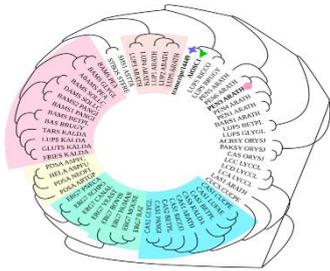


Neem Research Newsletter

Volume 5, Issue 10, 2025



WORLD NEEM ORGANISATION (WNO)



From

The Editor's Desk.....

In this Issue of the Neem Newsletter, we highlight the significant research findings on neem in agriculture, human health, and veterinary practice.

Green-synthesized silver nanoparticles fabricated using neem leaf extract as nanopriming agent was demonstrated to be cost-effective, sustainable, and biologically superior strategy to improve potato germination and heat stress resilience, offering a promising avenue for climate-smart agriculture. In another study, green-synthesized zinc oxide and magnesium oxide nanoparticles prepared using neem and licorice extracts mitigated alkaline stress in maize. In Sri Lanka, a new disease that caused mango stem bark blackening was effectively controlled by the potent antifungal effect of neem extract. One percent neem oil coated urea @ 75% of the recommended uncoated urea exhibited the potential to enhance the growth, yield, nitrogen uptake, and nitrogen use efficiency in wheat effectively under both rain-fed and irrigated conditions. Structural modeling and molecular docking studies identified interactions between azadirachtin and liquorice that could have implications for stress tolerance. Experiments using different organic amendments against sclerotium root rot disease of tomato revealed maximum efficacy with neem cake treatment. In Ethiopia, botanical extracts including neem was found to show *in vitro* antifungal activity against fungal pathogens of onion and red pepper.

In the area of human health, extracts of neem were reported as viable agents for green silver nanoparticle synthesis for antibacterial efficacy. A sequential herbal irrigation protocol using ethanolic extracts of Miswak, neem, tea tree oil and phytic acid showed comparable antimicrobial efficacy to conventional agents, with added benefits of safety, biocompatibility, and reduced cytotoxicity, making it a promising natural alternative in pediatric dental procedures. An integrative *in-silico* study identified the therapeutic potential of the neem compounds Nimolinin and Isomargolonone for Alzheimers disease. In a review article, polyherbal phytosome formulations that contained neem was shown to have the potential to significantly enhance diabetic wound healing outcomes.

Research findings have highlighted the potential of plant-based products-namely clove, cinnamon, and neem used in conjunction with kaolin clay as sustainable alternatives to synthetic chemicals for controlling mycotoxin contamination in poultry feed. Specific combination of medicinal plant extracts that contained neem was reported to significantly reduce methane emissions while positively modulating rumen fermentation parameters, indicating their potential as natural additives for sustainable livestock production. Incorporation of botanical antihelmintics including neem is currently a trending approach to control gastrointestinal diseases in ruminants.

S. Nagini

Core Founding Member, WNO
Chief Scientific Coordinator &
Regional Director, South India

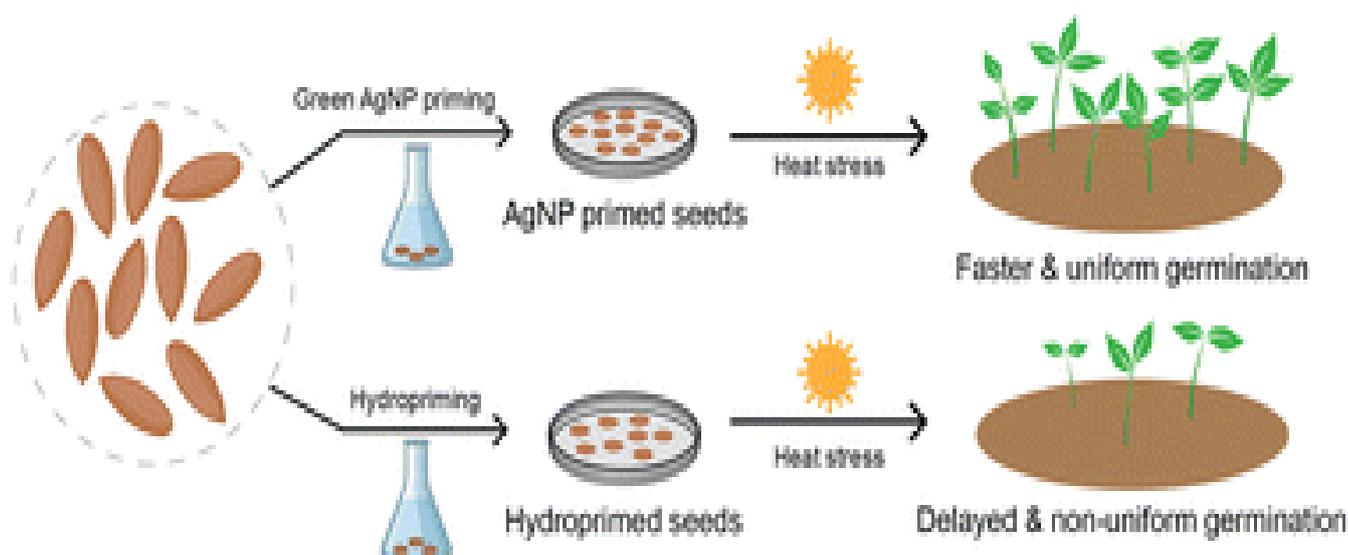


Neem in Agriculture

[Green-synthesized silver nanoparticles for improved heat stress resilience and germination in potato seeds.](#)

