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INDIAN SANDALWOOD (*SANTALUM ALBUM* L.): A COMPREHENSIVE REVIEW OF ITS CULTURAL HERITAGE, TRADITIONAL USES, AND MODERN PERSPECTIVES

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Abstract: Indian Sandalwood (*Santalum album* L.) is one of the most valuable plant species in the world that have been associated with human civilization for more than four millenia. This review aims to document the historical significance of sandalwood, its mythological background, cultural importance, economic value, and its traditional and scientific applications. Indian sandalwood has been widely celebrated and discussed abundantly in old Indian literary works like the Ramayana, Mahabharata, Vedas, and Arthashastra. It is being used extensively in different religious and spiritual practices of Hinduism, Buddhism, Jainism, and Zoroastrianism. Traditional uses of sandalwood are from birth till death, including homa and abhishekam in ceremonies, Ayurvedic medicine preparations like Chyawanprash, skincare products, and handcrafts. The efficacy of various traditional applications of sandalwood has been established by modern science through its pharmacological attributes like antitumor, antibacterial, anti-inflammatory, and neuroprotective effects. Main bioactive constituents are α - and β -santalols. Unfortunately, due to over exploitation for its cultural and economic importance, sandalwood has become a threatened species.

Keywords: *Santalum album*, Cultural heritage, Traditional, Pharmacological, Santalol, Handcraft, Bioactive

CHANGES IN SELECTED BIOCHEMICAL COMPOUND CONTENTS AND ENZYMATIC ACTIVITIES DURING VIVO-PLANT PRODUCTION IN PLANTAIN (*MUSA AAB*) CV. ‘CORNE 1’

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Abstract: The limited availability of high-quality planting material is one of the major constraints to increasing plantain production in Côte d'Ivoire. Macropropagation represents an accessible alternative for the rapid production of planting material; however, the biochemical and enzymatic processes associated with bud formation remain poorly documented. This study evaluated the effect of prior sucker dehydration on bud production and characterized changes in selected biochemical compounds and enzymatic activities during macropropagation of the plantain (*Musa AAB*) cv. ‘Corne 1’. A total of 90 suckers were collected, and healthy suckers were assigned to two treatments: non-dehydrated suckers (TEM) and suckers dehydrated for two weeks (DESH). Total sugar, total protein, and total phenolic compound contents, as well as phenylalanine ammonia-lyase (PAL) and peroxidase (POX) activities, were determined weekly over a six-week incubation period. The first roots emerged after 7–8 days, whereas the first buds were observed after 14 days. The mean number of buds per explant was significantly higher in DESH (58.28 buds) than in TEM (34.66 buds). In contrast, the mean times to root emergence and bud emergence did not differ significantly between treatments. Total sugar, protein, and phenolic compound contents, as well as PAL and POX activities, showed temporal variations that differed between treatments. These results indicate that prior dehydration for two weeks can enhance bud production and is associated with changes in the biochemical and enzymatic dynamics of suckers during plantain macropropagation.

Keywords: Plantain, Musa AAB, Macropropagation, Sucker dehydration, Bud production, Biochemical changes

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EFFECTS OF AQUEOUS LEAF EXTRACTS OF *AGERATUM CONYZOIDES* AND *BIDENS PILOSA* ON GERMINATION AND EARLY GROWTH OF TWO LOCAL RICE GENOTYPES FROM KOHIMA, NAGALAND

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Abstract: Weeds may affect crop establishment not only through competition for resources but also through chemical interactions. This study evaluated the effects of aqueous leaf extracts of *Ageratum conyzoides* L. and *Bidens pilosa* L. on seed germination and early seedling growth of two locally cultivated rice genotypes, *Thevür* and *Rosolha*. A factorial experiment was conducted in a completely randomized design with three replications. Root length (RL), shoot length (SL), root-to-shoot ratio (R/S), seedling vigor index (SVI), total seedling length (TSL), mean germination time (MGT) and germination percentage (GP) were evaluated. Extract concentration significantly affected SL, RL, R/S, SVI, TSL and MGT ($P < 0.001$), whereas GP was not significantly affected. *Rosolha* showed greater RL, R/S and SVI than *Thevür* ($P < 0.001$). Across weed species, seedlings exposed to *B. pilosa* had greater RL, R/S and SVI than those exposed to *A. conyzoides*, indicating stronger growth inhibition by *A. conyzoides* under the conditions tested. Significant genotype $\times$ concentration interactions were observed for SL ($P < 0.001$), TSL ($P = 0.002$) and MGT ($P = 0.020$), with reductions in growth and greater delays in germination at higher concentrations being more pronounced in *Thevür*. A significant weed species $\times$ concentration interaction was also observed for MGT ($P = 0.042$). Overall, the responses of the two rice genotypes to aqueous leaf extracts depended strongly on extract concentration, with *Thevür* showing greater reductions in early seedling growth at higher concentrations.

