained high concentrations of rutin (5.142 mg/g), kaempferol (3.846 mg/g), and rosmarinic acid (0.069 mg/g), while Rhodes Memorial samples showed elevated levels of cirsimaritin (0.095 mg/g), sagerinic acid (0.182 mg/g), and lirioresinol A (0.144 mg/g). Grootnek fontein samples accumulated higher concentrations of pyrrolizidine alkaloids, particularly lycopsamine-N-oxide (3.899 mg/g). Multivariate analyses demonstrated clear chemotypic separation among populations, with PCA and PLS-DA explaining 97.2% of total variance. Statistical analysis identified lycopsamine-N-oxide, rutin, lycopsamine, globoidnan B, and rabdosiin as key discriminatory metabolites. Doringrivier was the most promising population for future medicinal cultivation due to its high concentration of beneficial phenolic compounds and lower pyrrolizidine alkaloids. This study contributes valuable information on the phytochemical characterization, quality standardization and medicinal potential of L. fruticosus.

29 October 2026 | 10:50 – 11:00

Influence of Antioxidant Solutions and Drying Conditions on Biological Activity and Secondary Metabolites of Harpagophytum procumbens Secondary Tubers

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Abstract

Harpagophytum procumbens (Devil's claw) is a medicinal plant widely used for its anti-inflammatory and antimicrobial properties. Towards its value-chain optimisation, this study evaluated the effects of postharvest antioxidant treatments and drying methods on antimicrobial activity and secondary metabolite composition of cultivated material. Rooted plantlets propagated in vitro were acclimatized under glasshouse conditions before field establishment under 40% shade netting at Die Eiland Experimental Farm, Upington. After one-year, secondary tubers harvested during dormancy were washed, sliced, and treated with antioxidant solutions (control: AS0; synthetic: AS1; plant-based: AS2) before freeze-drying, oven-drying (45 ± 5 °C), full sun, or semi-shade drying, yielding 12 treatment combinations. Dried tubers were milled, extracted using water and acetone, and evaluated against eight microbial strains using the microdilution assay to determine their minimum inhibitory concentrations (MICs). Furthermore, their phytochemical profiling was analysed using ultra-performance liquid chromatography coupled with quadrupole time-of-flight ion mobility spectrometry/mass spectrometry (UPLC-QTOF-IMS/MS). Our results showed that acetone extracts from freeze-dried and oven-dried tubers treated with AS1 or AS2 exhibited the highest antibacterial activity, particularly against Gram-positive bacteria (Bacillus subtilis: MIC values of 16–32 µg/mL; Staphylococcus aureus: MIC values of 31.2–62.5 µg/mL). Gram-negative bacteria were less sensitive (MIC ≥ 250 µg/mL). Antifungal activity varied across treatments, with freeze-dried and sun-dried samples treated with AS1, as well as sun-dried samples with AS2, showing the highest activity (MIC:39 µg/mL) against Fusarium oxysporum. Phytochemical profiling indicates the presence of phenylethanoid glycosides, phenolic, flavonoids, and coumarins such as chrysoeriol 7-rutinoside, dihydro-n-caffeoyltyramine, acteoside, verbascoside, skimmin, melilotosides and orobanchoside, which are well-documented for strong antimicrobial activity. Overall, the combination of antioxidant pre-treatment and optimized drying conditions enhances the preservation of antimicrobial activity and phytochemical integrity. This integrated approach supports the conservation of H. procumbens through efficient agroprocessing, while strengthening cultivation potential as a sustainable source of bioactive compounds.

29 October 2026 | 11:00 – 11:10

Development and Consumer Acceptability of Cactus Pear Peel Flour-Enriched Biscuits and Ready-to-Use Baking Mix

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Abstract

Cactus pear peel is a by-product of fruit processing that is often discarded despite being rich in dietary fibre, minerals, and bioactive compounds. Transforming this waste into value-added flour offers a sustainable approach for functional food development. This study aimed to develop cactus pear peel flour from Opuntia ficus-indica, formulate biscuits and a ready-to-use (RTU) baking mix, and evaluate consumer acceptability. Peels were washed, dried, and milled into fine flour. The flour was characterised for nutritional composition, minerals, and amino acids. Biscuits and a RTU baking mix were formulated with cactus peel flour, substituting wheat flour at 1%, 5%, and 10% levels. Consumer sensory evaluation was conducted using a 5-point hedonic scale (1=disliked a lot; 5=liked a lot) for appearance, aroma, taste, texture, and overall acceptability, with qualitative comments also collected. The cactus peel flour showed high ash (15.33%) and fibre (30.29%) content, indicating it is a rich source of minerals and fibre, with low fat (1.80%) and protein (1.86%) content. The 5% substitution formulation achieved the highest overall consumer acceptability, with 39% of appearance ratings in the "liked" category and strong acceptance across all sensory attributes. Texture emerged as the most influential attribute: the 1% formulation was described as "too soft," while the 5% formulation achieved desirable crispness and structural integrity. The 10% formulation generated polarised responses – some participants preferred its reduced sweetness and unique colour attributes. The 5% cactus peel flour substitution provides the best sensory balance for biscuits and RTU baking mixes, demonstrating commercial potential for upcycled cactus peel flour in convenience foods while reducing agricultural waste.

Keywords: Cactus pear peel flour; ready-to-use baking mix; sensory evaluation; functional biscuits; consumer acceptability; upcycled ingredients

29 October 2026 | 11:00 – 11:10

Influence of Methoxylation on Antidiabetic Activity of ρ-Hydroxybenzaldehyde

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Abstract

Phenolic aldehydes such as ρ-hydroxybenzaldehyde (ρ-BN) are phytochemicals with several pharmacological benefits. The present study was designed to investigate the role of methoxylation on the antidiabetic potential of ρ-BN and its derivatives vanillin (VN) and syringaldehyde (SN) in various diabetes models. Fructose-fed streptozotocin-induced type 2 diabetes (T2D) rat model and inhibition of protein tyrosine phosphatases phosphatase 1B (PTP 1B) were used to investigate the antidiabetic activity of the compounds. Molecular docking was used to predict the binding affinities of the compounds with the PTP 1B. For the animal study, the treated groups at 50 and 100 mg/kg BW showed significant ($p < 0.05$) attenuation of hyperglycemia, insulin resistance, hyperlipidemia, and a significant ($p < 0.05$) improvement on pancreatic β-cell functions as well as insignificant ($P > 0.05$) improvement on insulin receptor substrate-1 (IRS-1) and glucose transporter-4 (GLUT-4) mRNA expression in skeletal muscle. For the PTP 1B inhibition, SN exhibited significantly (IC50: 12.75 μM) higher inhibition compared to ρ-BN (IC50: 33.79 μM) and VN (IC50: 42.82 μM). The molecular docking simulation predicted negative binding energies of -5.0 kcal/mol, -5.5 kcal/mol, and -5.5 kcal/mol for p-hydroxybenzaldehyde, vanillin, and syringaldehyde, respectively. In conclusion, the phenolic aldehydes (ρ-BN, VN, and SN) possessed anti-T2D activity in the models used while methoxylation partly influenced the antidiabetic effects of the compounds, thereby attributing the antidiabetic activity to the phenolic aldehyde skeleton.

29 October 2026 | 11:00 – 11:10

Phytochemicals from Euclea natalensis Modulate Th17 Differentiation, HIV Latency, and Comorbid Pathways: A Systems Pharmacology and Thermodynamic Profiling Approach

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Abstract

HIV/AIDS continues to pose a global health challenge, driven by persistent immune dysregulation, chronic inflammation, and latent viral reservoirs that are refractory to antiretroviral therapy (ART). Euclea natalensis, a medicinal plant widely used in Southern African traditional medicine, is well documented for its antimicrobial properties but remains underexplored for HIV and related immunomodulatory activities.

This study employed an integrated systems-pharmacology and molecular modeling pipeline, including absorption, distribution, metabolism, and excretion (ADME) profiling, host target prediction, protein–protein interaction (PPI) analysis, gene ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) enrichment, bioactive-target-pathway (BA-TAR-PATH) mapping, molecular docking, molecular dynamics (MD) simulations, and molecular mechanics/generalized Born surface area (MM/GBSA) binding free energy (BFE) calculations, to elucidate how E. natalensis phytochemicals may modulate host mechanisms involved in HIV pathogenesis.

From the literature, sixteen phytochemicals met the ADME criteria and mapped to 313 overlapping human targets, from which ten hub genes were identified. These hubs were enriched in pathways associated with immune regulation, apoptosis, and nuclear signaling. KEGG enrichment highlighted several HIV-relevant pathways, including Th17 cell differentiation, PD-1/PD-L1 immune checkpoint signaling, IL-17 signaling, HIF-1 signaling, and PI3K–Akt signaling. Among the phytochemicals, diospyrin and galpinone exhibited the strongest interactions with hub targets, including NF-κB1, STAT3, MTOR, HSP90AA1, and HSP90AB1. These interactions were characterized by favorable docking scores, stable MD trajectories, and favorable BFEs compared to those of known reference inhibitors.

Collectively, these findings suggest that E. natalensis phytochemicals may modulate host immune and metabolic pathways implicated in HIV pathogenesis, latency maintenance, and HIV-associated comorbidities. The multi-target properties identified highlight the potential of these compounds as promising adjunct agents for HIV and immunotherapy. This study establishes strong computational feasibility and provides a rationale for subsequent experimental validation.

29 October 2026 | 11:10 – 11:20

Metabolite Diversity and Chemotype Stability of in Vitro Regenerated Thymus vulgaris Revealed by UPLC-QTOF-MS and GC-MS Analyses

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Abstract

Thymus vulgaris L. (Lamiaceae) is an economically and medicinally important aromatic plant valued for its essential oil and polyphenolic composition. While its phytochemistry has been extensively studied in field-grown populations, limited information is available on the metabolic integrity of in vitro–regenerated plants. This study investigated the secondary metabolite profile of in vitro–regenerated T. vulgaris cultivated under controlled glasshouse conditions, with emphasis on chemotype expression and metabolite diversity. Polar metabolites from leaf material were analysed using ultra-performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry (UPLC–QTOF–MS), while volatile constituents of the essential oil were characterised by gas chromatography–mass spectrometry (GC–MS). The analyses revealed a rich and diverse phytochemical profile comprising phenolic acids, flavonoids, terpenoids, alkaloids, glycosides, and quinones. Major phenolic constituents included rosmarinic acid, salvianolic acid derivatives, and flavonoid glycosides, highlighting the prominence of phenylpropanoid metabolism in regenerated plants. The consistent detection of rosmarinic acid supports its chemotaxonomic relevance within the Lamiaceae family and its suitability as a quality control marker. GC–MS analysis of the essential oil confirmed a thymol-rich chemotype, with thymol, γ-terpinene, p-cymene, and caryophyllene as dominant constituents. The relative abundance of biosynthetic precursors alongside thymol suggests active regulation of the monoterpene biosynthetic pathway under in vitro regeneration and acclimatisation conditions. The maintenance of a pharmacopeial-compliant thymol chemotype demonstrates metabolic stability despite propagation through tissue culture. These findings indicate that in vitro regeneration does not compromise the phytochemical identity of T. vulgaris, but rather preserves key bioactive and chemotaxonomic features. The study supports plant biotechnology as a sustainable approach for producing chemically consistent medicinal plant material and contributes to the standardisation of T. vulgaris for research and cultivation.

29 October 2026 | 11:20 – 11:30

Edible Coating from Cactus Pear Mucilage for Postharvest Preservation of Fruits and Vegetables

Dr Ebrahiema Arendse[1], Ms Muneiwa Rumani[1], Prof Stephen Amoo[1,2]

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Abstract

Postharvest losses of fresh fruits and vegetables represent a significant challenge to food security. Edible coatings from plant mucilage offer a safe, eco-friendly alternative to synthetic preservatives. This study aimed to develop an edible coating from Opuntia ficus-indica mucilage and determine its effectiveness on blueberries and tomatoes. Mucilage was extracted, freeze-dried, and formulated with glycerol at concentrations of 2%, 4%, and 6% (w/v). Blueberries were stored at 5 °C for 14 days plus 5-day shelf-life; and tomatoes were stored at 10 °C for 21 days. Quality parameters including weight loss, total soluble solids, colour, and physiological disorders (shrivelling, decay, chilling injury, pitting) were recorded using a 5-point index. Coatings M2G1 (with 2% mucilage) and M4G1 (with 4% mucilage) significantly reduced physiological disorders in both fruits compared to the control. Weight loss increased with storage conditions but was less pronounced in coated fruits. For tomatoes, these coatings reduced decay and shrivelling after 21 days. Pitting occurred mainly in control blueberries. Based on our results, cactus pear mucilage edible coating can be considered an effective natural preservative that extends shelf-life and maintains quality of fresh fruits and vegetables with potential for commercial application.

Keywords: Edible coating; cactus pear mucilage; postharvest preservation; shelf-life extension; natural preservative

Poster Presentations

P001

Ethnobotanical Study for Maternal Healthcare in Qwaqwa, Free State Province, South Africa

Ms Mamokete Setshego Masters in Indigenous Knowledge Systems

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Abstract

The medicinal plant use is an ancient custom practiced in most rural areas around the world as service to meet the health care requirements of patients. Conversely, the very custom was perceived by old government as witchcraft, hence there was an Act 3 of 19 of 1957 Witchcraft Suppression which forbidden the use of medicinal plants and that lead to its marginalization. The medicinal plant-use is significantly practiced for diverse reproductive and maternal health related conditions such as childbearing, assuage menstruation challenges, assist recovery from after miscarriage, alleviate postpartum, haemorrhage, aid postpartum recovery and for pregnancy challenges. Maternal health refers to the health of women during pregnancy, childbirth, and the postnatal period. In African, most women use medicinal plants because of their socio-economic status and poor access to health care in their communities. However, the use of traditional medicine for maternal healthcare is banned in most African countries despite its significance because of misunderstanding and mistrust of the Indigenous knowledge systems. The mistrust is not because of the ineffectiveness, however because of the lack of knowledge. As a result, the very ethnobotanical knowledge is disappearing hence this study aimed to document the traditional use of medicinal plants used for maternal healthcare. A survey was conducted with 149 participants that includes mothers, traditional health practitioners and traditional birth attendants to collect data. Forty-five (45) plants from 32 families used for maternal healthcare were recorded. The results shows that most plants recorded belong to the family of Asteraceae. Modes of preparation and administration were also documented. Most of information was received from the elders and this suggests that young people do not have such knowledge, hence it is important to intensify the effort to document them. To advance the study, scientific validation of the claimed efficacy of traditional medicine is warranted.

P002

Ameliorative Potential of Tectona grandis Stem Bark against Scopolamine-Induced Neurotoxicity in a Female Mouse Model

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Abstract

Background: Alzheimer's disease (AD) is a neurodegenerative disorder marked by memory decline, cholinergic deficits, and neuroinflammation. Existing treatments mainly target symptoms, prompting ongoing research for improved therapies. Tectona grandis L.f. (Lamiaceae), used in Nigerian traditional medicine, has limited investigation into its neuroprotective properties. This study explores the neuroprotective effects of its stem-bark extract in a mouse model of scopolamine-induced AD.

Methodology: The stem bark of Tectona grandis (TGE) was extracted with 70% ethanol and concentrated under reduced pressure at 40°C. Antioxidant assays, including hydrogen peroxide (H2O2) and hydroxyl radical (OH) scavenging assays, were conducted using standard methods. In vitro acetylcholinesterase (AChE) inhibitory assay was performed according to Ellman's method. Gas Chromatography-Mass Spectrometry (GC-MS) was used to elucidate the phytochemicals present. For the in vivo assay, female mice were divided into five groups (n=6) as follows: normal group; scopolamine-only (1 mg/kg); TGE (50 and 200 mg/kg) plus scopolamine; and Donepezil (1 mg/kg) plus scopolamine. Cognitive performance was assessed using the Y-Maze assay. Biochemical parameters, including catalase (CAT), malondialdehyde (MDA), nitrite levels, and acetylcholinesterase (AChE) activity, were measured in brain samples. Data were analysed using one-way ANOVA.

Results: The plant extract exhibited dose-dependent radical-scavenging activity, with 1 mg yielding 49% and 59% inhibition against H2O2 and OH radicals, respectively. TGE also inhibited 52% of AChE activity at 1 mg. GC-MS analysis identified compounds such as 1,2-cyclohexanedione (19.2%) and 9,12-octadecenoic acid methyl ester (19.5%), likely responsible for the activity. Scopolamine administration increased incorrect modifications, MDA, and AChE levels, while decreasing catalase activity. Co-administration with TGE reversed scopolamine's effects, reduced oxidative stress markers, restored antioxidant levels, and altered behaviour.

Conclusion: Tectona grandis bark shows promising acetylcholinesterase inhibition, antioxidant, and neuroprotective effects, suggesting its potential as a multi-target treatment for Alzheimer's disease.

Keywords: Tectona grandis, Neuroprotective activity, Alzheimer's disease, Acetylcholinesterase inhibition.