Lina JM, Mostafa MS, Yeasmin S, Tasnim N, Dipto AR, Das H, Amin MN, Khan NMU, Habib A, Rahman M.RSC Adv. 2025 Oct 21;15(47):39975-39987. doi: 10.1039/d5ra04571a. eCollection 2025 Oct 20. PMID: 41127188

Climate change-induced heat stress severely impedes potato (*Solanum tuberosum*) germination, threatening global food security. Here, we report the application of green-synthesized silver nanoparticles (AgNPs), fabricated using *Azadirachta indica* (neem) leaf extract, as nanopriming agents to enhance germination and thermotolerance. The green-synthesized AgNPs exhibited a smaller crystallite size (9.7 nm) compared to chemically synthesized AgNPs (20.6 nm), with higher colloidal stability (zeta potential -55.2 mV vs. -35.7 mV). At the optimal priming concentration (5 mg L⁻¹), green AgNPs increased germination on the 12th day by 19% relative to chemical AgNPs and by 50% over hydroprimed controls. Under elevated temperature (32.2 °C), green AgNP-primed seeds maintained a consistent 10% higher germination rate than controls and showed faster radicle emergence. ICP-MS confirmed greater nanoparticle uptake in primed seeds (144 ppm Ag for green AgNPs vs. 105 ppm for chemical AgNPs, compared to 1.98 ppm in hydroprimed seeds). Enhanced water uptake was also evident, with an 82% increase in seed mass after green AgNP priming compared to 44% in hydroprimed seeds. A preliminary techno-economic analysis confirmed the superior cost-effectiveness of the green synthesis route. Collectively, these findings establish green-synthesized AgNP nanopriming as a cost-effective, sustainable, and biologically superior strategy to improve potato germination and heat stress resilience, offering a promising avenue for climate-smart agriculture.



[Green-synthesized ZnO and MgO nanoparticles modulate physiology and antioxidant defense in maize under alkaline stress.](#)

Iftikhar M, Shah AA. *Funct Plant Biol.* 2025 Oct 13;52(10):FP25200. doi: 10.1071/FP25200.PMID: 41134100

Alkaline stress severely impairs the growth and yield of *Zea mays* L. by disrupting physiological and biochemical functions. This study evaluated green-synthesized ZnO and MgO nanoparticles (NPs), prepared using neem and licorice extracts, for mitigating alkaline stress. NPs were nanosized, crystalline, and functionalized by phytochemicals, confirmed by scanning electron microscopy, FT-IR spectroscopy, UV-vis spectroscopy, and energy dispersive X-ray spectroscopy. A pot experiment using NPs (25-200 ppm) under control and alkaline stress assessed morphological, physiological, biochemical, and ionic responses. Alkaline stress reduced root fresh and dry weight to 2.60 and 0.66 g (-59.6%, -31.0%), shoot fresh and dry weight to 2.60 and 0.38 g (-59.6%, -70.0%), and chlorophyll a, b, and carotenoids to 1.31, 0.67, and 2.40 mg g⁻¹ (-62.4%, -54.7%, -62.8%), whereas it increased malondialdehyde (MDA) (244.6%), H₂O₂ (457.7%), and relative membrane permeability (RMP) (55.9%). The combined ZnO (50 ppm) and MgO (50 ppm) treatment improved chlorophyll a, b, and carotenoids to 3.48, 1.48, and 6.45 mg g⁻¹ (165.4%, 120.3%, 168.5%), and total soluble protein (392.8%), total protein (301.0%), proline (105.5%), glutathione (35.6%), and ascorbic acid (44.2%). Antioxidant enzymes increased, with superoxide dismutase at 29.52 U mg⁻¹ (452.8%), peroxidase at 24.44 U mg⁻¹ (862%), and ascorbate peroxidase at 51.62 U mg⁻¹ (560%), whereas MDA, H₂O₂, and RMP (-78.1%) were reduced. High NP concentrations (ZnO 100 ppm + MgO 100 ppm) were toxic. Moderate ZnO and MgO NP doses enhanced resilience, yield stability, and sustainable agriculture.

[Etiology of the mango stem bark blackening in Sri Lanka and in vitro biocontrol assays.](#)

Herath K, Thiruchchelvan N, Manike N, Jayaprada T, Kumara A. *Lett Appl Microbiol.* 2025 Oct 22:ovaf123. doi: 10.1093/lambio/ovaf123. Online ahead of print.PMID: 41124045

Mango (*Mangifera indica*) is an economically significant fruit crop in Sri Lanka. Recently, a new disease, stem bark blackening, emerged on mango in the country, causing concerns among growers. This study aimed to identify the pathogen and explore effective in vitro strategies for its management. Field observations revealed characteristic black, irregularly shaped patches encircling the mango stems and branches. Morphological studies and phylogenetic analysis of the ITS region confirmed the pathogen as *Aspergillus* spp. In vitro assays demonstrated 92.4% fungal inhibition by *Trichoderma viride*. Among the tested plant extracts, *Azadirachta indica* showed the highest antifungal activity (72.3% colony size reduction compared to control). Commercial fungicides tested were less effective. In-vitro biocontrol activity of *T. viride* and *A. indica* extract is more effective than conventional fungicides, highlighting their potential in integrated disease management of mango stem bark blackening disease.