Keywords: Angami, Allelopathy, Wet terrace rice, Weeds, Aqueous leaf extract

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GREEN SYNTHESIS OF SILVER NANOPARTICLES USING *THUJA OCCIDENTALIS* L. LEAF EXTRACT: A COMPREHENSIVE STUDY OF ANTIMICROBIAL POTENTIAL

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Abstract: The increasing prevalence of antimicrobial resistance has necessitated the exploration of novel therapeutic agents from natural sources. This study investigates the green synthesis of silver nanoparticles (AgNPs) using aqueous leaf extract of *Thuja occidentalis* L. and evaluates their antimicrobial potential against pathogenic bacteria and fungi. The biosynthesis of AgNPs was confirmed by UV-Visible spectroscopy, revealing a characteristic surface plasmon resonance peak at 420 nm, with the rapid formation of stable nanoparticles observed within 20 minutes of reaction. The antibacterial activity, assessed using the agar well diffusion method, demonstrated significant concentration-dependent inhibition against *Pseudomonas aeruginosa*, with maximum zones of inhibition of 16 mm at 60 μ g concentration, comparable to the standard antibiotic streptomycin (18 mm). However, *Staphylococcus aureus* exhibited resistance to all tested concentrations, indicating differential susceptibility between Gram-negative and Gram-positive bacteria. Antifungal evaluation revealed selective activity against *Candida albicans* with a zone of inhibition of 16 mm, while *Aspergillus niger* and *Phytophthora capsici* showed resistance. The study successfully demonstrates a simple, rapid, cost-effective, and environmentally friendly approach for synthesizing antimicrobial silver nanoparticles using *T. occidentalis* leaf extract. These findings validate the traditional medicinal use of *Thuja* and suggest its potential as a sustainable source for developing alternative antimicrobial agents. The green nanotechnology approach presented herein offers promising applications in biomedical fields, contributing to the global effort to combat antimicrobial resistance while promoting environmental sustainability.

Keywords: *Thuja occidentalis*, Silver nanoparticles, Green synthesis, Antimicrobial activity, UV-Vis spectroscopy

SEASONAL OCCURRENCE OF MAJOR SUCKING INSECT-PESTS AND THEIR NATURAL ENEMIES ON OKRA (*ABELMOSCHUS ESCULENTUS* L. MOENCH) DURING SUMMER

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Abstract: The present study investigated the seasonal occurrence of major sucking insect pests of okra (*Abelmoschus esculentus* L. Moench) and their natural enemies during the summer. Field observations were recorded from seedling stage to crop maturity on leafhopper, whitefly, and aphid populations, along with associated natural enemies, and were correlated with weather parameters. Pest populations appeared soon after crop establishment and peaked during the mid-season, with leafhopper being the most predominant pest. Natural enemy activity closely followed pest population trends, while temperature and relative humidity significantly influenced population fluctuations. The findings highlight the importance of understanding seasonal pest dynamics for developing effective and eco-friendly Integrated Pest Management strategies.

Keywords: Aphid, Coccinellids Okra, Leafhopper, Whitefly

RELOCATION, *EX-SITU* CONSERVATION AND VEGETATIVE PROPAGATION OF *ANDROGRAPHIS CHENDURUNII* E.S.S. KUMAR, A.E.S. KHAN & S.G. GOPAL (ACANTHACEAE): A STENO-ENDEMIC SPECIES OF THE SOUTHERN WESTERN GHATS

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Abstract: *Andrographis chendurunii* E.S.S. Kumar, A.E.S. Khan & S.G. Gopal, a steno-endemic species of the southern Western Ghats in Kerala, was successfully relocated to the Shendurney Wildlife Sanctuary after a lapse of three decades. Notes on its ecology, habitat, ex-situ conservation and propagation techniques are provided as complementary measures towards the long-term recovery and conservation of this narrowly distributed endemic species.

Keywords: *Andrographis chendurunii*, Rediscovery, Steno-endemic, Ex-situ conservation, Vegetative propagation