P003

Effects of Growth Media and Tuber Cutting Angle on Vegetative and Phytochemical Yield of Bulbine natalensis

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Abstract

Phytotherapy is a major component of complementary medicine that remains a primary source of healthcare for most people in developing countries. However, overharvesting and climate change threaten the long-term availability of medicinal plants. This study evaluated the effects of growth media and tuber cutting techniques on vegetative growth and phytochemical yield in ibhucu (Bulbine natalensis). A 4 × 3 × 3 pot experiment arranged in a randomized complete block design was conducted under semi-controlled nethouse conditions. Growth media assessed included commercial compost, river sand, commercial potting mix (peat moss and perlite), and a 50:50 sand–compost mixture. Propagation was carried out using tuber division, with uniform tubers cut longitudinally, transversally, or vertically following the division propagation method. Results showed that river sand resulted in the highest shoot and leaf numbers per tuber, while the 50:50 sand–compost mixture resulted in the highest emergence percentage. Transversal cuts planted in sand produced the highest leaf number (17.33) and shoot number (5.33), whereas transverse cuts in compost recorded the highest emergence (36.33). Postharvest analyses comparing antioxidant compounds of cultivated plants with wild-harvested ibhucu are ongoing. The findings provide baseline information on propagation techniques and growth media that can support sustainable cultivation of B. natalensis while producing vegetative and phytochemical yields comparable to or exceeding those of wild plants.

P004

Descriptive Analysis of Beliefs Towards Nutrition and Health Benefits Linked to Consumption of Indigenous Leafy Vegetables Among Rural Households at Joe Gqabi District Municipality, Eastern Cape Province, South Africa

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Abstract

Indigenous leafy vegetables (ILVs) are recognised for their potential to improve the diets and well-being of humans in communities, particularly in areas that are characterized by high poverty levels, like those of South Africa. South Africa is reported to have several kinds of these vegetables, such as Amaranth, Nightshade, and Pumpkin leaves, to mention a few, which can be utilised for food and medicine purposes, especially within the regions of KwaZulu-Natal, Eastern Cape, and Limpopo Provinces. Regardless of the abundance of these vegetables in the country, there is acknowledged lower consumption by the residents, leaving communities vulnerable to malnutrition and eventually susceptible to several diseases. Therefore, the study aimed to describe consumers' beliefs about the nutrition and health benefits of ILVs in Joe Gqabi District Municipality. A simple random sampling was employed, and 93 consumers of ILVs from the study area were chosen. Primary data were gathered through face-to-face interviews using a questionnaire. Data was analysed using descriptive statistics such as mean, standard deviations, percentages, and frequencies, and a Chi-Square test was done to check the relationship between variables (nutrition and health benefits). The results revealed and concluded that women are dominant in the consumption of ILVs, with most of the consumers characterised by unemployment. Also, most consumers affirmed nutrition and health benefits associated with the consumption of ILVs, while most consumers lack an understanding of the nutrition and health components entailed by ILVs. The findings demonstrate that indigenous leafy vegetables are not only perceived as nutritious foods but also as medicinal resources with potential bioactive and therapeutic properties. These medicinal perceptions highlight opportunities for further commercialization of ILVs as functional foods and plant-based therapeutic products. Harnessing indigenous knowledge systems can therefore contribute to innovation in African medicinal plant research and sustainable health-based enterprises.

Keywords: Consumers' wellbeing, Indigenous knowledge sustainability.

P005

In Vitro Cytotoxicity Screening and Antimicrobial Activity of Agave angustifolia and Agave sisalana Solvent Extracts against Bacteria and Fungi

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Abstract

Agave angustifolia (AA) and Agave sisalana (AS) are traditionally used in local communities to treat various health conditions, including skin rashes and blemishes. Local small businesses are producing agave-enriched cosmetic products, claiming soothing and nourishing properties, amongst other claims. Despite their growing use, scientific evidence supporting their safety and efficacy is limited. The study evaluated the in vitro cytotoxicity of Agave leaf solvent extracts to determine their potential safety for cosmetic applications and also assessed their antimicrobial activity against selected Gram-negative and Gram-positive bacteria and fungi. Leaf extracts of AA and AS were evaluated on Vero cell lines (African green monkey kidney cell lines). The antimicrobial screening against selected Gram-negative and Gram-positive bacteria and fungi was assessed using the agar disc diffusion, micro broth dilution, and CellTiter-Blue® (MABA) assays. AA hexane fraction reduced cell viability at 12.5 – 100 µg/mL, but cytotoxicity was less pronounced at 200 µg/mL. Ethyl acetate and methanol extract fractions from AA induced about 40% cell death, without a clear dose-dependency. AA methanol extract maintained more than 70% cell viability, suggesting non-toxicity at physiologically relevant concentrations. All AS extracts were non-cytotoxic. AS hexane and ethyl acetate extract fractions and the AA ethyl acetate fraction showed sensitivity against Enterococcus faecalis. Both AA and AS hexane extract fractions and AA ethyl extract fractions were active against Streptococcus pyogenes. Hexane and ethyl acetate extract fractions from both plants, as well as the AA methanol fraction, were sensitive against Streptococcus pneumoniae. No extracts were effective against the Gram-negative bacteria (E. coli, K. pneumoniae, and P. aeruginosa), Staphylococcus aureus, or Candida albicans at 2 mg/mL. AS extracts demonstrated no cytotoxicity. AA extracts showed moderate cytotoxic effects depending on the solvent fraction. Both species showed selective antimicrobial activity against Gram-positive bacteria, supporting their potential as natural ingredients in cosmetic formulations.

P006

Unraveling the Antifungal Mechanism of Jimsonweed (Datura stramonium L.) Compounds through Molecular Docking and Machine Learning

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Abstract

Smallholder farmers have historically used extracts derived from jimsonweed (Datura stramonium L.) as a sustainable and cost-effective method of managing pre- and postharvest diseases. These plant diseases include alternaria leaf spot, fusarium wilt, powdery mildew, ring spot, grey mold, and fruit rot, which are predominantly caused by phytopathogens including fungi. In this study, the antifungal mechanism of jimsonweed compounds against selected phytopathogens was investigated using an integrative computational approach. Liquid Chromatography-Mass Spectrometry (LC-MS) was used to identify compounds present in jimsonweed based on their physicochemical properties and mass-to-charge ratio. Thereafter, molecular docking was used to compute the binding affinity of the identified compounds. Furthermore, nonlinear machine learning models such as artificial neural networks and support vector machines were developed and evaluated to predict the binding affinity of the bioactive compounds against the target phytopathogens. Root mean square error, average absolute relative deviation, and coefficient of determination were used to assess the machine learning models performance. The LC-MS analysis yielded 28 compounds, with baicalin, lunacridine, and patuletin previously reported to contain antifungal activities. The machine learning models demonstrated good predictive accuracy, which indicates high discriminative ability and robustness in prediction. The findings are consistent with traditional uses of jimsonweed in the management of plant diseases. These findings highlight the effectiveness of machine learning in capturing complex relationships between compounds, fungi type, and their resulting binding affinity, suggesting its potential in predicting antifungal interactions.

P007

Medicinal Plants as Alternative Therapies for Candida Infections in South Africa: An Ethnobotanical Perspective

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Abstract

Candida infections remain a substantial public health concern, particularly in areas where access to antifungal treatments is insufficient. Medicinal plants remain widely utilized in managing these infections, yet their antifungal efficacy have not been scientifically validated. The review aimed to document medicinal plants used to treat Candida-related infections in South Africa. Relevant data was sourced from various online databases, including Google Scholar, Science Direct, and PubMed, using keywords such as ethnobotanical survey, medicinal plants, Candida, antifungal activity, and South Africa. A total of 90 medicinal plant species belonging to 59 genera and 70 families were identified. Fabaceae, Asteraceae, and Celastraceae were the most dominant plant families, each represented by 11, 7, and 5 plant species, respectively. Some of the plants include Bidens pilosa, Croton gratissimus, Diospyros mespiliformis, Vangueria infausta, and Ximenia caffra. The most involved active compounds were flavonoids, alkaloids, tannins, terpenoids, phenolic compounds, and the isolated compound catechin. Leaves (29%) were the most dominant plant part, followed by roots (28%) and bark (23%). Additionally, decoction (48%) was the major mode of preparation, followed by grinding into powder (17%), and infusion (12%). The study presents a diverse list of medicinal plants with potential antifungal properties against Candida species. The findings of this study underscore the need for further research focusing on the antifungal properties of traditional plants in other provinces besides Limpopo. Furthermore, more extensive research must be done on non-albicans Candida species.

P008

The Antibacterial Activity of Bitter Leaf (Gymnanthemum amygdalinum) and Water Hyacinth (Pontederia crassipes) and the Effect on Growth and Survival of Juvenile Tilapia (Oreochromis niloticus)

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Abstract

Aquaculture, particularly the cultivation of Nile tilapia (Oreochromis niloticus), plays a crucial role in global food security. However, disease outbreaks and suboptimal growth rates present significant challenges. Natural plant-based additives offer promising alternatives to synthetic antibiotics and growth promoters. The aim of the study was to investigate the antibacterial activity of bitter leaf (Gymnanthemum amygdalinum) and water hyacinth (Pontederia crassipes) and their effects on the growth and survival of juvenile Nile tilapia. Extracts from the dried leaves of both plants were subjected to proximate and phytochemical analysis using standard methods. Experimental fish of 1.4 ± 0.3g were grouped into nine rectangular glass tanks for 10 weeks fed on diet supplemented with G. amygdalinum and P. crassipes. Healthy O. niloticus were injected intraperitoneally with Aeromonas hydrophila 24 hours before prophylaxis and chemotherapy treatment for one week. G. amygdalinum had significantly higher crude protein (25.47 ± 0.33%) and carbohydrate (43.13 ± 0.14%) than P. crassipes, which had higher fiber (26.00 ± 0.05%) and lipid content (7.50 ± 0.10%). Both plants contained flavonoids and tannins. Nile tilapia fed on a diet supplemented with G. amygdalinum had a significantly higher final body mass (5.49 ± 1.82g), specific growth rate (2.20 ± 0.51), and overall weight gain. The survival rate of the G. amygdalinum group was 99.26%. In the challenge experiment with A. hydrophila, Nile tilapia prophylactically fed on G. amygdalinumshowed enhanced survival rate of 85%, significantly higher than the P. crassipes and the control diet. However, there was a lower survival rate of 40% in fish fed on both plants. In conclusion, G. amygdalinum could be a valuable ingredient in fish feed formulation due to its high protein content and antibacterial properties, contributing to better growth performance and disease resistance in juvenile Nile tilapia.

P009

Promoting Equity in Type 2 Diabetes Mellitus Care: Critical Evaluation of Integration Gaps Impacting Low-Income Communities and the Neglected Supportive Roles

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Abstract

Type 2 diabetes (T2DM) disproportionately impacts low-income communities, where cultural health practices, such as the use of homoeopathy, are frequently relied upon for managing chronic illnesses. Many people rely on traditional and complementary medicine (TCM), but health systems in many countries, like South Africa, do not include it in diabetes care. The present study examines how excluding homoeopathy as a supportive modality in integrative diabetes care may contribute to inequity, reduced treatment adherence, and unsustainable care burdens among low-income populations. A narrative review was carried out by examining both international and African literature from 2010 to 2025, concentrating on the management of T2DM, trends in the use of TCAM, frameworks for public health equity, and the role of homoeopathy in supporting chronic disease care. The evidence was compiled to evaluate cultural acceptability, patient adherence, policy structures, cost factors, and the sustainability of health systems. The results point out three equity issues in type 2 diabetes care. First, it mentions that ignoring culturally accepted support systems like homoeopathy can lower patient trust and adherence. Second, not including TCAM in policies affects low-income communities that depend on cheap care options. Third, not using affordable support methods adds to long-term system burdens, which goes against public health sustainability goals. While there is limited evidence of homoeopathy's direct effect on type 2 diabetes, it is known to be low-cost and patient-focused. It helps with chronic illness support, lifestyle motivation, and symptom management, which are important for sustainable care in low-income areas. This gap highlights an urgent public health need: not to replace conventional care, but to consider integrative and culturally coherent models that improve adherence, reduce burden on overstretched systems, and advance equity in chronic disease care.

P010

Antioxidant Compounds Derived from African Medicinal Plants: The Interplay of Sustainability, Maceration Efficacy, and Societal Impact

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Abstract

Medicinal plants are an important source of active ingredients used in most therapeutic products that are important for human and animal health. These products have long been used for the survival of humans, and this knowledge has been passed down generationally. However, factors like overharvesting, climate change, overgrazing, and monocropping threaten the sustainability of most indigenous plants. Research investigating the solvents that yield the highest active compounds from plant parts is necessary as an alternative to harvesting in bulk. A literature review indicated maceration by methanol, hot or cold water, ethanol, and, to a lesser extent, acetone as a common extraction of antioxidant compounds from African medicinal plants. The selection of extraction method, ideal temperature, duration of extraction, solvent pH, and the extracted plant parts were highlighted to be as important as the choice of the extraction solvent. Studies also mentioned fermentation of aqueous extracts to enhance antioxidant activity in some plant species. This is particularly essential in continents such as Africa, where water is the second most used solvent for research. "Green" extraction technologies present a financial barrier that results in a mismatch between research innovations and societal transmission to new technologies because most communities are dominated by small-to-medium enterprises that cannot afford sophisticated technologies. The availability of medicinal plants is also reported to gradually decline in their native ecosystems, which highlights the need to improve the research that targets the sustainability of the endangered or critically endangered species. Further studies on the cultivation and extraction accuracy of phytochemicals from African medicinal plants are recommended to guide the research and link it to ordinary African societies while embedding policies that emphasize practices that result in a low ecological footprint.

P011

Phytochemical, Nutritional and Biological Evaluation of Alabastar Products Derived from Indigenous Knowledge

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Abstract

The Mogwase community in Bojanala district, North West Province, has developed a range of Alabastar-based products, including bath salts, porridge, body butter, and petroleum jelly, derived from a traditionally utilised medicinal plant known for its wound-healing, skin-repair, and nutritional properties. This study aimed to provide scientific validation of the traditional claims associated with these products while supporting community empowerment by developing value-added formulations with commercial potential. Plant material was collected and taxonomically verified, followed by processing, extraction, and chemical characterisation. Nutritional profiling and biological activity assessments were conducted, with a focus on anti-inflammatory and wound-healing properties. The bioactivity and nutritional attributes of the Alabastar product range were further evaluated. The porridge formulation demonstrated notable antioxidant capacity, with a mean radical-scavenging EC_{50} of 7.39 µg/mL and total antioxidant activity EC_{50} of 21.81 µg/mL. In comparison, the standard antioxidants butylated hydroxytoluene (BHT) and ascorbic acid exhibited stronger activity, with lower EC_{50} values (6.7 and 1.2 µg/mL, respectively). Vitamin C was not detected in the formulation, indicating that the observed antioxidant effects are likely attributable to other bioactive constituents present in the plant. These findings suggest that the Alabastar porridge formulation has potential as a functional food, supported by its nutritional composition and antioxidant properties, while the plant-derived ingredient demonstrates promising cosmeceutical and therapeutic applications for topical use.

P012

Assessment of Heavy Metal Accumulation in Opuntia ficus-indica (L.) Mill. Along the R63 Highway to Alice, Eastern Cape, South Africa: Implications for Environmental Sustainability

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Abstract

In rural South Africa, Opuntia ficus-indica (prickly pear) serves as a vital resource for nutrition, livestock fodder, and traditional medicine. However, its prevalence along the R63 highway in the Eastern Cape exposes the species to vehicle-induced heavy metal pollution. This study investigated metal accumulation in both the plant and its growing environment to assess risks to environmental sustainability and community health. Soil and plant samples were collected at 2m, 7m, 25m, and 50m intervals from the road shoulder near Alice. Following acid digestion, samples were analyzed for Fe, Cr, Cu, Mn, Ni, and Zn using Atomic Absorption Spectrophotometry. Findings revealed predominantly acidic soil (pH 4.09–6.16), which enhances metal solubility. While most soil concentrations remained within safe limits, Chromium (Cr) approached critical thresholds. Alarmingly, plant tissue levels of Mn, Zn, and Cr significantly exceeded FAO/WHO permissible limits, with Cr concentrations (58.82–73.66 mg/kg) drastically surpassing the 2.3 mg/kg safety standard. Attributed to traffic emissions and runoff, these results highlight the plant's role as a facultative metallophyte. Although this indicates phytoremediation potential, it creates a "toxic food chain" for local consumers. Consequently, roadside O. ficus-indica is deemed unsafe for consumption. Sustainable management must prioritize public health advisories and established safe harvesting zones to prevent chronic toxicity.