[Managing pigweed flea beetle using insecticides and trap crop in *Amaranthus viridis* fields.](#)

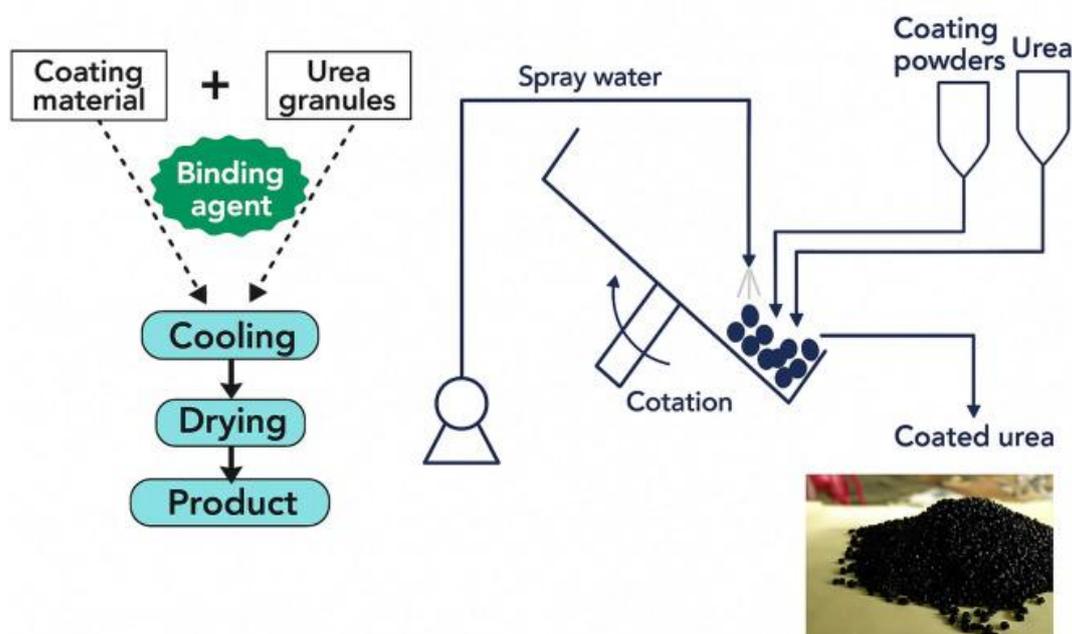
Williams Z, Cotton C, Zebelo S, Reid M, Nance I.J Econ Entomol. 2025 Oct 22:toaf243. doi: 10.1093/jee/toaf243. Online ahead of print.PMID: 41124310

Amaranthus viridis Linn, (Amaranth), or green amaranth, is grown by small farmers on the Delmarva Peninsula. The pigweed flea beetle is one of the key insect pests of amaranth. Here, the efficacy of organic insecticide (Neem-oil and Spinosad), conventional insecticide (Sevin), and hemp, *Cannabis sativa* (trap crop), was tested to manage the beetle and other insects in this 2-yr study. Spinosad and Sevin significantly reduced the number of insects in amaranth plants and increased the total fresh leaf yield. However, neither insecticide is registered for use in *A. viridis* in Maryland. Hemp as a trap crop was planted at 4 distance points from amaranth plants (control, 0.9, 1.8, and 2.7 m) in 2023. Hemp seems to be a good trap crop in the amaranth field, especially if it is planted at the appropriate distance (ie 2.7 m (?≈3 feet)) from the amaranth plant. The damage by the beetles was reduced as the distance from the trap crop increased, possibly due to the beetles' movement pattern from the field's edge toward the amaranth plants. However, this study needs further investigation to understand the role of hemp phytochemicals in attracting or repelling the pigweed flea beetle or other insects.

[Effects of coating agents on nitrogen dynamics and yield of wheat \(*Triticum aestivum* L.\) under irrigated and rainfed conditions.](#)

Aziz A, Tahir MA, Sabah NU, Adnan M, Ahmad M, Romman M, Lal R, Fahad S, Abdel-Maksoud MA, Fatima S, Al-Qahtani WH, Zakria AM.Sci Rep. 2025 Oct 9;15(1):35258. doi: 10.1038/s41598-025-14121-w.PMID: 41068140

Nitrogenous (N) fertilizers are widely applied in agriculture for improving crop yield. However, significant quantity of chemically-applied N is lost leading to low nitrogen use efficiency (NUE). Therefore, two laboratory incubation studies were designed to evaluate the effects of different coating agents [no coating, neem (*Azadirachta indica*) oil coating and potassium ammonium phosphate (PAP) coating) on urea hydrolysis and nitrification under varying temperatures (25, 35 and 40 °C) and moisture regimes (30, 60 and 90% of field capacity). Results revealed that the NH_4^+ and NO_3^- concentrations increased both with



temperature and moisture levels. Using the organic-coated neem oil coated urea (NOCU) significantly reduced the release of NH_4^+ and NO_3^- . Thereafter, a field experiment was conducted to explore the best coating agent [N_0 , 100% conventional urea, 75, 50 and 25% of recommended neem oil coated urea (NOCU)] using irrigated (Akbar-2019) and rainfed (Barani-2017) wheat cultivars. Even the reduced rates (50%) of the recommended NOCU performed at par to 100% recommended uncoated urea fertilizers. Application of 1% NOCU @ 75% of the recommended urea resulted in maximum grain yield (3.65 Mg ha^{-1}), N in roots (0.87%), N in straw (0.85%) and N in grains (1.07%) in irrigated wheat variety (Akbar-2019). Thus, using 1% neem oil coated urea @ 75% of the recommended uncoated urea has the potential to enhance the growth, yield, N uptake and NUE in wheat effectively under both rain fed and irrigated conditions.

