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AMF-MEDIATED DEFENSE RESPONSES IN CROP PLANTS AGAINST PHYTOPATHOGENIC FUNGI

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Abstract: In a symbiotic relationship, Arbuscular Mycorrhizal Fungi (AMF) enhance the host's absorption of nutrients such as phosphate and nitrate while the heterotrophic fungal partner is provided with photosynthates from the host plant. Mycorrhiza-induced resistance, or MIR, is a trait of AMF-colonized plants that is attributed to a variety of mechanisms, including enhanced plant nutrition, altered root morphology and rhizosphere environment, controlled synthesis of secondary metabolites, competition for invasion sites and nutrients, stimulation of the plant defense system to elicit defense responses that include morphological, biochemical, and molecular ones, thus effectively managing fungal diseases. Therefore, in sustainable agriculture, AMF can be employed as an important tool in integrated crop disease management.

Keywords: AMF, defense responses, mechanisms, phyto pathogenic fungi

VARIOUS APPROACHES FOR ENHANCING THE ARTEMISININ CONTENT AND AROMATIC OIL OF ARTEMISIA ANNUA L.

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Abstract: The *Artemisia annua* L. plant is well-known for yielding "artemisinin," a crucial ingredient in the treatment of malaria. Artemisinin, isolated from *Artemisia annua* L., is potentially being effective against multidrug-resistant strains of the malarial parasite, *Plasmodium*. The essential oils of the plant work well to keep mosquitoes away. The majority of efforts have been focused on increasing the content of artemisinin. Since wild *Artemisia* spp. produce limited amount of this metabolite, the artemisinin-based drugs remain exorbitantly costly despite tremendous efforts. An overview of the several initiatives to enhance these antimalarial chemicals is provided in this article.

Keywords: *Artemisia annua*, Artemisinin, Biotechnological tools, Fertilizers, Phytohormones

BIOPHYSICAL CHARACTERISTICS OF SANDALWOOD (*SANTALUM ALBUM* L.), AN ANALYSIS

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Abstract: Sandalwood (*Santalum album* L.) is an economically important versatile hardwood species in India and it is known to grow in varied regions and climatic conditions. Identifying the appropriate plant traits is crucial for ensuring sustained yield in plantation over the long term. The objective of this study was to explore the biophysical characteristics of sandalwood, uncovering variations in the examined traits. The investigation reveals diverse leaf colorations ranging from yellowish-green to dark green, exhibiting varying degrees of intensity. Seven distinct leaf shapes were identified, including Ovate, Obcordate, Elliptical, Lanceolate, Sickle-shaped, Oblanceolate, and Obovate. The leaf lamina displayed a surface area spanning from 7.6 cm² to 21.26 cm², while thickness along the midrib ranged from 498.92 µm to 877.13 µm. Additionally, laminal side thickness varied from 196.09 µm to 406.73 µm. Microscopic analysis unveiled stomatal indices on the abaxial leaf surface, ranging from 19.28% to 29.46%. Furthermore, the study assessed epicuticular wax content, revealing a maximum of 11.97 g and a minimum of 2.41 g per leaf. These findings provide valuable insights into the diverse leaf traits within the species, highlighting the significance of morphological and anatomical characteristics in plant taxonomy and ecology. Further exploration of these traits may unveil their significance in conferring resistance against pests and pathogens affecting sandalwood.

Keywords: Sandalwood, Biophysical, Leaf, variations

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ISOLATION, IDENTIFICATION AND BIOASSAY OF NATIVE *BACILLUS THURINGIENSIS* ISOLATES AGAINST *SPODOPTERA FRUGIPERDA*

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Abstract: Totally nineteen *B. thuringiensis* strains were isolated from 50 soil samples which were collected from various locations of Tirunelveli and Tuticorin districts. Out of 583 *Bacillus* like colonies 288 colonies were produced crystals and nineteen strains were identified as *Bt* based on crystal morphology. Bipyriform, cuboidal, spherical shape of crystals and spores attached with crystals were observed in the isolates. All strains showed positive results to gram staining, motility test, Methyl Red (MR) test, catalase test. Some of the strains were negative for Voges Proskauer and Starch hydrolysis test. *cryI*, *cry2Aa* and *cry2Ab* genes were observed in these isolates through PCR analysis. KKM 2 and KKM 14 were caused above 60% mortality. KKM 5, KKM 17 and KKM 18 were showed lowest per cent mortality (16.67%) against *S. frugiperda*.

Keywords: *B. thuringiensis*, Isolation, *Cry* genes, Fall army worm

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FORAGING BEHAVIOR OF INDIAN HONEY BEE, *APIS CERANA INDICA* (HYMENOPTERA-APIDAE) ON SPONGE GUARD, *LUFFA CYLINDRICA* L. FLOWERS IN SURGUJA DISTRICT OF CHHATTISGARH, INDIA

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Abstract: A study was undertaken at Raj Mohini Devi College of Agriculture and Research station, Ambikapur (Chhattisgarh) substation of Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) India. The foraging behavior of Indian honey bee, *Apis cerana indica* was observed in sponge guard flowers during 17 August 2022- 21 September 2022. The maximum foraging activity of honey bee was observed second week of September 2022 (2.82 bees/5min/m²) followed

by first week of September 2022 (2.48 bees/5min/m²) and fifth week of August 2022 (2.04 bees/5min/m²) however the lowest population was recorded during fourth week of August 2022 (0.16 bees/5min/m²). Similarly during the different hours of the day, the maximum population of honey bees was recorded at 1000 hrs. (2.33 bees/5min/m²) followed by at 1200 hrs. (1.82 bees/5min/m²) and at 800 hrs. (1.72 bees/5min/m²). However, the lowest population was recorded at 1600 hrs. (0.52 bees/5min/m²).

Keywords: Sponge guard flowers, *Luffa cylindrical*, *Apis cerana indica*, Foraging behavior

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EXTRACTION AND ASSESSMENT OF PHARMACOLOGICAL POTENTIAL OF *KAEMPFERIA GALANGA* L. ESSENTIAL OIL

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Abstract: *Kaempferia galanga* L., is known commonly as aromatic ginger or galangal. It is a medicinal plant with a long history of use in traditional medicine systems. This paper provides the extraction of essential oil from rhizomes of this medicinal plant and the results of gas chromatography-mass spectrometry (GC-MS) analysis of *Kaempferia galanga* essential oil. This discusses the major chemical components found in the rhizome oil, identified through GC-MS analysis and highlights the potential pharmacological applications of many compounds detected.

Keywords: *Kaempferia galanga*, Aromatic ginger, GC-MS, Galangal oil