P013

Ethnomedicinal Plants Used for Childhood Diarrhoea Management in Sub-Saharan Africa: Diversity, Therapeutic Potential, and Sustainability

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Abstract

Childhood diarrhoea, ranked as the third leading cause of mortality among children under five, remains a significant public health challenge, particularly in Sub-Saharan Africa, where medicinal plants continue to play an important role in primary healthcare. In response, this study presents a systematic review of ethnomedicinal plants used to manage childhood diarrhoea. Relevant literature was retrieved from major scientific databases, including Google Scholar and Elsevier, to identify plant species traditionally used to treat childhood diarrhoea across the region. A total of 95 medicinal plant species belonging to 46 families were documented from six countries, demonstrating substantial diversity in indigenous therapeutic knowledge. Fabaceae was the most represented family (14 species), while trees constituted the dominant growth form (77%). Leaves (49%) and roots (40%) were the most frequently utilised plant parts, with decoction (41%) and maceration (40%) being the predominant preparation methods. Oral administration (60%) was identified as the principal route of remedy delivery. Pharmacological evidence revealed that antimicrobial activity is the most investigated bioactivity (76%), while 84% of the documented species have been reported to contain bioactive compounds supporting their therapeutic potential. These findings highlight the relevance of ethnomedicinal knowledge in supporting natural product research and evidence-based healthcare applications. In terms of sustainability, most species (69%) were classified as Least Concern, although several taxa remain threatened (5%) or data deficient (22%), underscoring the need for conservation interventions, cultivation strategies, and sustainable harvesting practices. The frequent use of roots further heightens sustainability concerns due to destructive harvesting practices. Overall, the findings demonstrate the importance of ethnomedicinal plants in the management of childhood diarrhoea and support integrating indigenous knowledge, scientific validation, and sustainable resource use to advance modern healthcare.

P014

In Vitro Anti-Inflammatory and Anticancer Evaluation of Moringa oleifera Lam. Flowers

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Abstract

In recent times, Moringa oleifera has earned great interest for its various physiological and therapeutic benefits. This study aimed to investigate the anti-inflammatory and anticancer properties of Moringa oleifera Lam. flowers. Acetone, ethanol, methanol, and aqueous extracts of Moringa oleifera flowers were investigated for anti-inflammatory and anti-cancer potential. Anti-inflammatory capacity was evaluated using the inhibition of nitric oxide production (LPS-induced) on RAW 264.7, and cell viability was appraised with the MTT assay. The anticancer potential of the acetone extract was evaluated on the C3A cell line, with Melphalan as a positive control, as well as apoptotic markers (phosphatidylserine translocation, cell cycle arrest). Significant reduction in NO levels ($P<0.05$) was observed on methanol and ethanol extracts at 200 µg/mL, with no cytotoxicity against macrophages, but gradual concentration-dependent inhibition of NO production by the methanol extract. Acetone extract induced phosphatidylserine translocation resulting in apoptosis, cell cycle analysis revealed no significant cell-cycle arrest, while caspase-3 activation (125 µg/mL) showed a five-fold increase in cleaved caspase-3 ($P<0.05$). These findings imply for the first time that the acetone extract of Moringa oleifera has anti-inflammatory capacity and impedes hepatic cancer progression in C3A cells.

P015

Exploring Finger Millet as an Underutilised Indigenous Grain Crop for Food and Nutrition Security Interventions

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Abstract

Sub-Saharan Africa is severely affected by food insecurity and malnutrition emanating from climate change, that continues to threaten agricultural stability. Main food systems are dependent on a very narrow range of staple crops such as maize, rice, and wheat; which were prioritised during the green revolution at the expense of indigenous and nutrient rich grains. Therefore, this review aims to explore the potential of finger millet, an underutilised indigenous African grain crop, as a sustainable intervention for improving food and nutrition security. To achieve this, a literature search was conducted between March 2025 and April 2026 using different search engines. Although PRISMA guidelines were adopted, the review was ultimately presented in a narrative format rather than as a fully structured systematic review. The search found that finger millet is rich in variety of minerals such as Ca, Fe, Mg, and Zn; and is high in dietary fibre and bioactive phytochemical compounds. Finger millet is promising as a climate resilient crop, with a strong potential to reduce micronutrient deficiencies. The crop also supports livelihoods through its multiple uses in traditional foods, weaning products, fermented beverages, livestock feed, and value-added products such as flour, noodles, and bakery products. Despite these advantages, finger millet remains underexploited due to socioeconomic constraints, low research investment, limited mechanisation, and poor market integration. A major production constraint is that this crop is highly labour-intensive, requiring multiple post-harvest operations such as threshing, winnowing, and cleaning, and typically produces lower yields compared to staple crops like maize and rice. Ameliorating production constraints and promoting finger millet could contribute significantly to climate resilience, dietary diversification, and sustainable food and nutrition security interventions across Africa and the world.

P016

Harnessing Indigenous Ethnoveterinary Practices for Sustainable Livestock Management in uThukela District, KwaZulu-Natal Province

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Abstract

Ethnoveterinary medicine comprises a wide range of systems and knowledge for sustaining livestock health that are based on beliefs, traditional knowledge, skills, methodologies, medicinal plants, metaphysics, surgical procedures, technology, and teachings. The current study explored the role of ethnoveterinary knowledge in the management of livestock in uThukela District, KwaZulu-Natal Province, South Africa. The ethnobotanical survey was conducted through interviews using a semi-structured questionnaire with 530 knowledge holders. The participants were selected via the snowball technique. Data was analyzed using thematic analysis and ethnobotanical indices. The study documented 65 plant species belonging to 22 families that were dominated by Fabaceae (3) and Asphodelaceae (3). Based on Relative Frequency of Citations (RFC), the three most popular plants used for ethnoveterinary purposes were Aloe arborescens (0.38), Gunnera perpensa (0.36), and Aloe ferox (0.31) The Use-value (UV) revealed that A. ferox (0.02) and A. arborescens (0.01) were the most culturally important plants, highlighting their broad medicinal applications. Additionally, leaves (58%) and roots (17%), which were prepared by infusion and decoction were the most used parts. The preparation and harvesting of medicinal plants are often governed by cultural principles for conservation purposes. The health conditions treated were Newcastle diseases (47%), retained placenta (27%), diarrhea (15%), and worms (11%). This research underscores the importance of preserving indigenous knowledge and medicinal plants for ethnoveterinary use and adds to the limited body of literature on African indigenous health practices for livestock disease management. However, there is need for further downstream scientific validation for safety and efficacy.

P017

Phytochemical and Nutritional Analysis of Selected Wild Edible Plants Documented in Dr Ruth Segomotsi Mompati and Dr Kenneth Kaunda Districts, North West Province, South Africa

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Abstract

Wild edible plants have been used by rural communities for many years as food and for treating common health problems. In many parts of South Africa, these plants contribute to household nutrition, food security and cultural heritage. Despite their traditional importance, there is limited documentation regarding their phytochemical and nutritional composition, which restricts their wider recognition and utilisation. This study aimed to examine the phytochemical profile and nutritional value of the most popular wild edible plants selected through ethnobotanical surveys. The selected plants were collected, identified and stored in an herbarium. Plant materials were shade-dried, ground into powder, and extracted using solvents of varying polarities. All analyses were conducted in triplicate, and data were statistically analysed using one-way ANOVA followed by Tukey's post hoc test. The selected plants contained considerable amounts of total phenolic and flavonoid contents that may contribute to their health benefits such as antioxidant and anti-inflammatory effects. The plants were rich in essential nutrients such as iron and zinc, contributing to meeting their recommended dietary allowance. These results highlight the potential of wild edible plants in affordably improving diets and nutrition. The findings are consistent with the traditional use of wild edible plants as healthy food sources. Incorporating wild edible plants into sustainable food and health systems will help in addressing micronutrient deficiencies and diet-related diseases.

P018

Wild Edible Plants in Southern Africa: A Systematic Review and Bibliometric Analysis of Ethnobotanical Knowledge, Utilisation Patterns, Nutritional Value, and Economic Potential

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Abstract

Globally, wild edible plants are highly recognised and have gained substantial attention for their significant contribution to nutrition, healthcare, and cultural identity as well as economic empowerment. However, documentation of their diversity, preparation methods, uses, and economic importance remains fragmented. This review was aimed to synthesise the available literature and summarise the utilisation patterns and economic potential of wild edible plants consumed by rural communities in Limpopo Province. The study used a PRISMA approach method, where scientific articles from Google Scholar, Scopus, ScienceDirect, and Web of Science databases related to plant uses, nutritional potential, and economic value published between 2000 and 2026 were evaluated. The search terms included combinations of wild edible plants, ethnobotany, indigenous fruits, traditional vegetables, nutrition, and economic potential. A total search of 154 articles were identified of which 60 met the inclusion criteria and were reviewed. Findings showed that 72 plants, belonging to 58 genera and 34 families were identified, dominated by Fabaceae, Amaranthaceae, Anacardiaceae, Cucurbitaceae, and Malvaceae families. Additionally, the dominantly reported wild edible plants commonly utilised in rural communities were Sclerocarya birrea, Vangueria infausta, Ximenia afra, Cleome gynandra, and Amaranthus sp. The most utilised plant parts were fruits (46%), leaves (38%), tubers (9%), and seeds (7%). Raw consumption, boiling, drying, roasting, and pounding were the identified commonly used preparation methods. Administration methods mainly involved direct consumption as snacks, cooked vegetables, and beverages. From an economic perspective, approximately 19 indigenous wild species were informally traded in markets where the products are sold on the streets and homestead within the communities. Taken together, wild edible plants play a vital role in supporting cultural practices, food and nutritional security, and economic empowerment among rural communities of Bapedi and Vatsonga people.

P019

Bioactivity of Artemisia afra and Aloe arborescens against Poultry-Associated Pathogens

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Abstract

The rise of antimicrobial resistance and oxidative stress in poultry underscores the need for safe and sustainable treatment alternatives to conventional medicine. Medicinal plants, which contain a variety of bioactive compounds, represent promising candidates for enhancing animal health. This study evaluated the antimicrobial and antioxidant properties of Artemisia afra and Aloe arborescens against common poultry pathogen problems. Crude extracts prepared with various solvents were screened against Escherichia coli, Salmonella spp., and Staphylococcus aureus using the serial microdilution assay. The extracts demonstrated inhibitory activity, particularly against Gram-positive bacteria, with minimum inhibitory concentrations ranging from 1.25 to 0.313 mg/mL. The antioxidant capacity of Artemisia afra ethanol extract, assessed using 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays, revealed strong radical-scavenging activity with LC_{50} values of 26.04 µg/mL and 22.03 µg/mL, respectively. Although the precise mechanisms remain under investigation, these findings indicate that the diverse phytochemicals present in these plants may contribute to combating both microbial infections and oxidative stress. The combined antimicrobial and antioxidant activities highlight the potential of these plants as natural agents to support poultry gut health. Research on phytochemical profiling, safety evaluation, and elucidation of possible synergistic interactions to support the development of effective plant-based therapeutics is ongoing

P020

Wild Edible Plants as Functional Foods: Their Traditional Uses, Phytochemical Composition, and Health-Promoting Properties

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Abstract

Wild edible plants are naturally growing plants found in both managed and unmanaged environments without deliberate domestication and contain at least one edible component. They play a significant role in food security and are valuable sources of both macro and micronutrients which are beneficial for human health. However, their health-promoting properties remain under-explored. This review aims to provide a critical appraisal on the traditional use, phytochemical composition, and related health benefits of wild edible plants. A systematic and bibliometric review was undertaken, with data retrieved and extracted from Lens, Scopus, and Web of Science databases using a range of relevant keywords such as medicinal plants, nutritional fruits, functional foods, edible plants, and ethnobotany. As part of the inclusion criteria, only articles on wild edible plants, their uses and overall health benefits which were published from 2015 to 2025 were considered. Findings revealed that the edible parts of these plants are consumed in various forms for different purposes, including as foods and beverages. Most fruits are primarily eaten for their pleasant taste, while the leaves and seeds are commonly used as vegetables and as condiments. Wild edible plants also demonstrate significant ethnomedicinal importance, highlighting the close relationship between food and medicine. Beyond basic nutrition they help manage various health conditions such as gastrointestinal problems and digestive disorders. Phytochemical analysis revealed the presence of flavonoids and triterpenes, which are compounds widely recognised for their anti-inflammatory and antioxidant properties. Overall, wild edible plants continue to play an important role in sustaining community livelihoods through their therapeutic properties and their ability to alleviate nutrient deficiencies, thereby highlighting their importance as valuable functional foods that contribute to not only nutrition but also overall human health.

P021

Impact of Drought Stress on Growth and Phytochemical Composition of Artemisia afra

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Abstract

The increasing reliance on, and growing demand for South Africa's medicinal plants including Artemisia afra, necessitate the development of climate-resilient production methods. This study assessed the effects of varying watering regimes (well-watered, moderately watered, moderately stressed, and severely stressed) on growth and yield responses of Artemisia afra under a rainout shelter. The trial was set up using a randomized complete block design with six replicates. The plants were exposed to drought stress for three months before harvesting. Furthermore, harvested aerial parts from the treatments were subjected to two drying methods, which are oven drying (45±0°C) and freeze drying. Phytochemical profiling of the dried samples was achieved using ultra-performance liquid chromatography coupled with quadrupole time-of-flight ion mobility spectrometry/mass spectrometry (UPLC-QTOF-IMS/MS). The results showed that drought stress negatively affected fresh and dried shoot weight, plant height and carotenoid content. Phytochemical profiling in both positive and negative ionization modes revealed the presence of alkaloids, phenolic compounds, flavonoids, terpenoids, diterpenoids, and lignans. In total, 111 and 264 metabolites were detected in oven and freeze-dried materials, respectively, including eleven metabolites with significant contribution to environmental stress protection, including drought tolerance. Notably, the synthesis of four compounds (Mearnsetin-glu, 1.3-O-dicaffeoylquinic acid, Fabiatrn and Chlorogenic) was specifically induced in the drought-treated plants, indicating their critical roles in drought resistance. Additionally, compounds known for antioxidant, anti-inflammatory, anticancer, hepatoprotective, antimicrobial, and antimalarial activities, such as 4-O-feruloylquinic acid, geraldone, jaceosidin, 3',4'-dihydroxywogonin and tectorigenin were also induced in the same treatment. Our results provide a foundation for further research on drought-resistance mechanisms of A. afra.

P022

Aligning Traditional Medicine with the Sustainable Development Goals

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Abstract

Traditional medicine is an important part of primary healthcare for many communities, especially in developing countries where access to conventional medicine is limited. Integrating traditional medicine with the Sustainable Development Goals (SDGs) provides a unique opportunity to improve global health outcomes, preserve cultural heritage, and promote sustainable practices. For centuries, traditional medicine has been a valuable resource, encompassing a wide range of health practices, knowledge, and beliefs rooted in indigenous cultures. This abstract investigates the relationship between traditional medicine and the SDGs, specifically goals related to health (SDG 3), sustainable consumption (SDG 12), biodiversity (SDG 15), and inclusive economic growth (SDG 8). Communities can help achieve universal health coverage by utilizing traditional medicine, reducing the burden on conventional healthcare systems, and providing accessible, culturally appropriate care. The conservation and sustainable use of medicinal plants and natural resources are critical for SDG 15's goal of protecting biodiversity and ecosystems. Furthermore, the commercialization of traditional medicine can boost economic growth, particularly in rural areas, while also encouraging sustainable production and consumption patterns. However, aligning traditional medicine with the SDGs necessitates addressing issues like standardization, intellectual property rights, and the need for scientific validation. Collaboration among governments, healthcare providers, researchers, and indigenous communities is required to ensure that traditional medicine contributes effectively to sustainable development. This alignment not only promotes the SDGs, but it also protects valuable cultural knowledge for future generations.

P023

Integrating Indigenous Ethnobotanical Knowledge into Sustainable Healthcare Systems: Medicinal Plant Use for Livestock Health and Pest Management in South Africa

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Abstract

The growing demand for sustainable, natural health care has led to renewed interest in ethnobotanical knowledge, which is a source of health and environmental innovation. The study explores the use of medicinal plants by smallholder farmers in the Amathole District of the Eastern Cape, South Africa, specifically their role in livestock health, crop protection, and human health. An ethnobotanical survey was conducted across eight rural communities using semi-structured questionnaires with over 300 respondents. A total of 44 plant species were reported in 187 use reports, demonstrating the rich knowledge of the people. Aloe ferox was the most frequently mentioned, indicating its use and popularity. 57.8 % of the respondents used medicinal plants, primarily to treat livestock diseases, with fewer treating crops. The preparation methods were simply accessible methods, such as soaking and boiling, while the methods of application were usually oral for livestock and spray for crops. Quantitative ethnobotanical indices revealed moderate consensus among participants but high agreement in ethnoveterinary use. Multivariate tests indicated the influence of gender, farming system, and years of farming experience in the use of medicinal plants, revealing the social-cultural aspects of knowledge transmission. The reliance on plant-based remedies reduces dependence on synthetic agrochemicals and hence promotes greater sustainability and human health. These findings show the need for integration of traditional knowledge into modern health and agricultural practices. Finally, the plant species identified are a starting point for future phytochemical, pharmacological, and product development studies to develop natural product-based medicines and biopesticides.