[Stress Responsive Glycosyltransferase \(UGT72Z7\) from Glycyrrhiza glabra Showed Glycosylation of Azadirachtin.](#)

Hussain S, Verma B, Devi R, Kumar V, Wazir P, Chopra A, Arora P, Ghora B, Sharma A, Singh PP, Gupta S. *Appl Biochem Biotechnol.* 2025 Oct 14. doi: 10.1007/s12010-025-05401-2. PMID: 41085823

Uridine diphosphate glycosyltransferases (UGTs) play crucial roles in the glycosylation of plant metabolites, contributing to growth, defense, and stress adaptation. Despite their importance, UGT functions in *Glycyrrhiza* remain poorly understood, particularly in stress responses and xenobiotic metabolism. In this study, we report the cloning and functional characterization of GgUGT72Z7, a 1413 bp gene encoding a flavonol 3-O-glucosyltransferase that shares 74% sequence identity with *Glycine max* UGT72Z3. Structural modeling (AlphaFold, SWISS-MODEL, Phyre2) and molecular docking identified azadirachtin, a pharmacologically active tetranor-triterpenoid, as the most favorable ligand (binding energy -15 kcal/mol). In vitro enzymatic assays with recombinant protein validated its ability to glycosylate azadirachtin, a bioactive limonoid found in the seeds of the neem tree (*Azadirachta indica*) besides native flavonoids, kaempferol and quercetin. Among the models, the AlphaFold structure showed the best structural quality, highlighting interactions between azadirachtin and five key residues (Ser-249, Glu-370, Glu-251, Lys-53, Ala-348). Expression profiling demonstrated strong induction of GgUGT72Z under senescence (1136-fold), pathogen infection (33-fold), and phytohormone treatments, notably methyl jasmonate (1124-fold), auxin (568-fold), and abscisic acid (400-fold). These findings reveal a dual role of GgUGT72Z in xenobiotic glycosylation and stress tolerance, providing new insights into glycosylation-mediated defense in *Glycyrrhiza*.

[Use of organic amendments for sustainable management of root rot disease of tomato \(*Solanum lycopersicum* L.\) caused by *Sclerotium rolfsii*.](#)

Mandal D, Pal R, Mohapatra S, Seni A, Bansude SK, Seth P, Barla S, Sahu J. *Sci Rep.* 2025 Oct 14;15(1):35772. doi: 10.1038/s41598-025-01706-8. PMID: 41087411

The utilization of organic amendments has been considered as the best nonchemical management strategy for controlling the soil borne pathogens and hence can act as a potential tool to manage different soil borne diseases of tomato. Keeping this in view, several organic amendments were used against sclerotium root rot disease of tomato which is soil borne in nature. Effects of these amendments on the plant growth parameters

as well as on the soil mycoflora were also studied. The experimental result revealed that among different organic amendments the maximum plant height and leaf number/plant were observed in neem cake treated plot representing the values 54.61 cm and 122.08 per plant respectively at 50 days after transplanting, against 40.86 cm and 71.03 per plant in case of control plots. The least sclerotium root rot disease incidence (14.75%) and maximum fruit yield (266.33q ha⁻¹) were also observed in neem cake treated plot (T₁). Quantitative changes in the rhizosphere fungal population were also noticed due to the application of organic amendments in soil. It was observed that the fungal population peaked at 60 DAT and declined thereafter irrespective of the treatment. Minimum population was recorded in neem cake treated plot (T₁) and maximum population was recorded in farmyard manure treated plot (T₅) at all stages of plant growth except initial population (before transplanting). Soil beneficial fungi like *Penicillium chrysogenum*, *Trichoderma asperellum* were also observed in neem cake treated plot (T₁) which can play an important role in sustainable management of the disease.

[In vitro antifungal activity of plant extracts against fungal pathogens of onion \(*Allium cepa* L.\) and red pepper \(*Capsicum annum* L.\) in selected districts of Western Hararghe, Ethiopia.](#)

Abraham A, Tahir M, Ahmed S, Dinsa G. BMC Plant Biol. 2025 Oct 29;25(1):1464. doi: 10.1186/s12870-025-07477-8. PMID: 41162860

Introduction: Identifying pathogenic fungi from vegetable is a critical first step in disease management and development of effective plant-based antifungal agent, aligning with environmentally friendly and sustainable agricultural practices. This study aimed to isolate, identify, and characterize the major fungal pathogens of vegetables and to evaluate the antifungal efficacy of selected plant extracts against vegetable pathogenic fungi. Therefore clear identification is crucial for designing effective management protocols against these persistent fungal threats in Western Hararghe, Ethiopia.

Method: Diseased onion samples (leaves, bulbs, and roots) and pepper samples (leaves and fruits) were collected from Gemechis and Boke district, Western Hararghe, Ethiopia, respectively, from July 2023 to January 2025. Data were analyzed using a Completely Randomized Design (CRD) and ANOVA. Three medicinal plants (*Allium sativum*, *Azadirachta indica*, and *Acokanthera schimperi*) were selected based on traditional usage and literature evidence. Crude extracts were prepared using maceration method, while essential oils were obtained through hydro distillation, using Clevenger apparatus. The chemical composition of the crude extracts was assessed using standard phytochemical screening and essential oils was analyzed by using gas chromatography-mass spectrometry (GC-MS). Antifungal activity of both extract was evaluated using the agar well diffusion method and detached leaf assay for obligate biotroph.

Result: A total of six major fungal pathogens (*Peronospora destructor*, *Rhizoctonia solani*, and *Fusarium oxysporum* from onions; and *Erysiphe* species, *Sclerotinia sclerotiorum*, and *Aspergillus niger* from pepper) were identified. Phytochemical screening of these selected plants confirmed the presence of alkaloids, flavonoids, phenolics, tannins, and sulfur compounds in the crude extracts. Antifungal assays results demonstrated that the plant extracts significantly inhibited fungal growth, particularly at higher concentrations (200

µl/ml). *Acokanthera schimperi* showed the highest antifungal activity, followed by *Azadirachta indica*, while *Allium sativum* exhibited moderate effects.

Conclusion: The findings underscored the potential of botanical extracts as environmentally friendly alternatives for managing fungal diseases in vegetable crops.

[The Effectiveness of plant-based Bioinsecticides in controlling *Aedes aegypti* larva populations: Scoping review.](#)

Wardaya ECE, Martini M, Sutningsih D, Fauzi M, Nurjazuli N.J Vector Borne Dis. 2025 Oct 29. doi: 10.4103/jvbd.jvbd_220_25. Online ahead of print.PMID: 41157956

Background objectives: This study aimed to systematically review the effectiveness of plant-based bioinsecticides in controlling *Aedes aegypti* larvae, the primary vector of dengue, Zika, and chikungunya. It also sought to explore formulation innovations, identify implementation challenges, and propose directions for future research. A scoping review was conducted following the PRISMA guidelines to ensure comprehensive and structured analysis. **Methods:** A literature search was performed in PubMed, ScienceDirect, and Scopus for peer-reviewed articles published between 2020 and 2025. Keywords related were used. Data extraction included study characteristics, plant species, compound type, formulation, concentration, and larvicidal outcomes. **Results:** Out of 1,142 identified records, 225 articles were assessed in full, and 21 studies met the final inclusion criteria. Results showed that plant-based bioinsecticides, particularly those using active compounds such as azadirachtin, citronella, and capsaicin, demonstrated significant larvicidal efficacy. Nanoparticle formulations and combinations of multiple plant extracts exhibited higher potency and faster larval mortality rates at lower concentrations. **Interpretation conclusion:** Plant-based bioinsecticides present a promising eco-friendly alternative to synthetic insecticides. Effectiveness varies with extraction methods and formulation types. Modern approaches, such as nanoformulations and synergistic plant combinations, enhance larvicidal potential. Future studies should focus on optimizing formulation techniques and validating efficacy through field trials for sustainable vector control.

Neem for Human Health

[Synthesis of Silver Nanoparticles using *Azadirachta indica* and *Cinnamomum verum* Extract and Its Antibacterial Action against *Enterococcus faecalis*: An *In Vitro* Study.](#)

Chandran N, Ramesh S, Muliya S, Thouseef CH, Verma N, Haridas H.J Pharm Bioallied Sci. 2025 Sep;17(Suppl 3):S2674-S2676. doi: 10.4103/jpbs.jpbs_824_25. Epub 2025 Jul 14.PMID: 41164631

Objective: To evaluate the antibacterial efficacy of neem and cinnamon extract-mediated AgNPs against *Enterococcus faecalis* and assess their cytotoxicity.

Materials and methods: Neem (*Azadirachta indica*) and cinnamon (*Cinnamomum verum*) extracts were employed to reduce silver nitrate, synthesizing AgNPs, with visual changes confirming the reaction. Antibacterial properties were assessed using Mueller-Hinton agar

for zone of inhibition (ZOI) and minimal inhibitory concentration (MIC) assays. Cytotoxicity was evaluated on nauplii models. **Results:** Neem-based AgNPs exhibited significantly larger ZOIs compared to cinnamon-based AgNPs against *E. faecalis* ($P < 0.05$). MIC assays demonstrated both bacteriostatic and bactericidal effects. Cytotoxicity results showed acceptable safety profiles for both AgNP types. **Conclusion:** Neem and cinnamon extracts are viable agents for green AgNP synthesis, with neem-based AgNPs showing promising antibacterial efficacy against *E. faecalis*.

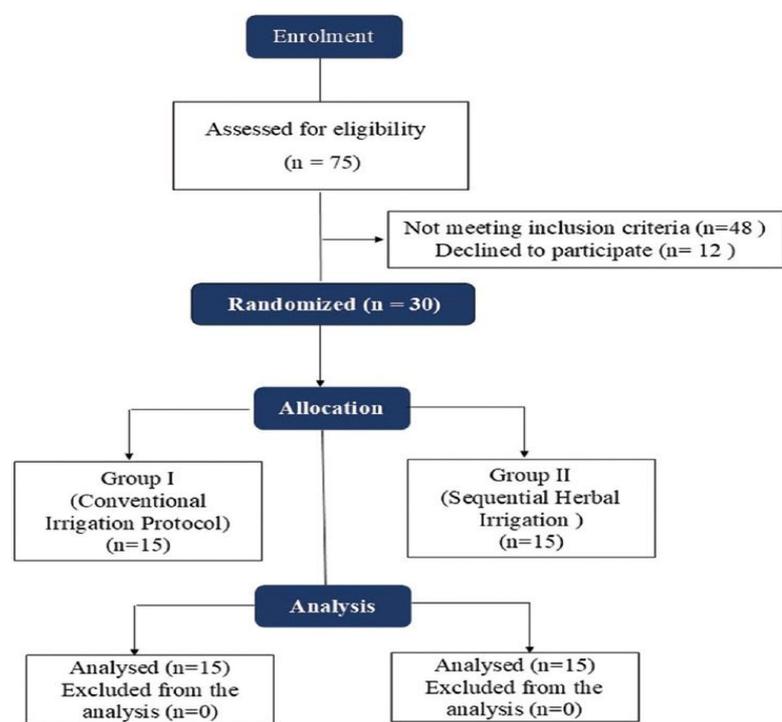
[Comparative evaluation of antibacterial efficacy of sequential herbal irrigation with conventional irrigation in endodontic therapy of primary teeth: A randomized controlled trial.](#)