P024

From Preclinical Evidence to Clinical Trials: A Review of South African Aloes for Wound Healing

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Abstract

South Africa is home to approximately 125 of the over 500 recognized Aloe species, of which many are used for treating skin ailments and wounds. However, only about 20% of these indigenous aloes have documented medicinal uses and even fewer have been studied for their wound-healing properties. This systemic literature review aims to critically evaluate the existing in vitro, in vivo and clinical studies that support the ethnobotanical use of South African aloes as wound healing agents. Relevant published studies were identified using PubMed, Scopus and Web of Science databases. To maintain focus on indigenous species, Aloe vera was excluded in the systemic review. The study highlighted only six South African Aloe species, namely Aloe arborescens, Aloe maculata, Aloe ferox, Aloe brevifolia, Aloe grandidentata and Aloe perfoliate, which have in vivo studies supporting their use in topical applications for wounds. Despite their promising preclinical findings, there is a notable lack of published clinical trials evaluating their use in human wound care. This underscores the need for more in vivo research and clinical trials to assess the efficacy, safety, and therapeutic applications of South African aloes for wound treatment.

P025

Cytotoxicity of Pterocelastrus echinatus Extracts in Real Time, Their Antimicrobial and Antioxidant Properties

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Abstract

Pterocelastrus echinatus is traditionally used to treat microbial infections in the Eastern Province, South Africa. Previous studies on P. echinatus acetone bark showed that it was cytotoxic against normal cell lines. This study evaluated the antimicrobial, antioxidant, and cytotoxic potential of the leaf and stem extracts of P. echinatus using micro-broth dilution, DPPH, Ferric reducing power, cell viability assays and xCELLigence real-time cell analysis. The results demonstrated notable antimicrobial activity (MIC= 310 ± 0.001 to 2500 ± 0.001 µg/ml) and strong antioxidant activity, particularly in the methanolic leaf extract (IC50 = 14.97 ± 6.53 µg/ml). Additionally, the extracts exhibited low toxicity towards HEK 293 (LC50 = 429.29 ± 18.55 µg/ml) and Vero CCL-81 (LC50 = 527.85± 4.58 µg/ml) cell lines, as supported by high cell index values (1.0). Tentative identification of the P. echinatus secondary metabolites and mechanistic antimicrobial studies are currently in progress. Although further studies including isolation of bioactive compounds and in vivo studies are required, these findings highlight the potential of P. echinatus in ethnobotanic antimicrobial drug discovery.

Keywords: Antimicrobial resistance, Cytotoxicity, Therapeutic activity, Pterocelastrus echinatus

P026

Disrupting the Metastatic Cascade: The Role of Buddleja saligna Willd. and Two Isolated Phytochemicals in Metastatic Melanoma

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Abstract

Metastatic melanoma is a highly aggressive and treatment-resistant malignancy, necessitating the development of novel therapeutic strategies. The metastatic cascade is a complex, coordinated cascade of events that includes epithelial-to-mesenchymal transition (EMT), extracellular matrix remodelling, angiogenesis, intravasation, immune evasion and colonisation of secondary sites, each of which facilitates tumour dissemination and therapeutic resistance. This study aimed to evaluate the ethanolic leaf extract of Buddleja saligna Willd. (BS) and its isolated phytochemicals, namely oleanolic (OA) and ursolic acid (UA), for their anti-metastatic potential. Objectives include the investigation of antiproliferative potential, cell invasion, angiogenesis, transendothelial migration, glucose transporter (GLUT) inhibitory assays and graphene oxide nanoparticles as potential delivery systems to enhance solubility and stability, control release, and facilitate tissue-targeting. Selective cytotoxicity has been demonstrated across melanoma and metastatic melanoma cell lines (MeWo, SH-4, RPMI 7951 and SK-MEL-3) compared to the noncancerous HEK293 kidney cell line, with selectivity index values ranging from 1 to 4. Buddleja saligna displayed half-maximal inhibitory concentrations (IC_{50}) of 44.28, 40.13, 45.34, and 47.80 µg/mL against MeWo, SH-4, RPMI 7951, and SK-MEL-3, respectively. IC50 values of 96 µg/mL, 104.55, 90.87 and 110.98 µg/mL were obtained for OA, while values of 5.00, 8.22, 4.56 and 4.12 µg/mL were observed with the UA sample. A 1:1 OA:UA combination also demonstrated enhanced cytotoxicity across all melanoma cell lines. Additionally, graphene oxide nanoparticles functionalised with BS, OA and UA were successfully synthesised for comparative evaluation. Overall, these findings support medicinal plants and their bioactive compounds as promising candidates for future anti-metastatic melanoma therapy development.

P027

Comparing Metabolite Diversity and Antioxidant Activity of Wild Bush Tea (Athrixia phylicoides DC.) Leaves and Stems from KwaZulu-Natal and Eastern Cape Provinces, South Africa

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Abstract

Bush tea (Athrixia phylicoides) is a medicinal plant widely consumed in Southern Africa for its health-promoting properties. However, limited information is available on the influence of geographical origin on its metabolite composition and bioactivity. This study investigated the metabolite profiles and antioxidant activity of wild bush tea leaves and stems collected from KwaZulu-Natal (KZN) and Eastern Cape (EC) during the same season. The 1H NMR-based metabolomics, combined with principal component analysis (PCA) and orthogonal partial least squares discriminant analysis (OPLS-DA), was employed to evaluate regional variation in metabolite composition. Spectral data were pre-processed using MestReNova v17.0 and analysed in SIMCA v18. PCA revealed natural clustering with partial overlap among samples, while OPLS-DA provided clear discrimination between regions, confirming that geographical origin significantly influences bush tea metabolite profiles. Contribution and S-plots identified key chemical shifts responsible for regional differentiation, suggesting potential biomarkers associated with geographical variation. The antioxidant activity of leaf and stem extracts was evaluated using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay, where varying concentrations of the extracts were incubated with a DPPH solution and the absorbance measured spectrophotometrically at 517 nm, with results expressed as IC_{50} values. Leaf extracts exhibited stronger antioxidant activity than stem extracts, with IC_{50} values ranging from 2.51–3.41 mg/mL and 5.24–9.69 mg/mL, respectively. Among the samples, LUS demonstrated the highest antioxidant activity in both leaves (IC_{50} = 2.51 mg/mL) and stems (IC_{50} = 5.24 mg/mL), whereas KBC stems showed the lowest activity (IC_{50} = 9.69 mg/mL). In conclusion, geographical origin significantly influenced both the metabolite composition and antioxidant activity of wild bush tea, highlighting the importance of regional environmental factors in shaping its phytochemical characteristics and potential medicinal value.

P028

South African Medicinal Plants as Sustainable Sources of Natural Sunscreens: Opportunities and Challenges under Climate Change

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Abstract

South Africa is one of the world's megadiverse countries, harbouring an exceptional diversity of medicinal plants that have long been used in traditional healthcare. Increasing concerns regarding the adverse health and environmental effects of synthetic sunscreen ingredients have renewed interest in plant-derived photoprotective compounds as sustainable alternatives. Indigenous South African plants contain a wide range of bioactive phytochemicals, including flavonoids, phenolic acids, carotenoids, terpenoids and alkaloids, which exhibit antioxidant, anti-inflammatory and ultraviolet (UV)-absorbing properties that protect the skin against UV-induced damage. This review synthesises current knowledge on South African medicinal plants with potential sunscreen applications, highlighting their phytochemical composition, reported sun protection factor (SPF) values, mechanisms of photoprotection, and potential for cosmeceutical development.

Several indigenous species, including Cyclopia intermedia, Cassipourea flanaganii, Aspalathus linearis, Aloe ferox and Buddleja saligna, demonstrate promising photoprotective activity and may provide environmentally friendly alternatives to conventional UV filters. Beyond their role in skin protection, these botanical resources represent opportunities for value addition, biodiversity conservation, and sustainable livelihoods for local communities through the commercialisation of indigenous knowledge. However, challenges remain, including the need for standardised extraction protocols, rigorous efficacy and safety evaluations, compliance with regulatory requirements, and conservation of threatened medicinal plant species.

Climate change poses additional threat by altering species distributions, reducing phytochemical production and increasing the vulnerability of medicinal plant populations through habitat loss, prolonged droughts and rising temperatures. Addressing these challenges will require multidisciplinary research integrating phytochemistry, pharmacology, conservation biology and climate science. Strengthening scientific validation while promoting sustainable harvesting and cultivation practices will facilitate the development of safe, effective and environmentally sustainable botanical sunscreens. Such efforts will contribute to preserving Africa's rich medicinal plant heritage while supporting innovation in phytomedicine, public health and biodiversity conservation under changing environmental conditions.

Keywords: medicinal plants; phytomedicine; natural sunscreen; phytochemicals; climate change; biodiversity conservation; South Africa.

P029

α-Amylase and α-Glucosidase Inhibition of Leaf Extracts and Isolated Compounds of Eugenia uniflora L.

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Abstract

Eugenia uniflora leaf (EUL) is implicated in the African traditional medicine as a remedy for diabetes, obesity and other metabolic diseases without much scientific knowledge of it therapeutic action and active ingredients. Therefore, this study evaluated the antidiabetic potential of EUL by isolating its putative α-amylase and α-glucosidase inhibitors. The leaf ethanolic extract was solvent-partitioned into n-hexane, DCM, EtOAc, and n-BuOH fractions. Chromatographic separation of the most active EtOAc fraction led to isolation of two compounds, Myricetin-3-O-rhamnoside (1) and its isomer, Unifloratrin (2), elucidated by 1D- and 2D NMR spectroscopy, and high-resolution mass spectrometry. The extract, EtOAc fraction, 1 and 2 exhibited IC50 values of 67.1±2.5, 49.4±2.9, 25.6±1.8 and 33.0±2.2 µM against α-amylase, suggesting that fractionation of the plant enhanced its bioactivity. Furthermore, 1 demonstrated notable inhibition against α-glucosidase with an IC50 of 19.3±2.6 µM, which was comparable to Acarbose (17.1±1.3 µM) but less effective to Metformin (11.5±1.5 µM) standards. In conclusion, the study validates the ethnomedicinal usage of the plant for diabetes management by revealing that EUL contains α-amylase and α-glucosidase inhibitors that may help to modulate postprandial blood glucose elevations in diabetic conditions.

P030

Phytochemical Profiling and Antioxidant Evaluation of Salvia africana (Lamiaceae) Leaf and Stem Extracts

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Abstract

Salvia africana L. (Lamiaceae) is an indigenous medicinal plant with limited standardisation of bioactive compounds and remains underexplored in the integration of bioactivity and nanotechnology. This species is traditionally used to treat respiratory and gastrointestinal ailments. This study aims to characterise the phytochemical constituents, evaluate the antioxidant activity of plant extracts, and assess their potential in green nanoparticle synthesis. To investigate phytochemicals, leaf and stem materials were subjected to sequential solvent extraction using solvents of increasing polarity (hexane, chloroform, and methanol) via reflux at a 1:10 (w/v) solid-to-solvent ratio to maximise compound recovery across polarity gradients. Preliminary qualitative phytochemical screening indicated the presence of phenolics, flavonoids, terpenoids, and essential oils, with a higher abundance of polar compounds observed in methanolic extracts. Comparative analysis revealed differences in metabolite distribution between leaf and stem extracts, suggesting differential extraction efficiencies and compound-specific behavior across plant parts and solvents. These bioactive compounds are associated with antimicrobial, antioxidant, and anti-inflammatory activities, supporting the reported therapeutic applications of the species. Preliminary antioxidant screening using the DPPH assay indicates moderate to high radical scavenging activity, with quantitative analysis ongoing. GC–MS analysis is currently underway to identify volatile and semi-volatile constituents, supporting compound-level characterisation and phytochemical standardisation. Additionally, S. africana extracts are being explored for the green synthesis of nanoparticles, where phytochemicals may function as reducing and stabilising agents. This study establishes a novel link between phytochemical composition and functional application in sustainable nanotechnology. In conclusion, this integrated framework linking phytochemistry, bioactivity, and green nanotechnology positions S. africana as a promising candidate for sustainable pharmaceutical and nutraceutical applications.

P031

Morphological Evidence for the Taxonomic Revision of Series Roella and Prostratae

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Abstract

The genus Roella consists of 22 currently accepted species, the majority of which are restricted to the Greater Cape Floristic Region. Twelve of these species form a taxonomic complex comprising the series Roella and Prostratae. The current taxonomic classification rests solely on Adamson's (1952) revision, which, following the traditional taxonomic approach of its time, relied on a limited suite of morphological characteristics. Consequently, species limits within the complex remain poorly defined, leading to unreliable identifications and an unstable framework for classification. Additionally, Adamson's infrageneric classification, which divides the genus into five series, has never been formally evaluated using modern quantitative or phylogenetic methods, and its validity remains unverified. Morphology continues to serve as the foundation of both taxonomy and systematics, and any comprehensive taxonomic revision must include a rigorous morphological evaluation. This chapter therefore presents a morphological analysis of species belonging to series Roella and Prostratae in order to clarify species limits, identify diagnostic characters, and provide a first quantitative test of the infrageneric classification of the genus. A phenetic approach was adopted because it assesses overall morphological similarity without a priori assumptions regarding evolutionary relationships, making it particularly suited to reticulate complexes characterised by hybridisation and continuous variation conditions under which cladistic inference is compromised. A total of 60 herbarium specimens and four fresh collections were morphologically characterised using quantitative and qualitative vegetative and reproductive characters, supplemented by digital herbarium specimens from Kew and JSTOR. Data were analysed using phenetic methods, including Principal Component Analysis (PCA) as implemented in the NTSYSpc software package. Preliminary results cast doubt on the current infrageneric classification, with observed patterns of morphological variation suggesting that the existing series delimitations may not reflect natural groupings within the genus.

P032

Validation of AI-Generated Candidates from Traditional Medicinal Plants for Antimalarial Activity Followed by Chemometric Analysis of Solid-Phase Fractions of Dovyalis afra

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Abstract

AI technologies and machine learning are increasingly being employed to enhance various drug discovery stages. To support of these advancements, the successful application of AI in drug discovery relies on experimental validation to confirm the biological activity of AI-predicted hits. Word embedding-based virtual screening (WEBVS), a machine learning-driven approach that analyses a large corpus of scientific abstracts, was used to prioritise plant species with potential antimalarial activity from the Biodiscovery Centre's curated repository of 10,000 African plant species at the University of Pretoria for subsequent experimental validation.

The DCM-Methanol extracts of 3 plants predicted by the AI model were fractionated using solid-phase extraction and 7 solvent mixtures with differing polarity. Antiplasmodial screening of the extracts and fractions was done at the University of Pretoria's Malaria Parasite Molecular Laboratory (M2PL). The crude extract and fractions 5–7 of Delonix regia showed 71–82% inhibition, while fractions 5–6 of Sida rhombifolia exhibited 72–99% inhibition at 20 µg/mL. Interestingly, the crude extract and fractions 5–7 of Dovyalis afra, a plant not previously evaluated for antiplasmodial activity to the best of our knowledge, exhibited 98–100% inhibition at 20 µg/mL and 78–86% inhibition at 10 µg/mL. UPLC-HRMS data was collected from all 7 fractions of D. afra with the aim to identify molecular characteristics associated with the observed activity using MS-based chemometric analysis that compares the inactive and active fractions. Prioritisation of candidate features was achieved by integrating visual chromatographic comparison, principal component analysis, orthogonal partial least squares-discriminant analysis and S-plot interpretation. Lastly, candidate features were tentatively annotated using Waters UNIFI, Sirius, and further contextualised using LOTUS-informed chemotaxonomic assessment. These findings support the value of combining bioactivity profiling, chemometrics, and chemotaxonomic filtering to guide the prioritisation of novel antiplasmodial metabolites from underexplored plant species.

P033

Influence of Growth Stages on the Nutritional Value of Momordica balsamina Leaf Powder

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Abstract

The nutritive mineral element concentrations of most African leafy vegetables (ALVs) are influenced by the plant's growth stages. Momordica balsamina is an ALV in the Cucurbitaceae family, rich with nutraceutical and pharmaceutical properties, available in the plant at different growth stages. A greenhouse study was conducted to determine the responses of the nutritional value of M. balsamina leafy vegetable harvested at different growth stages. Six growth stages, namely, vegetative (reference), bud development, flower initiation, fruit set, fruit development and physiological maturity, served as treatments, with 10 replicates and arranged in RCBD. Treatments had highly significant ($P \leq 0.01$) effect on the tested nutritional quality, namely, potassium (K), calcium (Ca), magnesium (Mg), zinc (Zn), iron (Fe) and phosphorus (P). Relative to the reference, K was the highest (1206 mg/L) at flower initiation stage, whereas the highest Ca (127.70 mg/L) and Zn (2.21 mg/L) concentrations occurred at the fruit development stage. At the physiological maturity stage, the highest Mg (25.19 mg/L), P (16.54 mg/L) and Fe (5.49 mg/L) concentrations, were recorded. Noticeably, during early growth stages, P, Fe and Zn were negatively reduced, when compared to K, Ca and Mg, which were increasing at every growth stages. In conclusion, the greatest accumulation of the tested mineral elements was mainly observed as from when the leafy vegetable started setting fruit until physiological maturity stage.

P034

Microsporum gypseum and Trichophyton tonsurans: A Comprehensive Review of the Disease Spectrum

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Abstract

Microsporum gypseum and Trichophyton tonsurans are important dermatophytes causing a spectrum of superficial mycoses (tinea infections) in humans, including scalp, skin, and nail diseases. This comprehensive narrative review synthesizes current knowledge on species-specific diseases, pathogenesis, and management of infections via standard antifungal drugs and natural anti-dermatophytic products. Microsporum gypseum, a geophilic dermatophyte, thrives in soil, secretes keratinolytic enzymes, and adheres to host keratin. It invades superficial skin layers, and elicits aggressive host inflammatory responses yielding kerion-type lesions. It is associated with tinea capitis, corporis, faciei, rarely, tinea unguium, and atypical cutaneous infections. Risk factors include soil contact, outdoor occupation, and exposure to animals. Trichophyton tonsurans, an anthropophilic species, multiplies rapidly on human skin/scalp. It secretes proteinases and other hydrolytic enzymes, adheres to keratinized tissues, and persists through asymptomatic carriage, causing chronic, scaly dermatophytosis including tinea capitis (preeminently), corporis, faciei, and onychomycosis, spread by close contact and sharing in communal settings.

Current management includes systemic and topical drug therapies like terbinafine, griseofulvin, itraconazole, and fluconazole, which inhibit ergosterol biosynthesis or disrupt fungal cell membrane. However, efficacy is often hampered by treatment failures and limited resistance signals. Natural anti-dermatophytic products have gained attention. Certain plant extracts and essential oils contain antifungal metabolites that chelate essential metals like iron and inhibit spore germination and biomass production. Reports show that pulcherriminic acid analogues and curcuminoids suppress M. gypseum and T. tonsurans growth in vitro, while essential oils from oregano and tea tree demonstrate broad inhibition through membrane disruption.

This review addresses the fragmentation of existing literature in species-specific data and provides a consolidated, disease-inclusive overview. It underscores the need for species-specific clinical and in vitro studies, standardized susceptibility testing, and translational work on natural products, laying the foundation for refined diagnostic, therapeutic, and preventive strategies for dermatophytosis.

P035

Investigating the Therapeutic Potential of Spirostachys africana Stem-Bark Extracts for Determining Skin Irritation Strength

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Abstract

Traditional medicine derived from medicinal plants has proved extremely beneficial in dealing with health difficulties in many cultures, particularly in rural and underserved communities. Spirostachys africana Sond. is a versatile and widely used plant species with cultural and medical value throughout South Africa (Singh et al., 2020). The plant belongs to the Euphorbiaceae family and is commonly known as “tamboti”, “tambotie”, “umThombothi”, “Ndzopfori”, “Morukuru”, and “Muonze” in other languages (TreeSA, 2024). The study evaluated the cosmeceutical potential of S. africana, an indigenous medicinal plant found in South Africa that is commonly used to treat skin disorders, particularly in children. The study's goal was to conduct skin irritation tests using appropriate in vitro models to determine the safety and non-irritant nature of S. africana stem-bark extracts, ensuring their eligibility for application on the skin. Water and ethanol stem-bark extracts of S. africana were tested for skin irritation potential on rats using a single application method. The positive control (1% sodium lauryl sulfate) caused severe skin irritation, whereas the negative control (deionized water) caused less irritation. The ethanol extract had considerable skin irritation potential, with visual ratings reaching 1.5-1.6 after 72 hours. Finally, this investigation provides evidence supporting the medical use of S. africana stem-bark extracts, particularly the water extract, for the treatment of skin irritation. The findings are consistent with traditional knowledge and emphasize the necessity of looking into natural sources for safe and effective treatment options.

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P036

Host Immune Responses to Tuberculosis through the Gut–Lung Axis: Exploring the Therapeutic Potential of South African Medicinal Plants

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Abstract

Background: Tuberculosis (TB) remains a major public health challenge in South Africa, with high antibiotic use. The gut microbiome regulates immune responses to Mycobacterium tuberculosis, affecting disease outcomes and treatment efficacy. However, TB therapy can disrupt microbial balance and impair immunity. South African medicinal plants, rich in phytochemicals, may restore gut health, boost short-chain fatty acid production, and support immune function, making them promising adjuncts for improving TB outcomes.

Objective: This review synthesizes current knowledge on how the gut microbiome modulates host immune responses to TB and evaluates the potential of South African medicinal plants as microbiome-targeted adjunct therapies.

Method: A comprehensive review of peer-reviewed studies (1997–2026) from major databases yielded 247 relevant sources. Keywords included tuberculosis, gut microbiota, immune responses, SCFAs, anti-TB drugs, South African medicinal plants, phytochemicals, and the gut-lung axis.

Results: The gut–lung axis influences TB immunity through multiple mechanisms. Microbial metabolites such as SCFAs regulate systemic immune responses by promoting regulatory T cells, modulating macrophage activity, and enhancing epithelial barrier integrity. Dysbiosis, characterized by reduced microbial diversity and depletion of beneficial taxa, disrupts these processes, leading to impaired Th1 immune responses, increased inflammation, and reduced bacterial clearance. South African medicinal plants, such as Sutherlandia frutescens, and Aspalathus linearis are rich in bioactive compounds with immunomodulatory and prebiotic properties. These phytochemicals can modulate gut microbiota composition, enhance beneficial microbial metabolites, and restore immune balance. Emerging evidence suggests that such plants may improve host resilience to TB by indirectly enhancing macrophage activation, cytokine regulation, and mucosal immunity via microbiome-mediated pathways.

Conclusion: The gut microbiome regulates immune responses in TB via the gut–lung axis, influencing disease and treatment outcomes. South African medicinal plants offer accessible microbiome-modulating agents as potential adjunct TB therapies. Future research should prioritize mechanisms, clinical validation, and standardized formulations targeting microbiome–immune interactions.

P037

The Botanical Safety Consortium: A Collaborative Effort to Advance the Use of NAMs for Evaluating Natural Product Toxicity

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Abstract

The use of natural health products, including botanical dietary supplements, is increasing, making their safety a crucial issue for public health. The Botanical Safety Consortium (BSC) was formed through a Memorandum of Understanding as a collaborative effort between the US FDA, the National Institute of Environmental Health Sciences, and the Health and Environmental Sciences Institute. It aims to improve safety evaluation methods for botanicals, operating as an international platform where experts from various sectors, including government, academia, industry, and non-profits, collaborate to advance and apply new approach methodologies (NAMs) for the safety assessment of botanical products

Different toxicity working groups have selected assays and data-rich botanicals to evaluate the utility of the assays for complex mixtures. For example, for genotoxicity the Ames test and the in vitro micronucleus assay were tested with botanicals including aristolochia which is known to induce DNA-damage. For hepatotoxicity, botanicals like concentrated green tea extract which is known to induce animal and human liver toxicity, was tested in primary human hepatocytes, measuring endpoints like cytotoxicity and specific enzymes to understand the potential for botanical drug interactions.

Future work will focus on refining and enhancing the tool-kit through assay refinement, filling endpoint gaps with additional assays, and incorporating ADME data and in silico modeling approaches. By leveraging advances in NAMs, chemical analysis, and data interpretation, the consortium is building a foundation for tools that researchers will be able to use for botanical safety. These efforts aim to support regulatory frameworks, improve consumer safety, and enable innovation in the development of safe botanical products.

P038

CYP3A4 Mediated Herb–Drug Interactions between Wild Edible Plants and Chronic Antihypertensive Medication

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Abstract

Wild edible plants (WEPs), including herbs, leafy vegetables, and fruits, are widely used by Batswana communities in the Northwest Province as a source of nutrition, food security and health. The medicinal properties of these WEPs are attributed to bioactive constituents, including phenolics, alkaloids, and terpenoids, which confer antidiabetic, anti-inflammatory, antimicrobial, and antihypertensive effects. Concurrent consumption of WEP with antihypertensive drugs may lead to herb-drug interactions (HDIs). Cytochrome P450, particularly CPY3A4 accounts for more than 60 % of clinically used drugs, including amlodipine, felodipine and nifedipine, used for hypertension therapy. HDI is primarily mediated by CYP enzymes involved in Phase I metabolism, potentially altering drug pharmacokinetics and causing adverse reactions. Therefore, this study aims to evaluate the in vitro inhibitory effects of selected WEP against the CYP3A4 enzyme and assess their potential to interact with common antihypertensive medications using an in vitro fluorescence-based assay. Plant specimens will be authenticated, then processed using traditional preparation methods. Nutrients and trace elements will be detected using ICP-OES, while phytochemical characterisation will be performed using UPLC-MS/MS. CYP3A4 inhibition will be determined using computational predictive tools and in vitro fluorescence-based assays with a commercial kit and rat liver microsomes. Ketoconazole and midazolam will serve as the positive control and substrate, respectively. Time- and concentration-dependent inhibition kinetics will be assessed to calculate inhibition percentage, half-maximal concentration (IC50) and inhibition constants (Ki). The in vitro-in vivo extrapolation (IVIVE) will be performed to determine the risk of HDIs in accordance with regulatory guidance. The findings will provide preliminary evidence-based support for the safe use of WEP in combination with hypertensive therapy, with implications for advancing the sustainable use of WEPs in support of multiple Sustainable Development Goals (SDGs), including Zero Hunger (SDG 2) and Good Health and Well-Being (SDG 3).

P039

Phytochemical and Antioxidant Potential of Ethnoveterinary Botanicals Used in Livestock Health Management

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Abstract

The use of medicinal plants for livestock health management is a long-standing practice in rural South Africa, particularly where access to conventional veterinary services is limited. Ethnoveterinary plants are widely used to treat a range of livestock conditions; however, their bioactive composition and mechanisms of action remain insufficiently validated. This study aimed to evaluate the phytochemical composition and antioxidant potential of selected ethnoveterinary plants. Ten plant species were selected based on ethnoveterinary importance. Plant materials were extracted using 50% methanol. Quantitative phytochemical analyses were conducted to determine total phenolic content (TPC), total flavonoid content (TFC), and condensed tannins (CT). Furthermore, liquid chromatography-mass spectrometry (LC-MS) profiling was conducted on five plants which showed good biological activity. Antioxidant activity was assessed using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay and the β-carotene–linoleic acid assay. The plant extracts exhibited significant variation in phytochemical content, with TPC ranging from 11.29 to 38.09 mg GAE/g, TFC from 2.1 to 17.8 mg CE/g, and CT from 1.8 to 34.6 mg CCE/g. High phenolic and flavonoid contents were associated with strong antioxidant activity. In the DPPH assay, leaf extracts of Bulbine abyssinica and Drimia sanguinea demonstrated the strongest radical scavenging activity (lowest EC_{50} values). In the β-carotene–linoleic acid assay, leaf extracts of Drimia sanguinea, Ipomoea oblongata, and Securidaca longepedunculata showed the highest lipid peroxidation inhibition. The findings validate the traditional use of these ethnoveterinary plants and highlight their potential as natural antioxidant agents for livestock health management. These plants may contribute to mitigating oxidative stress-related conditions in animals. Further studies focusing on isolation of bioactive compounds and in vivo validation are recommended.

P040

Evidence of Nutraceutical Value of Batswana Wild Edible Plants: Phytochemicals, Nutritional and Antioxidant Potency

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Abstract

Wild edible plants (WEPs) are becoming more recognised for their nutritional value. They possess a variety of phytochemicals that contribute to their health benefits. Among the Batswana communities in North West Province, South Africa, WEPs contribute to food security, traditional health care, and cultural identity. However, there is a paucity of scientific data on their nutraceutical composition and antioxidant properties. We investigated the phytochemical composition, nutritional value, and antioxidant potential of eight WEPs traditionally consumed by the Batswana people. The WEPs were Amaranthus viridis (leaves), Dicoma anomala (tuber), Grewia flavescens (fruit), Helichrysum paronychioides (whole plant), Hypoxis obtusa (bulb), Ipomoea ommaneyi (tuber), Myrothamnus flabellifolia (shoot), and Senna italica (leaves). Standard protocols were used to quantify the phytochemical and micronutrient contents, while antioxidant activity was evaluated using 2, 2-diphenyl-1-picryhydrazyl (DPPH) radical scavenging activity and β-carotene-linoleic acid assays. Phytochemical contents varied significantly ($p < 0.05$), with total phenolics ranging from 12.64 to 38.58 mg GAE/g and flavonoids from 4.49 to 16.62 mg CE/g. Helichrysum paronychioides exhibited the highest iron content (170.47 mg/100 g DW), while A. viridis contained the most zinc (12.29 mg/100 g DW), β-carotene (21.79 mg/100 g DW), and vitamin C (55.43 mg/100 g DW) contents. In terms of the radical scavenging activity, the EC50 values ranged from 8.61 to 84.90 µg/mL, indicating strong antioxidant potential, particularly in I. ommaneyi (8.61 µg/mL). The findings underscore the nutritional and therapeutic potential of these WEPs in addressing micronutrient deficiencies and diet-related diseases, advocating for their incorporation into sustainable food and health systems.

P041

Phytochemical Diversity of Cannabis Landraces from South Africa and Eswatini

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Abstract

Cannabis has a longstanding history in Africa, where it has been utilised for medicinal and spiritual purposes within local communities. Long before its formal legalisation in South Africa for medicinal use in 2016 and for both medicinal and recreational use in 2018 rural communities in South Africa and Eswatini had already been cultivating the plant, primarily as a psychoactive substance. The diverse applications of Cannabis correspond to distinct types: industrial hemp, cultivated for fibre, and psychoactive Cannabis, grown for recreational or medicinal purposes. These types are differentiated by their cannabinoid profiles, particularly concerning Δ9-tetrahydrocannabinol (Δ9-THC) and cannabidiol (CBD) concentrations. Consequently, chemical analysis of local Cannabis landraces is essential for determining their unique biochemical profiles and assessing their potential applications in both medicinal and recreational contexts. This study, therefore, evaluates the cannabinoid diversity of South African and Eswatini Cannabis landraces using gas chromatography-mass spectrometry (GC-MS), with a focus on psychoactive cannabinoids (Total Δ^9-THC) and non-psychoactive cannabinoids (Total CBD). Two categories of compounds were identified: non-cannabinoids, such as fatty acids, and cannabinoids. For analytical purposes, psychoactive cannabinoids (Δ^9-THC, Δ^8-THC, and Dronabinol) were classified as Total THC, while non-psychoactive cannabinoids (CBDV, CBC, CBN, CBG, and CBD) were categorised as Total CBD. Among these, Δ^9-Tetrahydrocannabinol emerged as the predominant cannabinoid, with consistently elevated levels observed across landraces in both plant parts. Specifically, concentrations ranged from approximately 6.9–16.2 mg/ml in leaves and 4.6–21.8 mg/ml in flowers. These findings provide essential data for Cannabis breeding programs targeting medicinal and recreational applications and support traditional farmers in optimising Cannabis production.

P042

Synthesis and in Silico Evaluation of 5-(4-Chlorophenyl)-1,3,4-Oxadiazol-2-Amine Hybrid Compounds Incorporating Selected Essential Oil Components for the Potential Treatment of Bacterial Co-Infections

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Abstract

The increasing prevalence of bacterial co-infections associated with viral diseases, particularly COVID-19, necessitates the development of novel antibacterial agents to address antimicrobial resistance. In this study, hybrid compounds based on the 5-(4-chlorophenyl)-1,3,4-oxadiazol-2-amine scaffold and selected essential oil constituents were synthesized and evaluated for their antibacterial potential. Compounds 1–3 were successfully synthesized through a two-step reaction sequence involving chloroacetylation of 5-(4-chlorophenyl)-1,3,4-oxadiazol-2-amine followed by nucleophilic substitution with the bioactive natural products eugenol, thymol, and carvacrol. The synthesized hybrids were screened against five Gram-negative and seven Gram-positive bacterial strains, and their pharmacokinetic and drug-likeness properties were assessed using the SwissADME web tool. The compounds exhibited promising antibacterial activity, with minimum inhibitory concentration (MIC) values as low as 7.8125 µg/mL against selected bacterial strains. In silico evaluation revealed favorable physicochemical and pharmacokinetic characteristics, including acceptable lipophilicity, aqueous solubility, and drug-likeness profiles. These findings suggest that hybridization of the 1,3,4-oxadiazole scaffold with essential oil-derived pharmacophores is a promising strategy for developing new antibacterial agents and highlights the potential of these compounds as lead candidates for the treatment of bacterial co-infections associated with viral diseases.