Kendre SB, Bhatane AU, Dadpe MV, Kale YJ, Dahake PT.J Indian Soc Pedod Prev Dent. 2025 Jul 1;43(3):410-417. doi: 10.4103/jisppd.jisppd_253_25. PMID: 41026567

Background: Successful endodontic therapy in primary teeth relies on effective microbial control. Although conventional irrigants are effective, they pose risks such as cytotoxicity, unpleasant taste, and tissue irritation. Herbal alternatives offer a safer, biocompatible option, especially suitable for children.

Aims: To evaluate and compare the antimicrobial efficacy of a sequential herbal irrigation protocol with a conventional irrigation protocol in the endodontic treatment of primary teeth.

Materials and methods: It is a split-mouth, double-blind, and randomized controlled trial that included 15 pediatric patients aged 4-8 years with bilateral primary molars indicated for pulpectomy. Group I received conventional irrigation with 3% sodium hypochlorite, 17% ethylenediaminetetraacetic acid, and 2% chlorhexidine. Group II underwent sequential herbal irrigation using ethanolic extracts of 12.5% *Salvadora persica* (Miswak), 20% *Azadirachta indica* (Neem), 2% tea tree oil, and 10% phytic acid. Pre and postirrigation microbial samples were collected and cultured to quantify



Enterococcus faecalis and *Prevotella intermedia*. Statistical analysis used paired t-tests for intragroup comparisons and one-way analysis of variance for intergroup differences, with significance set at $P < 0.05$.

Results: Both groups showed significant microbial reduction ($P < 0.0001$). Group I had 90.54% and 87.6% reductions in *E. faecalis* and *P. intermedia*, respectively, while Group II

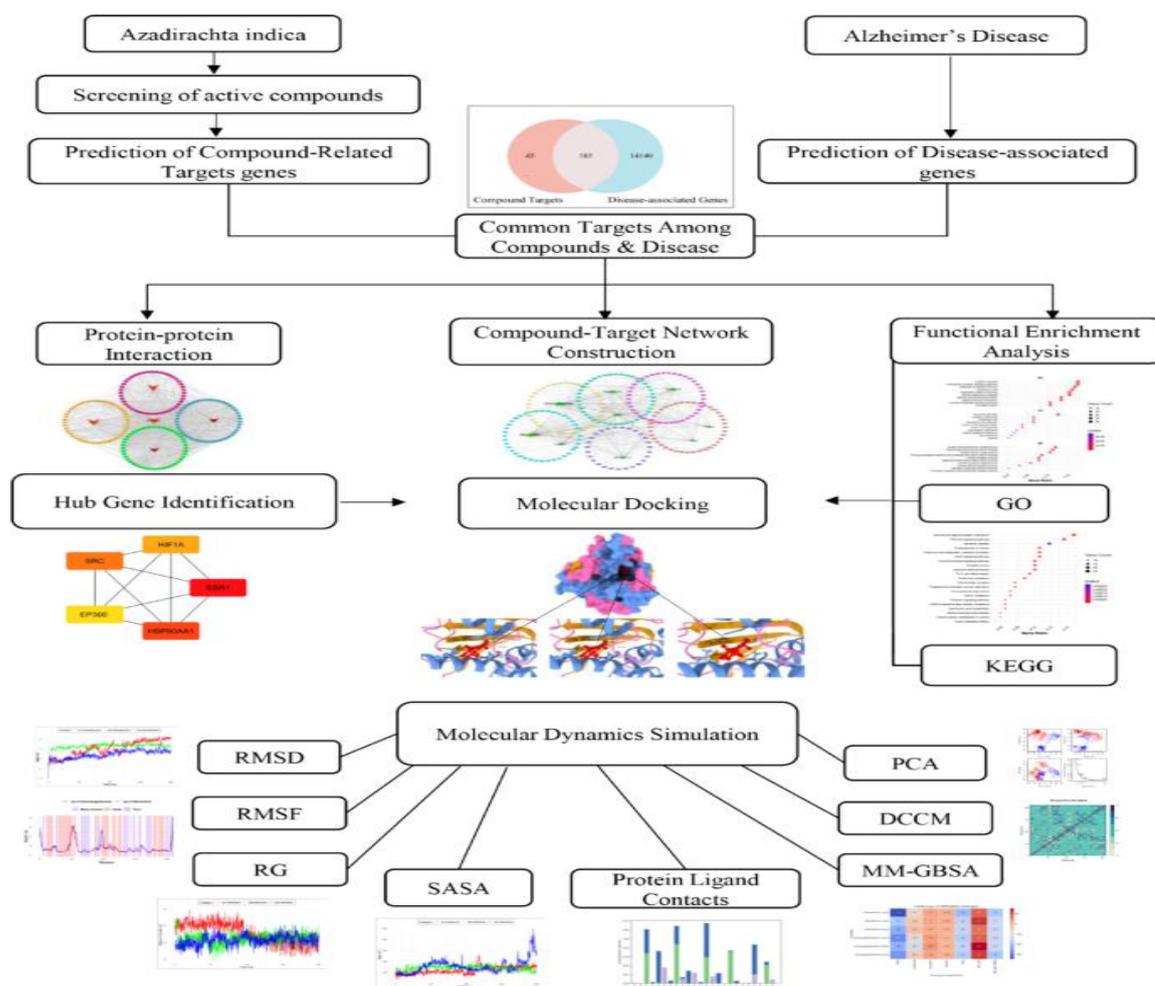
achieved 92.2% and 90.54%. Herbal irrigation showed significantly greater *E. faecalis* reduction ($P = 0.025$), but *P. intermedia* reduction was not significant ($P = 0.384$).