P043

Ethnobotanical Uses and Phytochemical Profiles of South African Medicinal Plants in Wound Management: A Systematic Review (1990–2024)

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Abstract

Wounds are often colonized by more than one pathogenic microorganism, which prevents healing and causes significant damage to skin tissues. These wounds are often associated with multidrug-resistant pathogens. Indigenous knowledge holders in South Africa have successfully utilized various medicinal plants to treat wounds for many decades. This systematic review aims to collate medicinal plants used to treat various types of wounds from ethnobotanical surveys conducted throughout South Africa between 1990 and 2024. The data was retried from electronic databases including e-books, Google Scholar, MedlinePlus, ScienceDirect, ResearchGate, PubMed, Journals, Repository, published research articles, theses, dissertations, SpringerLin, SciELO and other sources using key words, ethnobotany, traditional medicine, medicinal plants, ethnomedicine, wounds, cosmeceuticals, South Africa, traditional healthcare, traditional health practitioners, alternative medicine, and complementary medicine. A total of 3,139 records were identified, and after screening for duplicates, 782 were retrieved, with an additional 33. The 788 did not contain sufficient information; 27 were used to complete the inventory. A total of 295 species, belonging to 86 families, were documented from 27 ethnobotanical surveys conducted throughout South Africa, representing eight provinces, with no records of studies having been done in the Gauteng province. The plant families with the highest number of species known to heal wounds were Asteraceae, with 36 species, Fabaceae, with 25 species, and Asphodelaceae, with 21 species. Two species are critically endangered (Brackenridgea zanguebarica and Siphonochilus aethiopicus), two are endangered (Alepidea amatymbica and Cassipourea flanaganii), four are vulnerable (Warburgia salutaris, Kniphofia drepanophylla, Haworthia limifolia, and Dioscorea sylvatica), and two are near threatened (Eucomis bicolor and Merwilla plumbea). There were no records for 97 species of the phytochemical screening to confirm the healing properties. The major phytochemical compounds found in the species mentioned are alkaloids, flavonoids, tannins, saponins, and terpenoids. The findings underscore the need for further validation of phytochemicals, pharmacology, and toxicology, alongside conservation and sustainable use strategies, to support the integration of traditional wound-healing remedies into primary healthcare systems.

P044

Protection of Medicinal Plants against UVA-Induced Oxidative Stress and Photoaging in Human Keratinocyte Cells

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Abstract

The Earth's surface is predominantly exposed to ultraviolet A (UVA) through sunlight. UVA is less energetic than other UV components, however, its ability to penetrate the dermis makes it the primary driver of the degradation and remodelling of the extracellular matrix (ECM), therefore, leading to photoaging and other skin conditions. These effects are due to the production of reactive oxygen species (ROS), which induce lipid peroxidation and trigger pro-inflammatory signalling cascade. Current treatments for UVA protection and photoaging include topic anti-oxidant creams and procedures like chemical peels, however, these often present challenges like high cost and adverse side effects, necessitating the need for safer plant-based alternatives. This study evaluated the protective effects of four medicinal plants against UVA-induced damage in human keratinocyte cells (HaCaT) by assessing oxidative stress and inflammatory markers, including malondialdehyde (MDA), glutathione peroxidase (GPx), Interleukins 6 and 8 (IL-6 and IL-8) as well as nitric oxide (NO). The selected plants belong to the Nelumbonaceae (NEL), Poaceae (POA), Rutaceae (RUT) and Punicaceae (PUN) families. A cytotoxic assay was conducted on HaCat cells that were treated with ethanolic plant extracts at four different concentrations (10, 50, 100 and 200µM). All plant extracts consistently showed survival rates (%) above 90% across all four concentrations, thus showing minimal to no toxicity. A dose-dependent decrease in NO, MDA, IL-6 and IL-8 following treatment with plant extracts was observed, while GPx secretion increased with concentration. Among the plant extracts tested, PUN (at 200µM) showed the best reduction in IL-6 (76.33 pg/mL), IL-8 (250.67 pg/mL), MDA (0.97 nmol/mg) and GPx (49.75) levels, however, POA (at 200µM) demonstrated the best result for the NO assay (9.5µM) as compared to other extracts. Ongoing studies are investigating the direct protection of the dermis using additional assays to validate these results and provide plant-based photoprotective therapies.

P045

The Current Standing of Bryophytes in Phytomedicine

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Abstract

The term "bryophyte" refers to a group of approximately 24,000 species of plants further broken down into three clades – mosses (bryophyta), liverworts (marchantiophyta), and hornworts (antherocerophyta). These minute plants are drastically under researched relative to their diversity in terms of their potential to contribute to plant based pharmacopeiae, and have long been utilized as traditional medicines in certain cultures. This review compiles present day knowledge regarding the diversity, ethnomedicinal uses, phytochemical properties, pharmacological potential and conservation considerations of bryophytes.

Current literature suggests that the wide array of secondary metabolites presented by bryophytes may be useful for future drug development programs. Many of the isolated phytochemicals possess structural features unique to bryophytes, and include terpenoids, flavonoids, phenylpropanoids and bibenzyls. Certain classes of compounds, including marchantins, riccardins, and plagiochilins, have been isolated from bryophytes, and demonstrate considerable therapeutic potential via in vivo and in vitro analyses. The model moss Physcomitrella patens has shown great promise in pharmaceutical production due to its biotechnological potential and ease of genetic editing for the production of recombinant therapeutics that cannot be produced through the traditional synthetic drug pipelines.

However, despite these advances, taxonomic ambiguity, endophyte contamination, and unavailability of plant material have remained obstacles in the face of further investigation. Furthermore, bryophytes are known to occupy specific ecological niches that are highly susceptible to disruption. Nevertheless, with the development of modern techniques, researchers have access to numerous tools that alleviate much of the challenges anticipated in exploring the medicinal potential of bryophytes. With careful and deliberate research strategies bryophytes may help to satisfy the pressing need for novel therapeutic agents as an under-explored tool for natural product research.

P046

The Effects of Selected Cassipourea Species on Melasma in Darker Skin Types

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Abstract

Background: Melasma is a chronic pigmentary disorder that primarily affects the face and can significantly impair quality of life. Although it occurs across all populations, it is more prevalent among women and individuals with darker skin tones. Current treatment options often have limited effectiveness and may cause adverse effects in darker skin types. Medicinal plants, widely used across cultures for their therapeutic properties, offer a promising and sustainable alternative for developing inclusive and accessible melasma treatments.

Methods: A multimethod approach was used. A cross-sectional analytical study was conducted with 150 patients with melasma, using the Melasma Area and Severity Index (MASI) and the Melasma Quality of Life Scale (MELASQoL). A phytochemical comparison of three Cassipourea species was performed using Liquid Chromatography–Mass Spectrometry (LC-MS/MS) analysis in negative mode. To assess its safety for potential therapeutic use, acute and subacute oral toxicity studies of C. flanaganii bark methanol extract were carried out in Wistar rats. In vitro assays were employed to determine the antioxidant and antityrosinase effects of the selected Cassipourea species.

Results: Predictors of quality of life (QoL) were identified through multivariable analysis and stepwise regression, revealing that MASI score, cheek involvement, education level, and menopausal status were significant factors ($p < 0.05$). The results obtained from the LC-MS/MS yielded a total of twenty-four compounds of different chemical classes. The presence of these compounds, either in synergy or individually, can be attributed to the anti-tyrosinase effect. No clinical, haematological, biochemical, or histopathological signs of toxicity were observed, and statistical analyses revealed no significant differences between treated and control groups.

Conclusion: These findings suggest that C. flanaganii is non-toxic, and support further investigation into its development as a safe, plant-based therapeutic agent for melasma in individuals with skin of colour.

Keywords: Melasma, Treatment, Plants, Darker skin types, Cassipourea species

P047

Sustainable Harvesting and Traditional Use of Helichrysum odoratissimum Sweet. (Hilliard & b.l.burtt); a Case of Thaba Chweu

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Abstract

The conservation of medicinal plants is an increasing concern due to overharvesting and exploitation, as these species are vital sources of medicines in both traditional and modern healthcare. Helichrysum odoratissimum sweet. (Hilliard & B.L.Burtt) holds significant cultural and medicinal value across South Africa, however its population is increasingly threatened by unsustainable harvesting practices. This study investigated the harvesting practices used by local communities and the conservation strategies employed to ensure the sustainable management of the species. An ethnobotanical survey was conducted with 31 participants using semi-structured interviews. Ethnobotanical indices, such as Relative Frequency of Citation (RFC), Use Value (UV) and one-way ANOVA were used for data analysis. The ethnobotanical survey indicated that H. odoratissimum was predominantly used to treat respiratory infections (RFC = 0.29; UV = 0.44) and menstrual pain (RFC = 0.16; UV = 0.31). The spiritual and ancestral applications exhibited the highest RFC (0.58) and UV (0.80). The leaves (35%) and the entire plant were the most frequently utilized plant parts, with infusion (44%) and decoction (33%) being the primary methods of preparation. Most treatments were administered orally (68%), with topical and inhalation methods also used. The quadrat survey revealed that Matibidi had the highest average number of H. odoratissimum plants (12.8 per quadrat), while both Leroro and Hlabekisa had averages of 11.2 plants per quadrat. Hlabekisa exhibited the greatest variation in plant numbers (standard deviation = 4.66), with some quadrats containing as few as five plants, likely due to excessive harvesting and fire. These findings underscore that unsustainable harvesting practices, particularly the uprooting of entire plants, jeopardize the long-term viability of H. odoratissimum. The study emphasizes the importance of implementing community-led conservation interventions, strengthening public awareness, and promoting sustainable harvesting practices to enhance the long-term conservation of the species and safeguard the associated indigenous knowledge systems for future generations.

P048

Post-Harvest Bio-Preservation and Metabolite Bioaccessibility of Strychnos spinosa (Monkey Orange): Fermentation as a Strategy to Mitigate Anti-Nutritional Plant Defenses and Enhance Phytochemical Stability

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Abstract

Strychnos spinosa (monkey orange) represents an underutilized African crop whose commercial potential is constrained by high post-harvest perishability and the presence of inherent plant defense metabolites that limit nutrient bioavailability. This study evaluated the dual role of controlled Saccharomyces cerevisiae fermentation (Wine A and Wine B) as a biological post-harvest preservation strategy, coupled with subsequent INFOGEST 2.0 simulated gastrointestinal digestion, to modulate the untargeted metabolome, carotenoid stability, and anti-nutritional sequestration capacity of S. spinosa juice. Comprehensive UHPLC-QTOF-MS and HPLC-DAD analyses revealed that fermentation fundamentally restructured the phytochemical defense landscape. Principal Component Analysis (PCA) demonstrated stark metabolic segregation between raw juice and fermented wines, with fermentation driving the de novo biosynthesis of stress-responsive bioactive metabolites including delphinidin glycosides, pseudoalkaloids, macrolides, toxol, deoxypodophyllotoxin, and (+)-sesamin compounds implicated in microbial antagonism and oxidative stress mitigation during extended storage. Critically, fermentation mitigated the intrinsic sequestration of bile acids (3α',12α'-Dihydroxy-7-Ketocholanic Acid) observed in raw juice, effectively neutralizing a key anti-nutritional plant defense mechanism. Following simulated digestion, the release of bound phenolics resulted in total phenolic bioaccessibility exceeding 100% (110.8–118.8%), while total carotenoid bioaccessibility ranged from 33.2% to 51.3%. Notably, digestion liberated theophylline derivatives and monoterpenoids (up to 9.85 mg/L) absent in undigested samples, indicating that gastrointestinal stress further unlocks sequestered phytochemicals. Although fermentation reduced crude protein and amino acids by 67–70% due to yeast nitrogen assimilation, it concurrently enhanced the bioaccessibility of calcium and phosphorus (up to 40.0% and 35.7%, respectively). We conclude that controlled fermentation serves a dual protective function: (i) acting as a biological post-harvest tool that reduces reliance on synthetic preservatives by stabilizing stress-induced antimicrobial metabolites, and (ii) dismantling endogenous anti-nutritional complexes to improve mineral release. This synergistic bio-preservation-digestion cascade positions S. spinosa wine not merely as a functional beverage, but as a resilient, value-added product that enhances food safety, reduces post-harvest losses, and promotes the sustainable domestication of an indigenous African plant resource.

P049

The Anti-Turbecular and Immunomodulatory Effects of Compounds Isolated from the (Dichloromethane) DCM Fraction of Sanicula elata

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Abstract

Pulmonary tuberculosis is an infectious disease and one of the leading causes of death. The treatment outcome is affected by drug administration of longer period that perpetuate drug resistance. The macrophages are the primary cells infected during TB infections and are easily manipulated by the bacteria. In view of these challenges, the medicinal plants remain the untapped source for new interventions. These plants are taken as natural remedies for quite many diseases, including tuberculosis. Our study aimed to isolate compounds from dichloromethane fraction of Sanicula elata to test immunomodulatory properties in vitro. The objectives were to isolate the compounds from the dichloromethane fraction of the crude extract of Sanicula, and to screen them for immunomodulatory properties on macrophages invitro. Column chromatography was employed for the isolation of compounds and further by thin layer chromatography. Tetrazolium salt assay (MTT) was employed to test for cytotoxicity of the compounds, and Griess method was employed for testing the immunomodulatory effects. Concentrations tested were: 1, 10, 50,100, 200 ug/ml respectively. Three compounds were isolated and tested. MTT showed cell viability above 80% margin as compared to the control, with high viability observed at 1ug/ml, 10µg/ml and 50ug/ml. In the lipopolysaccharide (LPS) stimulated RAW 264,7 an increase of nitrite production was observed, with the concentration of 6,8uM observed at 50ug/ml when compared to the LPS treated cells. The combined compounds showed synergism in driving the nitric oxide production in treated macrophages. This observation indicates that these compounds supported the macrophages to attain the required phenotype that can destroy the Mycobacterium tuberculosis (Mtb). In conclusion we confirm that the isolated compounds displayed bioactivity and could boost macrophages during Mtb infection indicating their eligibility as compounds for consideration. We, therefore, recommend characterization of the three compounds which would lead to their synthesis as new drugs for host-directed-therapies.

P050

Bioactive Compounds and Molecular Interactions of Selected Medicinal Plants

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Abstract

Oral infections are associated with oxidative stress and inflammation, highlighting the necessity for plant-derived alternatives to conventional oral healthcare products. This study evaluated the phytochemical composition, antioxidant activity, cytotoxicity, and inflammatory responses of medicinal plants traditionally utilised for oral health. Plant extracts were prepared using dichloromethane, methanol, water, and petroleum ether. Phytochemical analysis was conducted both qualitatively and quantitatively, while antioxidant activity was assessed through DPPH, FRAP, and β-carotene–linoleic acid assays. Cytotoxicity was determined via the MTT assay, and intracellular production of reactive oxygen species (ROS) and nitric oxide (NO) was measured in lipopolysaccharide-stimulated RAW 264.7 macrophages. Selected methanolic extracts were further characterised using Ultra-High-Performance Liquid Chromatography–Quadrupole Time-of-Flight Mass Spectrometry (UHPLC-QTOF-MS) to identify potential bioactive compounds, and molecular docking was employed to explore their interactions with relevant molecular targets. The extracts displayed varying levels of phenolics, flavonoids, and tannins, with several showing considerable antioxidant activity. Additionally, selected extracts significantly reduced ROS and NO production while preserving cellular viability at biologically active concentrations. UHPLC-QTOF-MS profiling revealed a diverse array of bioactive metabolites, including phenolic and flavonoid compounds. Docking analysis suggested favourable interactions between specific metabolites and molecular targets, indicating their contribution to the observed biological activities. Overall, the findings emphasise the potential of certain indigenous medicinal plants as sources of bioactive compounds with antioxidant and protective properties, relevant for the development of natural or complementary oral healthcare products.

P051

Spectroscopic Characterisation of Five Cold-Pressed Moringa oleifera L. Seed Oils Cultivated in the Limpopo Region

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Abstract

Moringa oleifera Lam. has expanded diversely, recognised as a valuable phytomedicinal species due to its diverse bioactive constituents and wide range of nutritional, pharmaceutical and industrial applications. Although the seed oil is rich in monounsaturated fatty acids and natural antioxidants, limited information is available on the structural characteristics of oils derived from cultivars, cultivated under South African conditions. This study investigated the chemical functional groups and comparative molecular fingerprints of cold-pressed seed oils obtained from five M. oleifera cultivars using attenuated total reflectance Fourier-transform infrared (ATR-FTIR) spectroscopy.

Cold-pressed oils extracted from five cultivars were analysed directly using ATR-FTIR over the mid-infrared spectral region. Each spectrum was evaluated to identify characteristic functional groups associated with triglyceride, to assess the structural integrity of the oils and compare their cultivar-specific chemical makeup. All cultivars exhibited the characteristic absorption bonds of vegetable oils, including strong aliphatic C–H stretching bonds, a pronounced ester carbonyl (C=O) bond and prominent C–O stretching vibrations, confirming the predominance of intact triacylglycerols. Weak absorptions associated with cis-unsaturated fatty acids were also observed, which is consistent with the known oleic acid-rich composition of M. oleifera seed oil. Comparative evaluation of the spectra indicated a high degree of structural similarity among cultivars, although differences within the carbonyl and fingerprint regions suggested cultivar-dependent variation in chemical composition.

One cultivar displayed a distinct spectral profile, indicating the need for further investigation using complementary physicochemical and chromatographic analyses. The observed structural characteristics provide a scientific basis for further evaluation of South African M. oleifera cultivars as potential sources of phytomedicinal products, nutraceutical ingredients and sustainable bio-based materials.

Keywords: Applications, fatty acids, cold-press extraction, cultivar-specific, Moringa oleifera

P052

A Combination of Psidium guajava and Seriphium plumosum Modulates Glucose Metabolism and Reduces Hepatic GLUT2 Expression through Additive-to-Synergistic Interactions

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Abstract

Type 2 diabetes mellitus (T2DM) remains a major global health challenge, prompting interest in plant-derived interventions with multi-target metabolic effects. This study evaluated the individual and combined effects of aqueous extracts of Psidium guajava (PG) and Seriphium plumosum (SP) on glucose metabolism using HepG2 hepatocytes and differentiated C2C12 myotubes. Cell viability, glucose uptake, GLUT2 protein expression, glycogen content, and AMP levels were assessed following treatment with PG, SP, and a 1:1 PG+SP combination. Interactions were evaluated using Bliss Independence, Combination Index (CI), Loewe Additivity, and Zero Interaction Potency (ZIP) models. SP exhibited minimal cytotoxicity, whereas PG induced concentration-dependent reductions in HepG2 viability. The PG+SP combination maintained higher viability than PG alone and demonstrated additive-to-synergistic interactions (CI = 0.51-0.89). In HepG2 cells, all treatments significantly increased glucose uptake relative to untreated controls ($p < 0.05$), with the combination achieving approximately 94% of the metformin response. The combination also significantly reduced GLUT2 protein expression, with the greatest effect observed at 125 + 125 µg/mL (0.77 ± 0.14-fold, $p < 0.0001$). In differentiated C2C12 myotubes, PG, SP, and the combination significantly enhanced glucose uptake and glycogen accumulation ($p < 0.05$). While SP increased AMP levels at lower concentrations, the PG+SP combination reduced AMP levels below control values. Overall, the PG+SP combination exhibited concentration- and endpoint-dependent interactions ranging from additivity to synergy, supporting further investigation of this botanical combination as a potential multi-target strategy for T2DM and metabolic dysfunction.

Keywords: Psidium guajava; Seriphium plumosum; type 2 diabetes mellitus; metabolic syndrome; glucose uptake; GLUT2; bioactive compounds; functional foods; glycaemic control; synergistic interactions66

P053

Anti-Bacterial and Anti-Tubercular Activity of Sanicula elata n-Hexane and Acetyl Acetate Fractions on Drug Resistant Clinical Isolates

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Abstract

The global rise of antimicrobial resistance (AMR) to drugs has emerged as one of the greatest public health threats of the 21st century, with tuberculosis being the world's leading infectious killer disease. Increasing drug resistance among bacterial, fungal, and mycobacterial pathogens has rendered many conventional antibiotics and antifungal agents ineffective, resulting in higher morbidity, mortality, and treatment costs. Traditional medicinal plants have been used for centuries to treat various diseases and are gaining popularity in the scientific community, among other reasons that have prompted the search for safer natural alternatives from medicinal plants like Sanicula elata. It has been proven scientifically to exhibit both antimicrobial and immunomodulatory activity, but not anti-tubercular activity. The aim of this study was to evaluate the antibacterial and anti-tubercular efficacy of the crude extract, n-Hexane, and ethyl acetate fractions of Sanicula elata against drug-resistant clinical isolates. The plant was collected, dried and extracted with 70% ethanol to obtain the crude extract that was further fractionated according to the solvent partitioning protocol. Drug-resistant clinical isolates of Mycobacterium tuberculosis, Klebsiella pneumoniae, Candida albicans, Escherichia coli, and Staphylococcus aureus were tested using a resazurin microtiter assay in concentration ranges of 1000 µg/mL to 15.625 µg/mL. The microbial activity of the tested plant samples was determined based on colorimetric changes of resazurin dye after incubation. The crude extract exhibited complete inhibition across all tested organisms at all tested concentrations, while n-Hexane and ethyl acetate fractions exhibited dose-dependent inhibition across all tested organisms. The observed activity highlights synergistic interactions among phytochemicals (polyphenols, flavonoids, and terpenoids) present in the plant. Sanicula elata demonstrated potent antibacterial and anti-tubercular activity against drug-resistant clinical isolates, validating its traditional use and therapeutic potential. Further in vivo studies are recommended to identify and develop effective bioactive molecules from this plant.

P054

Antiproliferative Effects of Annona muricata Leaf Extract in MCF-7 Breast Cancer Cells

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Abstract

Annona muricata L. is a medicinal plant traditionally used to manage several diseases, including cancer. Its leaves contain diverse bioactive phytochemicals with potential antioxidant and anticancer properties. This study investigated the phytochemical composition, antioxidant activity and antiproliferative effects of a hydroethanolic extract of A. muricata leaves. A 70% ethanolic leaf extract was prepared, and total phenolic and flavonoid contents were determined using the Folin–Ciocalteu and Aluminium Chloride colorimetric assays, respectively. Free radical scavenging activity was evaluated using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. Cytotoxicity was assessed in Vero cells following 48-hour exposure to 16.625–250 µg/mL extract, while effects on cell-cycle progression were investigated in MCF-7 breast cancer cells using DNA cell-cycle analysis. The extract contained 144 µg gallic acid equivalents/mg dry extract of total phenolics and 30 µg quercetin equivalents/mg of total flavonoids. DPPH radical scavenging activity yielded an IC_{50} of 1015.98 µg/mL, indicating moderate antioxidant activity. Exposure to A. muricata reduced Vero cell viability across the tested concentrations, demonstrating cytotoxic activity. In MCF-7 cells, the extract markedly altered cell-cycle distribution, with accumulation of cells in the G2 and early M phases at lower concentrations. At higher concentrations, the apoptotic cell population increased, particularly at 125 and 250 µg/mL. These findings demonstrate that A. muricata leaf extract modulates breast cancer cell-cycle progression and suggest that inhibition of the G2/M transition may contribute to its antiproliferative activity. Further studies characterising the active constituents, molecular targets and selectivity towards cancer cells are warranted to establish its potential as a source of anticancer lead compounds.

Keywords: Annona muricata; breast cancer; cell-cycle arrest; antiproliferative activity

P055

Documenting Indigenous Knowledge and Traditional Uses of Hemp (Cannabis sativa L.) in Local Communities of Limpopo Province, South Africa

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Abstract

Cannabis sativa L. has a long history of utilisation by communities worldwide for medicinal, nutritional, cultural, and household purposes. Despite increasing scientific interest in cannabis, Indigenous Knowledge Systems (IKS) concerning its traditional uses remain insufficiently documented in many rural communities of South Africa, particularly in Limpopo Province. This study aimed to document Indigenous knowledge and traditional uses of Cannabis sativa L. among local communities in Limpopo Province, South Africa. An ethnobotanical cross-sectional survey was conducted in Leolo Village, Blouberg Local Municipality. A total of 17 participants, including cannabis/hemp farmers, traditional healers, and community leaders, were selected using purposive and snowball sampling. Data was collected through semi-structured questionnaires, face-to-face interviews, and focus group discussions conducted in the local language. Information regarding vernacular plant names, plant parts used, traditional applications, preparation methods, and dosages was collected. In addition, the use value (UV) and relative importance (RI) were determined. A total of 30 cannabis/hemp strains were identified in the study. Five utilisation categories were documented: medicinal, nutraceutical, recreational, cosmeceutical, and fibre/industrial. Medicinal use was most frequently reported, followed by recreational and nutraceutical uses. Leaves and buds/inflorescences were the most used plant parts, while decoction and direct consumption were the predominant preparation methods. The most important strains according to their use value were NL, MG, SJ, SS, SF, MM, MA, CJ, and SA. The findings demonstrate substantial Indigenous knowledge and diverse traditional applications of Cannabis sativa in Limpopo Province. Documenting this knowledge contributes to its preservation and provides a basis for further research into the potential medicinal, nutritional, cosmetic, and industrial value of locally recognised cannabis/hemp strains.

P056

Phytochemical Characterisation and Anti-Inflammatory Potential of Selected Medicinal Plants for the Management of Fibroid-Associated Menorrhagia

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Abstract

Menorrhagia, a major sub-type of abnormal uterine bleeding (AUB), is defined as excessive menstrual blood loss of 80 mL or more per menstrual cycle or prolonged bleeding that continues for more than 7 days (Begum et al., 2016; Igbokwe and John-Akinola, 2021). The International Federation of Gynaecology and Obstetrics (FIGO) classifies the causes of menorrhagia using the PALM-COEIN system. Additional contributing factors include uterine structural abnormalities, hemodynamic alterations, and severe uterine contractility (Ting and Burke, 2020). This study evaluated the therapeutic potential of selected medicinal plants traditionally used in the management of menorrhagia and related gynaecological disorders and investigated their mechanistic roles in fibroid-induced menorrhagia. Five plants, Achillea millefolium, Cinnamomum verum, Taraxacum officinale, Viburnum opulus, and Zingiber officinale plant species were selected and subjected to phytochemical profiling to identify bioactive compounds. In vitro biochemical anti-inflammatory activity screening assays were performed to assess their pharmacological potential. The GC-MS analysis revealed several constituents previously associated with anti-inflammatory activity, including gingerol, cinnamaldehyde, coumarin, phytol and urs-12-en-3-ol. These compounds may contribute to the observed anti-inflammatory effects of the respective plant extracts. The results demonstrate that C. verum and Z. officinale exhibited the strongest concentration-dependent inhibition of COX-2 activity, achieving 89.18% and 83.98% inhibition, respectively, at 500 µg/mL. The potent activity of these extracts may be attributed to the presence of cinnamaldehyde, trans-4-methoxycinnamaldehyde, coumarin and gingerol, compounds previously reported to suppress COX-2 expression through modulation of NF-κB and MAPK signalling pathways. Collectively, these findings support the potential application of C. verum and Z. officinale as promising sources of anti-inflammatory phytochemicals for the management of fibroid-induced menorrhagia.

P057

Metabolomic Profiling and Bioactivity of Indigenous Leafy Vegetables in Limpopo: An Ethnobotanical Approach

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Abstract

Indigenous leafy vegetables (ILVs) are the cheapest and easily accessible sources of important nutrients such as proteins, vitamins and dietary fibre. ILVs are also significant sources of phytochemicals, which are natural plant compounds that offer various health benefits, including antioxidant and anti-inflammatory properties.

This study aimed to document ILVs used as food as medicine in ga Molepo area of the Limpopo province and evaluate their antioxidant activities, total phenolic content, total carotenoids content as well as profiling their untargeted metabolites. Ethnobotanical surveys were conducted through questionnaires to select the ILVs consumed as food as medicine. Top five

ILVs commonly consumed were selected, and their extracts were evaluated for antioxidant activities using DPPH, FRAP and ABTS assays. TCC and TPC were also determined. Methanol extracts of the dried ILVs were utilized for liquid chromatography using UHPLC-QTOF for metabolites profiling. Bidens pilosa, Cleome gynandra, Crotalaria juncea, Tribulus terrestris and Amaranthus cruentus were selected as the top 5 ILVs. From the assays, Bidens pilosa exhibited the highest TCC, TPC and high antioxidant activities from DPPH and FRAP assays. The were no significant differences among the antioxidant activities of Amaranthus cruentus and Bidens pilosa using ABTS assay, which both exhibited the highest antioxidant activities among other ILVs. Over 200 metabolites were identified from the five ILVs and metabolite networks were determined using Feature based molecular networking GNPS2 online software. Consumption of ILVs is encouraged for diet diversification, combating food insecurity and for treatment of aliments.

Keywords: ILVs, antioxidants, total phenolic content, total carotenoids, metabolites, food as medicine.

P058

Phytochemistry and Biopharmaceutical Profiling from Dicoma anomala for Cytotoxicity Properties

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Abstract

Genus Dicoma was selected for this study based on its ethno-medicinal uses. The main objective of this study is to isolate and perform biopharmaceutical profiling of isolated compounds and encapsulated compounds will be screened for their cytotoxicity activities. Approximately 2 kg of dried and weighed ground roots part plant material was extracted for 4 days with solvent mixture of dichloromethane: methanol (50/50 % DCM: MeOH) enough to fully immerse the plant material at room temperature. This was followed by evaporation and concentration using a rotary evaporator at 60 ºC and then further dried in a fume hood to obtain 80 g of dry crude extract. Liquid-liquid partitioning of the crude extract was carried out using solvents hexane and DCM. Twenty-five grams of DCM extract was fractionated and separated to obtain two compounds were isolated. The isolated compounds were characterized using spectroscopic data; namely 1D and 2D NMR (nuclear magnetic resonance spectroscopy), IR (infrared spectroscopy), MS (mass spectrometry) and Optical rotation. Compound 1 was identified as unreported 3,11-dihydroxyeudesma-4(15)-ene-12,6α-olide while compound 2 was found to be known triterpenoid, sitosterol. Compound 2 was previously isolated and was found to possess numerous biological actions namely analgesic anxiolytic and sedative effects, antimicrobial, immunomodulatory, anticancer and other therapeutic areas. Compounds will be encapsulated and screened for their cytotoxicity activities. All the compounds were established on the basis of spectroscopic data such as NMR, IR, MS and melting point.

Keywords: Dicoma, Cytotoxicity, Compound, Isolation.

P059

HPLC-Based Isolation of Compounds from South African Medicinal Plants Traditionally Used to Treat Inflammation and Cancer

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Abstract

Cancer and inflammatory diseases remain leading causes of global mortality. Late-stage diagnosis, metastasis, drug resistance, and treatment-related adverse effects continue to limit therapeutic success, demonstrating the need for safer and more effective drug agents. South African medicinal plant diversity and their rich traditional uses offer valuable opportunities for the discovery of novel anti-cancer and anti-inflammatory compounds. This study aimed to expand the Biodiscovery repository and identify bioactive compounds from South African medicinal plants traditionally used to treat inflammation and cancer.

An initial selection of 120 plant species was refined to 55 priority species, from which 81 samples were obtained. Plant materials were extracted using dichloromethane: methanol (1:1) and methanol, and the resulting crude extracts were fractionated by positive-pressure solid-phase extraction (ppSPE), yielding 567 fractions. Extracts and fractions were screened against A549 lung cancer cells and LPS-activated RAW 264.7 macrophages. Several ppSPE fractions exhibited promising anticancer activity, leading to the selection of Mimusops afra and Rothmannia globosa for further chemical investigation. HPLC-based purification and structure elucidation afforded flavonoid glycosides and phenolic acids; however, their limited cytotoxicity suggested possible synergistic effects within the active fractions.

Anti-inflammatory screening identified Conyza scabrida as the most promising candidate, with its crude extract inhibiting nitric oxide production by 98%. HPLC-base purification and structural elucidation yielded 5,3',4'-trihydroxy-3,6,7,8-tetramethoxyflavone and hautriwaic acid. The 5,3',4'-trihydroxy-3,6,7,8-tetramethoxyflavone displayed potent inhibition of nitric oxide production, surpassing that of appositive control (aminoguanidine). These findings highlight the value of HPLC-based fractionation and isolation strategies in discovering bioactive compounds from South African medicinal plants.

P060

Anti-Pigmentation, Anti-Wrinkle and Anti-Melanoma Potential of Baillonella toxisperma (Sapotaceae)

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Abstract

The skin is the body's largest organ, acting as a protective, sensory, and temperature-regulating barrier. It is made of epidermis, dermis, and subcutaneous layers. It functions as a shield against pathogens, ultraviolet light, and infections while regulating body heat. Incorporation of synthetic chemicals in skin products or cosmetics has been associated with side effects such as skin irritation, allergies, endocrine disruptions, and even cancer. The use of medicinal plants could provide an alternative for the prevention and treatment of dermatitis. The current study aimed to provide an overview of the medicinal uses of Baillonella toxisperma (moabi) oil, its pharmacological activities, and its phytochemicals. The literature was collected from various online research databases, including ScienceDirect, Scopus, Sabinet, SciFinder, PubMed, and Web of Science. The keywords such as 'Baillonella toxisperma', 'moabi oil', 'medicinal uses', pharmacological activity', and 'bioactive compounds' were used for searching. The seeds or kernels of moabi are dried, processed into a fatty oil or butter, and used for cooking, skin care, and hair moisturizers. Pharmacological studies revealed that moabi oil had anti-inflammatory activity against protein denaturation of egg albumin with a minimum inhibitory concentration (IC50 = 79.95 mg/ml). Also, the oil demonstrated antioxidant activity, inhibition against 2,2-diphenyl-1-picrylhydrazyl (DPPH) radicals with an IC50 of 4.97 mg/ml. High-performance liquid chromatography (HPLC) and gas chromatography-mass spectrometry (GC-MS) analysis of fatty acid composition of oil showed the presence of oleic acid, stearic acid, palmitic acid, arachidic acid, and linoleic acid. Therefore, these findings suggest that oil extracted from B. toxisperma has the potential to reduce pain, swelling, and healing. Future research is necessary to evaluate the oil for anti-skin pigmentation, anti-wrinkle, and antimelanoma activities.