Conclusions: The sequential herbal irrigation protocol showed comparable antimicrobial efficacy to conventional agents, with added benefits of safety, biocompatibility, and reduced cytotoxicity, making it a promising natural alternative in pediatric endodontics.

[Multi-target therapeutic potential of Neem \(*Azadirachta indica*\) phytochemicals in Alzheimer's disease: an integrative network pharmacology and molecular dynamics simulation approach.](#)

Kavey MRH, Hossain MA, Shohag MSR, Ansari IA, Ansari SA, Alkahtani HM, Hossain A, Rahman MH. In *Silico Pharmacol.* 2025 Oct 17;13(3):147. doi: 10.1007/s40203-025-00434-1. eCollection 2025.PMID: 41113166

Alzheimer's disease (AD) remains a significant challenge in neurological research, with limited treatments available to halt or reverse its progression. This study utilizes an *in-silico* approach to explore the therapeutic potential of Neem (*Azadirachta indica*)-derived phytochemicals in targeting key AD-associated proteins. We screened 286 bioactive compounds, selecting 9 with favorable ADME profiles and blood-brain barrier permeability. A compound-target complex network was built to retrieve hub genes through topological analysis. GO and KEGG analyses provided biological insights into target functions. Molecular docking assessed compound binding affinities, while molecular dynamics simulations analyzed stability and interaction details through RMSD, RMSF, radius of gyration, SASA, and PCA. Network analysis highlighted ESR1, HSP90AA1, SRC, HIF1A and EP300 as key hub genes within the AD-related compound-target network, suggesting critical regulatory roles. KEGG pathway analysis emphasized Neem compounds roles in mitigating cell death, amyloid accumulation, apoptosis, and synaptic dysfunction, suggesting their therapeutic potential in AD. Subsequent molecular docking revealed high binding affinities of Nimolinin and Isomargolonone with AD-associated proteins, particularly HSP 90-alpha, Src kinase, and HIF-1 α . These compounds demonstrated strong hydrogen bonding and hydrophobic interactions, showing promise for stabilizing pathological protein conformations in AD. MD simulations validated interaction stability, with RMSD and RMSF analyses confirming consistent binding and minimal fluctuations. Structural integrity, solvent accessibility, and PCA further supported stable binding. This integrative *in-silico* study identifies Nimolinin and Isomargolonone as promising multi-target compounds with strong affinities for key AD-related proteins and pathways. These findings provide a foundation for experimental validation (Enzyme-Linked Immunosorbent Assay and western blotting) further could offer novel therapies for AD.



[Polyherbal formulations and phytosome-based delivery in diabetic wound healing: an integrative review.](#)

Chettupalli AK, Bukke SPN, Vardhan J, Yadhav S, Mamilla Mugaiahgari BK, Jahnvi P, Yata VK, Narapureddy BR.J *Biomater Sci Polym Ed.* 2025 Oct 4:1-28. doi: 10.1080/09205063.2025.2568684. Online ahead of print. PMID: 41045264

Diabetic foot ulcers are a global health concern due to their high prevalence, chronicity, risk of infection, and recurrence. Alternative therapy is necessary since clinical outcomes are poor despite prescribed treatments such as debridement, antibiotic medication, and revascularization. A growing number of researchers are looking at plant medicines as potential new adjuvant or supplementary treatments; the topic includes polyherbal preparations and innovative nanocarrier platforms. This review aims to evaluate the pharmacological action, formulation strategy, and translation potential of polyherbal formulations and phytosome-based drug delivery with a focus on their potential for use in DFU therapy. The anti-inflammatory, antioxidant, antibacterial, and pro-angiogenic effects of polyherbal formulations, including *Curcuma longa*, *Azadirachta indica*, and *Centella asiatica*, work in tandem to accelerate the healing process once a wound has occurred. Vesicular carriers derived from phospholipids, phytosomes, improve the skin's absorption of phytoconstituents and their medicinal efficacy by increasing their solubility, stability, and bioavailability. New research from both animal and human studies indicates that herbal actives encased in phytosomes can influence inflammatory pathways, speed up re-epithelialization, and enhance collagen synthesis. The necessity for standardization of

herbal products, regulatory hurdles, and insufficient broad clinical validation are some of the current challenges that this research highlights further. It concludes by discussing future possibilities in wound care protocols, such as omics-oriented techniques, biomarker-driven individualized treatment, and the use of phytosome-enhanced polyherbal systems. Together, our findings reinforce the notion that polyherbal phytosome formulations have the potential to enhance diabetic wound healing outcomes significantly.

Neem Veterinary Science & Medicine

[Sustainable control of aflatoxin B1, ochratoxin A, and fumonisin B1 in poultry feed using plant extracts and clay.](#)

Gherbawy YA, AlOmari H, Al-Harathi HF, ElDewy E, Ioan P, Elhariry H. *Sci Rep.* 2025 Oct 15;15(1):35966. doi: 10.1038/s41598-025-17693-9. PMID: 41093865

Mycotoxin contamination in poultry feed continues to pose significant challenges for animal health, food safety, and overall public health. In this study, we investigated the antifungal and antitoxigenic activities of hydro-alcoholic extracts and crude essential oils from Clove (*Syzygium aromaticum*), Cinnamon bark (*Cinnamomum verum*), Ginger (*Zingiber officinale*), Neem (*Azadirachta indica*), and Fenugreek (*Trigonella foenum-graecum*). These plant-derived substances were evaluated both with and without the addition of kaolin clay, targeting major mycotoxins such as Aflatoxin B1 (AFB1), Ochratoxin A (OTA), and Fumonisin B1 (FB1) levels (Table 3). Our antifungal assays focused on *Aspergillus flavus*, *A. niger*, and *Fusarium proliferatum*. Among the tested agents, clove and cinnamon oils demonstrated the strongest antifungal properties, with clove oil providing consistent inhibition across all fungal species. Neem extracts exhibited moderate efficacy, particularly in lowering AFB1 concentrations. Notably, the incorporation of kaolin clay (1 mg/g feed) enhanced FB1 detoxification, especially when combined with ginger or clove oils. In contrast, fenugreek-derived products showed minimal antifungal or antitoxigenic effectiveness. These findings highlight the potential of certain plant-based products—namely clove, cinnamon, and neem—used in conjunction with kaolin clay as sustainable alternatives to synthetic chemicals for controlling mycotoxin contamination in poultry feed. Further research is recommended to optimize dosage and application strategies to maximize their efficacy.

[Synergistic effects of bioactive plant extract mixtures on methane reduction and rumen fermentation of *eragrostis curvula* hay in vitro.](#)

Akanmu AM, Hassen A, van Marle-Köster E, Azaizeh H, Apostolides Z, Landau SY. *Sci Rep.* 2025 Oct 7;15(1):34878. doi: 10.1038/s41598-025-16544-x. PMID: 41057434

Building on prior research indicating the methane-mitigating potential of specific medicinal plants for ruminant animals. This study aimed to investigate the associative effects of combining six medicinal plant extracts known for their methane-reducing properties: Aloe vera (AV), Carica papaya (CP), *Azadirachta indica* (AZ), *Tithonia diversifolia* (TD), *Jatropha curcas* (JA), and *Moringa oleifera* (MO). Methanolic extracts of the plants were combined in equal proportions into two-way mixtures and applied at a concentration of 50

mg/L to 400 mg *Eragrostis curvula* hay, followed by a 48-hour in vitro incubation. Phytochemical profiling of individual plant extracts was performed using LC-MS and HPLC methods. Evaluated parameters included methane (CH₄) production, total gas production (TGP), in vitro organic matter digestibility (IVOMD), ammonia nitrogen, and volatile fatty acids (VFA). Phytochemical profiling revealed diverse bioactive compounds such as flavonoids, saponins, anthraquinones, phenols, alkaloids, and terpenoids in all extracts, with AZ showing the highest phenolic content. The mixtures significantly reduced CH₄ production by over 50%, individual plant extracts generally showed greater improvements in IVOMD compared to mixtures. Moreover, the mixture displayed positive associative effects on various parameters, including TVFA, CH₄/IVOMD, CH₄/TGP, and CH₄/TVFA production. Two-way mixture containing AV or CP (AV + CP, AV + JA) notably increased propionic acid concentration, differentiating them from single plant extracts, monensin, and control treatments. The study highlights that specific combinations of these medicinal plant extracts can significantly reduce methane emissions while positively modulating rumen fermentation parameters, indicating their potential as natural additives for sustainable livestock production.

[Botanical Anthelmintics: A Trending Approach to Control Gastrointestinal Diseases in Ruminants.](#)

Jamil M, Saleemi MK, Rehman MU, Ali A, Murtaza B, Ijaz MU, Abbas RZ, Khatoon A. *Mini Rev Med Chem.* 2025 Oct 30. doi: 10.2174/0113895575397910251007115700. Online ahead of print. PMID: 41169142

Anthelmintic resistance in livestock is an escalating global concern, as synthetic anthelmintics tend to lose their efficacy within 2-10 years of their routine usage. This rapid development of resistance results in significant economic losses and threatens the sustainability of livestock production systems. Gastrointestinal (GI) parasitism, a primary health challenge in ruminants, significantly impairs productivity, fertility, and overall animal welfare. Environmental factors such as high humidity, temperature fluctuations, and poor management practices further predispose animals to certain parasitic infections. In recent years, the search for alternative solutions has led to a growing interest in plant-derived anthelmintics. These botanical compounds, rich in bioactive phytochemicals, offer a promising and eco-friendly approach to controlling parasites by targeting their metabolism, reproduction, and structural integrity. Unlike synthetic drugs, herbal anthelmintics are often associated with fewer side effects, reduced toxicity, and a lower risk of developing possible resistance. Several medicinal plants, such as *Azadirachta indica*, *Allium sativum*, *Artemisia absinthium*, and *Fumaria parviflora*, have demonstrated potent anthelmintic properties in both in vitro and in vivo studies. Furthermore, synergistic effects among multiple phytochemicals can enhance efficacy and broaden the spectrum of activity against diverse helminths. This review highlights the efficacy, mechanisms of action, and practical applications of herbal remedies in controlling parasitic infections in ruminants. Emphasizing the integration of natural remedies into sustainable livestock health programs, this approach holds great potential to reduce reliance on synthetic drugs while improving animal health, productivity, and farm profitability.