P061

Analgesic Activity and Chemical Profiling of Selected South African Medicinal Plants Used in Traditional Medicine for Pain Relief

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Abstract

Inflammation and pain-related conditions represent major global health challenges, highlighting the need to explore alternative therapeutic agents from medicinal plants. In Southern Africa, medicinal plants play a critical role in primary healthcare, particularly in rural communities; however, limited scientific valorization exists regarding their efficacy in pain management. This study aimed to evaluate the analgesic and anti-inflammatory potential of selected South African medicinal plants and to identify bioactive compounds responsible for these activities. Eight medicinal plant species traditionally used for pain relief were investigated. Aqueous and organic extracts were prepared and screened for biological activity using nitric oxide (NO) inhibition, cyclooxygenase-2 (COX-2) expression, and cytotoxicity assays involving lipopolysaccharide (LPS)-activated RAW 264.7 macrophages at concentrations of 10 µg/mL and 50 µg/mL. Chemical profiling of active extracts was conducted using Ultra-Performance Liquid Chromatography coupled with Quadrupole Time-of-Flight Mass Spectrometry (UPLC-QTOF-MS) to characterise their chemical profiles. Preliminary results demonstrated significant reductions in COX-2 expression at 10 µg/mL for extracts of Capparis tomentosa, Clerodendrum glabrum, and Hypoxis hemerocallidea, indicating notable anti-inflammatory activity without detectable cytotoxic effects. In addition, extracts of H. hemerocallidea and C. glabrum significantly reduced nitric oxide production in LPS-stimulated macrophages. Chemical profiling of H. hemerocallidea revealed several bioactive constituents, including astragalin, complanatuside, hypoxoside, and salicylic acid-β-D-glucoside. Pathway enrichment analysis indicated significant involvement of phenylalanine metabolism, which is associated with inflammatory regulation. These findings provide preliminary scientific support for the traditional use of C. tomentosa, C. glabrum, and H. hemerocallidea in pain management. Further research is ongoing, focusing on isolating and characterising the active compounds to valorize their bioactivity and support the development of standardised plant-based therapeutic formulations.

P062

Ethnopharmacological Validation of South African Medicinal Plants Used for Elephantiasis: Antimicrobial, Antimycobacterial, Anti-Inflammatory and Cytotoxic Evaluations

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Abstract

Background: Elephantiasis is a debilitating condition marked by severe swelling and skin thickening due to lymphatic obstruction. In rural South African communities, traditional healers use medicinal plants to manage elephantiasis and related infections, yet pharmacological validation is limited.

Aim: This study evaluated the phytochemical composition and biological activities of selected plants traditionally used against elephantiasis and its secondary infections.

Methods: Plant species including Achyropsis avicularis, Cinchona officinalis, Euphorbia clavarioides, Gnidia kraussiana, Hermannia geniculata, and Senecio speciosus were collected with guidance from traditional healers. Water, ethanol, and acetone extracts were analyzed for phytochemicals and assessed for antimicrobial, antimycobacterial, anti-inflammatory, and cytotoxic activities using standard in vitro assays.

Results: Phytochemical screening revealed the presence of tannins and saponins in several extracts; steroids, anthraquinones, and cardiac glycosides were absent. H. geniculata exhibited the highest tannin content (2.45), while E. clavarioides had the highest saponin level (5.1%). E. clavarioides inhibited all tested bacterial strains (MIC 0.098–0.781 mg/mL). Other plants, including H. geniculata, G. kraussiana, S. speciosus, and C. officinalis, also showed strong antibacterial activity (0.098–1.563 mg/mL) and notable antifungal activity against Candida albicans (0.098–0.781 mg/mL). Antimycobacterial effects were observed for A. avicularis, S. speciosus, and G. kraussiana (0.049–0.78 mg/mL). The ethanol extract of H. geniculata strongly inhibited 5-Lipoxygenase (IC_{50} = 0.764 ± 0.340 µg/mL). Some extracts of C. officinalis and A. avicularis displayed cytotoxicity in HuTu cells.

Discussion: The observed bioactivities are mechanistically consistent with the presence of tannins and saponins, which are known to disrupt microbial membranes, inhibit inflammatory pathways, and modulate cellular responses.

Conclusion: The study supports the traditional use of these plants for managing elephantiasis and associated infections, likely due to tannins and saponins, though cytotoxicity warrants further toxicological evaluation and bioactive compound isolation.

P063

In vitro Cytotoxicity of South African Medicinal Plants: A Review

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Abstract

Background: South Africa is the powerhouse of several plant species, representing 10% of all the plant families globally. Cancer is not only a crises African country, it is also a major health challenge due to shortage of funding and resources.

Aim of the study: The aim of the study was to evaluate the cy totoxicity of South African medicinal plants and analyze their overall safety.

Materials and Methods: A literature search was conducted on studies that assessed the cytotoxicity of South African medicinal plants. Scientific databases, such as ScienceDirect, Google Scholar and PubMed, were searched following a predetermined inclusion and exclusion criteria. Studies that met the inclusion criteria: research papers; studies conducted in South Africa; and studies conducted on South Africa medicinal plants from (2005-2023). Research reports; reviews; theses; dissertations; online and text-textbooks; as well as studies outside South Africa. The plant was considered less cytotoxixity if IC50<30 ug/mL.

Results and findings: The Fabaceae was the most the botanical family mostly used with the most used plant part being the leaves (52%). Acetone (34%) was the most used extract Dichloromethane being the least used extract (5%). The MTT assay was the most (57%) used assay, followed by the Brine shrimp lethality assay at 18% and Ames test being the least used assay with 2%. Vero cells were the most used cell line. Pappea capensis was the plant that showed little to no cytotoxic effects against Vero cells. The Helichrysum cymosum (Asteraceae) was the most cytotoxic plant, with an IC50 value of 17.4 ug/ml respectively. Dovyallis caffra exhibited cytotoxicity against the MCF-7 breast cancer cells.

Conclusions: Considering that the criteria of cytotoxicity activity for the crude extracts, as established by the American National Cancer Institute (NCI), is an IC50 <30 µg/mL, we conclude that many extracts from the South Africa medicinal plants are safe and could be a promising source of cytotoxic agents. With medicinal plants such as Dovyallis caffra that exhibited cytotoxicity against the MCF-7 breast cancer cells, there is hope that medicinal plants can play a significant role in the treatment of cancer.

P064

Indigenous Knowledge and Practices Used for Maternal Care in Mopani District, Limpopo Province

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Abstract

Globally, over five hundred thousand women die due to complications related to pregnancy, and childbirth, annually. Research shows that mother and infant morbidity and mortality rates are in fact high in developing countries, especially in sub-Saharan Africa. Indigenous knowledge and practices have long been used for maternal care among African women and continue to play a significant role in promoting mother and infant maternal morbidity and mortality among rural areas. The aim of the study was to explore indigenous knowledge and practices used for maternal care in Mopani district municipality, Limpopo province, South Africa. The study design was exploratory and followed a qualitative research approach with traditional birth attendants as targeted population. Thirteen participants were sampled purposefully based on their knowledge, expertise, and experience on maternal care among the Vatsonga in Mopani district municipality, Limpopo province, South Africa. Data was collected through face-to-face semi-structured interviews and was analysed using thematic analysis. The following themes emerged from the study, the practice of abstinence and seclusion, storage of the placenta and umbilical cord, and the use of herbal remedies. These indigenous practices have been used for generations and continue to play a significant role in managing mother maternal mortality and morbidity and plays cultural and spiritual role among indigenous communities. Further studies may focus on the knowledge, attitudes, and perceptions of young women towards these practices

P065

Opportunities, Challenges and Prospects in the Value Chain Development of Medicinal Plants: An Example of Pelargonium sidoides DC.

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Abstract

Pelargonium sidoides is one of the commercially important medicinal plants that are wild-harvested in southern Africa, leading to over exploitation of wild populations. The species is not yet critically endangered; however, there is a dire need for implementation of conservation measures. Unsustainable harvesting methods, where the whole plant is uprooted and large volumes demanded due to the health benefits contribute to the over-exploitation. Cultivation of the species is limited despite recommendations by conservation agencies and illegal harvesting without required permits is continuing at an alarming rate. A systematic literature review with specific search terms related to P. sidoides was used to collect information from peer-reviewed literature and grey literature databases. The commercial potential of P. sidoides, and possibilities to contribute to the local economy through income generation and job creation, were reviewed. The challenges in cultivation, local processing and the value chain of P. sidoides were also studied. The identified challenges include lack of access to formal markets by local communities, lack of access to suitable facilities for basic agro-processing, lack of access to funds to start commercial operations, and lack of technical support and knowledge on cultivation. Thus, the regulation of the industry to de-monopolize it and enforcement of some of the international treaties and protocols are recommended. Promotion of cultivation and provision of necessary support to smallholder farmers is also recommended. In addition, development of partnerships with existing markets will ensure that the growers gain access to the markets. This can be achieved through industry-grower-government partnerships. The partnerships can further be used for development and marketing of new products. Availability of mobile and shared community-based processing facilities will give growers an advantage of adding value to the harvested plant material and thus increase their profits.

P064

Indigenous Knowledge and Practices Used for Maternal Care in Mopani District, Limpopo Province

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Abstract

Globally, over five hundred thousand women die due to complications related to pregnancy, and childbirth, annually. Research shows that mother and infant morbidity and mortality rates are in fact high in developing countries, especially in sub-Saharan Africa. Indigenous knowledge and practices have long been used for maternal care among African women and continue to play a significant role in promoting mother and infant maternal morbidity and mortality among rural areas. The aim of the study was to explore indigenous knowledge and practices used for maternal care in Mopani district municipality, Limpopo province, South Africa. The study design was exploratory and followed a qualitative research approach with traditional birth attendants as targeted population. Thirteen participants were sampled purposefully based on their knowledge, expertise, and experience on maternal care among the Vatsonga in Mopani district municipality, Limpopo province, South Africa. Data was collected through face-to-face semi-structured interviews and was analysed using thematic analysis. The following themes emerged from the study, the practice of abstinence and seclusion, storage of the placenta and umbilical cord, and the use of herbal remedies. These indigenous practices have been used for generations and continue to play a significant role in managing mother maternal mortality and morbidity and plays cultural and spiritual role among indigenous communities. Further studies may focus on the knowledge, attitudes, and perceptions of young women towards these practices

P066

Tetradenia riparia (Hochst.) Codd: A Natural Remedy for Skin Conditions

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Abstract

Tetradenia riparia (Hochst.) Codd, a medicinal shrub in the Lamiaceae family, is widely used in traditional medicine across southern and eastern Africa. In South African communities, leaf preparations are applied to wounds and sores, but its skincare potential requires further investigation. This study evaluated the chemical composition and selected biological activities of T. riparia leaf extracts to assess their relevance to skin-related conditions. Plant material collected from the University of KwaZulu-Natal Botanical Garden was dried, ground and sequentially extracted using dichloromethane (DCM), a dichloromethane–methanol (MeOH) mixture (1:1), and methanol. Extracts were fractionated using diol solid-phase extraction. Gas chromatography–mass spectrometry (GC–MS) profiled the DCM extract, while ultra-performance liquid chromatography–mass spectrometry (UPLC–MS) analysed the more polar extracts. Chromatographic methods were used to isolate compounds, and extracts were assessed for antibacterial and antioxidant activity. GC–MS tentatively identified 49 constituents in the DCM extract, of which 25 had similarity indices above 60%. These represented several chemical classes, including terpenoids and fatty acids. Three compounds were reported for the first time in T. riparia, including a diterpenoid. UPLC–MS analysis of the DCM–MeOH and MeOH extracts detected 16 compounds; five α-pyrones and rosmarinic acid were reported for the first time in the species. A previously unreported diterpenoid was also isolated from the DCM–MeOH extract. Both extracts demonstrated antibacterial activity against Staphylococcus aureus and Klebsiella pneumoniae.

P067

Isolation and Characterisation of Metallo-β-Lactamase Inhibitory Compounds from the South African Medicinal Plant Gunnera perpensa L.

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Abstract

Antimicrobial resistance (AMR) in infectious disease-causing bacteria has emerged as one of the most critical global health threats, undermining the effectiveness of current antibiotic therapies. Metallo-β lactamases (MBLs), produced by certain bacteria, are of particular concern due to their ability to hydrolyse most β-lactam antibiotics, including last-resort carbapenems. Despite extensive research, there remains a critical shortage of clinically approved MBL inhibitors, highlighting the urgent need for novel therapeutic strategies. Natural products, particularly medicinal plants, represent a promising yet underexplored source of bioactive compounds with potential MBL inhibitory activity. The South African medicinal plant Gunnera perpensa L. was evaluated in vitro for inhibitory activity against clinically relevant MBLs, New Delhi metallo-beta- lactamase-1 (NDM-1) and Verona integron-encoded metallo-beta-lactamase-1 (VIM-1), with captopril used as the positive control. Dried leaf powder of G. perpensa L. was extracted using a dichloromethane-methanol solvent system (1:1, v/v). The crude extract was fractionated by solid- phase extraction (SPE) using seven sequential solvent systems: methanol-water (5:95, Fraction 1), (20:80, Fraction 2), (40:60, Fraction 3), (60:40, Fraction 4), (80:20, Fraction 5), (100:0, Fraction 6), and acetonitrile-methanol (50:50, v/v; Fraction 7), targeting inhibitory compounds. Fraction 1 displayed IC_{50} values of 3.00 µg/mL against NDM-1 and 5.00 µg/mL against VIM-1, while Fraction 2 displayed IC_{50} values of 2.00 µg/mL against both enzymes. In comparison, captopril showed IC_{50} values of 5.2 µg/mL against NDM-1 and 139.1 µg/mL against VIM-1. Ultra- performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry (UPLC-QTOF-MS) analysis of the active fractions led to the tentative identification of chinensinaphthol (Rt 0.59 min), sanguisorbic acid dilactone (Rt 2.20 min) and punicacortein B (Rt 3.44 min). Molecular docking indicated favourable binding interactions between these compounds and the target enzymes. Isolation and structural characterisation of the compounds are currently in progress.

P068

Integrating Phytochemical Diversity, Bioactivity, and Safety Profiling of Indigenous African Botanicals for Phytomedicine and Cosmetic Innovation

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Abstract

Africa's indigenous flora represents a rich yet underutilised source of bioactive compounds with significant applications in phytomedicine, nutrition, and cosmetics. This review synthesises current knowledge on the phytochemical composition, bioactivity, ethnopharmacological relevance, genetic diversity, and safety profiles of selected African botanicals, including Uapaca kirkiana, Agave angustifolia, Agave sisalana, Artemisia afra, and key medicinal plants such as Annona senegalensis, Carissa macrocarpa, Vangueria infausta, and Englerophytum magalismontanum. These plants are widely used in traditional medicine, with approximately 80% of South Africans relying on them for primary healthcare. They are rich in phytochemicals such as flavonoids, phenolic acids, tannins, saponins, terpenoids, and alkaloids, which contribute to antioxidant, antimicrobial, anti-inflammatory, antiparasitic, and antimalarial activities. Indigenous fruits such as Uapaca kirkiana provide essential micronutrients (e.g., Mg, Zn, Fe, and Se) and demonstrate strong nutraceutical potential. Fermentation of U. kirkiana products with Lactobacillus rhamnosus enhances the bioaccessibility of iron and zinc and improves the functional quality of the resulting foods. Agave species exhibit promising antioxidant and dermatological applications, although trace metal contamination raises safety concerns requiring strict quality control. Genetic diversity studies of Artemisia afra reveal chemotypic variability that may affect therapeutic consistency. Despite these benefits, key research gaps remain, including limited phytochemical and pharmacological characterisation of underutilised species such as Carissa macrocarpa and Englerophytum magalismontanum, insufficient toxicological validation, and a lack of standardised extraction and formulation methods. Environmental variability and unsustainable harvesting further threaten the sustainability of resources. This review highlights the need for multidisciplinary approaches integrating phytochemistry, molecular biology, toxicology, and formulation science. Future research should prioritise standardisation, clinical validation, bioavailability studies, and sustainable conservation strategies to support the safe commercialisation and global competitiveness of African plant-based products.

P069

Anti-Elastase Potential of Extracts and Biogenic Gold Nanoparticle Using Elegia tectorum (L. f.) Moline & H. P. Linder

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Abstract

Atopic dermatitis, known as eczema, is a common skin condition that is more prevalent in children and can persist throughout one's life. One of its main symptoms is an intolerable itching sensation caused by overproduction of histamine, which leads to the over-expression of elastase, resulting in the formation of wrinkles. Natural products are becoming useful skincare ingredient owing to their dermato-protective properties. The aim of this study was to determine the anti-elastase potential of Elegia tectorum. The ethanolic of E. tectorum (ET-EtOH), its fermented (ETF) extract and extract-mediated gold nanoparticle (ETAuNP) were evaluated for anti-elastase activity using standard procedure. The ET-AuNP showed UV-Vis absorption peak at 535 nm typical of AuNPs, FT-IR bands at 3353 (OH) and 1637 (C=O) cm-1, suggesting a successful capping by the extract. The nanoparticle exhibited a round shape with average diameter and zeta potential of 115±77.74 nm and -9.42 mV, respectively. However, only the ET-EtOH displayed considerable anti-elastase activity with a fifty percent inhibitory concentration (IC50) of 14.58±2.00 µg/mL. Furthermore, at 13 and 50 µg/mL, it exhibited considerable reduction in cell viability and reduced histamine production compared to the vehicle control (0.25% DMSO). GC-MS analysis of ET-EtOH revealed forty-seven constituents including benzothiazole, α-tocopherol and stigmasterol. This study has shown the anti-elastase activity of E. tectorum EtOH extract, which may support its potential to prevent or delay the onset of wrinkles, while fermenting or synthesizing AuNPs with the extract may not enhance anti-elastase activity. Further investigation into whether ET-EtOH targets histamine-associated receptors on mast cells as a potential mode of action could be considered.



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