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A review on physiological function of phytochemicals identified in various parts of the plantAlbizialebbeck

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ABSTRACT
Albizialebbeck L., scientifically referred to as Indian Siris or Koko, is an annual tree from the Fabaceae (formerly Leguminosae) family of legumes.Medicinal plants are an important and fundamental source for the herbal and pharmaceutical industries, and they contribute significantly to the global health protection of millions of people.Phytochemicals are substances extracted from plants that are produced by various plant parts, such as roots, stems, bark, rhizomes, leaves, flowers, fruits, and seeds, throughout different stages of cellular metabolism.
Previous studies have dealt with the phytochemicals of various plant parts, including nutrients, glycosides, alkaloids, anthraquinones, essential oils, flavonoids, terpenoids, steroids, saponins, phenolics, and tannins.All plant parts, including root, leaves, flowers, bark, and seed, are useful in Indian traditional medicine in the treatment of several health ailments, for example, allergies, asthma, bronchitis, arthritis, fractures, gingivitis, gum inflammation, toothache, hemorrhage, leprosy, leukoderma, malaria, night blindness, scorpion sting, snakebite, and syphilis.
Finally conclude that A. lebbeck is still an excellent source of phytochemicals with a variety of biological activities that have exceptional therapeutic effects for people all over the world.
Key word: Albizialebbeck, Medicinal plants, phytochemicals, therapeutic effects.

I. INTRODUCTION

According to the World Health Organisation, approximately 70–80% of the world's population, particularly in the poorest countries of Asia and Africa, depends on non-traditional medicine for some component of basic healthcare (Srivastava and Pandey, 2015).Ancient literature (Rabia, 2005) documents the use of medicinal plants in India in systems of medicine such as Ayurveda, Homoeopathy, Siddha, and Unani (AYUSH system of medicine).

"Medicinal plant" refers to a diverse group of plant species used to treat sickness or discomfort. Medicinal plants are an important and fundamental source for the herbal and pharmaceutical industries, and they contribute significantly to the global health protection of millions of people (Khan, 2016).
Phytochemicals are substances extracted from plants that are produced by various plant parts, such as roots, stems, bark, rhizomes, leaves, flowers, fruits, and seeds, throughout different stages of cellular metabolism. Several types of phytochemicals exist, including alkaloids, phenols, flavonoids, tannins, sterols, carbohydrates, lipids, proteins, and their derivatives, as well as nucleic acids (Balkrishnaet al., 2022). These phytochemicals have been used in traditionally by tribal people from a long back in herbal medicines. These phytochemical studies are important so as to validate and commercialize the use of these phytochemicals in formation of new drugs and medicines (Sharma et al., 2022).

Plants: Albizialebbeck

Albizialebbeck L., scientifically referred to as Indian Siris or Koko, is an annual tree from the Fabaceae (formerly Leguminosae) family of legumes. It is a member of the class Magnoliopsida, comprising the genus Albizia and the subfamily Mimosoideae. Most members of this family are found in tropical and subtropical parts of Asia and Africa, where they grow quickly as trees and shrubs (Latifet al., 2019).

The flowers of the plant are self-compatible; however they require pollinators to come for the flowers to trip. Higher values for visiting frequency and rate indicate that floral visitors are considered effective pollinators of flowering plants (Zameeret al., 2017). Pollinators vary in their frequency of visits and levels of activity, which has an impact on the fruit and seeds setting in plants (Cane and Schiffhauer, 2003).Due to its fragrant flowers and attractive appearance, the

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plant is grown as an ornamental tree. Its roots, which bind the soil, also help control soil erosion.

Previous studies have dealt with the phytochemicals of various plant parts, including nutrients, glycosides, alkaloids, anthraquinones, essential oils, flavonoids, terpenoids, steroids, saponins, phenolics, and tannins (Elshiekhet al., 2020; Avosehet al., 2021).

According to Abdul-Hafeezet al. (2014), A. lebbeck bark extract exhibited the greatest phenolic concentration (148.00 mg/g gallic acid equivalents). Among the flavonoids that were separated from the bark are isookanin, luteolin, geraldone, and catechin. Similar to this, stem bark has yielded the isolation of many triterpenoidssaponins chemicals (Bajpaiet al., 2024; Vianaet al., 2019). The acetone extract of A. lebbeck stem bark revealed the presence of many phytochemicals, such as phytosterolstocopherols, eight phenolic acids, mostly cinnamic acid, and eight flavonoids, namely chrysoeriol, hesperidin, and quercetin(Ibrahim and Abdul-Hafeez, 2023).

Pharmacological properties

All plant parts, including root, leaves, flowers, bark, and seed, are useful in Indian traditional medicine in the treatment of several health ailments, for example, allergies, asthma, bronchitis, arthritis, fractures, gingivitis, gum inflammation, toothache, hemorrhage, leprosy, leukoderma, malaria, night blindness, scorpion sting, snakebite, and syphilis(Balkrishnaet al., 2022). In light of their possible anti-hepatotoxicity, anti-inflammatory, antimicrobial, antiviral, and antioxidant properties, herbal products have recently come to light as effective treatments for a variety of skin conditions, including eczema, herpes, leucoderma, cellulitis, ringworm, and scabies (Note et al., 2015).

In Indian traditional medicine, all partsof plant A. lebbeck(roots, leaves, flowers, bark, and seeds) are beneficial for treating a wide range of illnesses, including syphilis, allergies, asthma, bronchitis, arthritis, fractures, gingivitis, gum inflammation, toothaches, haemorrhages, leprosy, leukoderma, malaria, night blindness, scorpion stings, and snakebite (Meshramet al., 2015). Moreover, the flowers have an anti-pulmonary activity (Faraget al., 2013).The anti-carcinogenic properties of plant bark, namely that of A. lebbeck and B. lanzan, were investigated scientifically by Shrivastavaet al.(2024).

Phoraksaet al. (2023) applied human microglial HMC-3 cells to study the impact and mechanism of A. lebbeck leaf extracts on glutamate-induced neurotoxicity and apoptosis associated with ER stress.According to Saleemet al. (2019), A. lebbeck possesses antioxidant and neuroprotective qualities, which raise the possibility of evaluating its conventional medicinal potential in neurodegenerative illnesses.Islam et al. (2018) assessed the methanol extract of A. lebbeck leaves' neuropharmacological effects on Swiss albino mice.

According to a clinical investigation by Haramohan, (2017), sixty individuals with allergic conjunctivitis had a considerable reduction in their symptoms. A. lebbeck is used as an eye drop, administered two drops three times a day for thirty days.Nikhat and Fazil (2017) investigated the anti-inflammatory properties of several solvent extracts of A. lebbeck on both acute and chronic phases of inflammation, as well as the anti-inflammatory properties of the extracts in an animal model of adjuvant-induced arthritis.

In vitro studies have revealed the antibacterial properties of crude plant extracts rich in a range of phytochemicals, including tannins, flavonoids, phenols, and alkaloids. To determine the functional qualities or efficacy of each portion of the plant, such herbal extracts should be researched or require scientific validation (Ibrahim and Abdul-Hafeez, 2023).

In General herbal medicines recognized as potent antimicrobial agents, WHO has approved traditional medicinal remedies safe for ailments of either microbial or non-microbial.There are versatile perceptive in drug discoveries using plant based natural products like antimicrobial screening(Aliet al., 2018).A. lebbeck extract was biologically active as an antibacterial agent againstB. subtilis and S. marcescens and had moderate activity against A. johnsonii and A. tumefaciens,while E. carotovora and E. coli were the least affected (Ibrahim and Abdul-Hafeez, 2023).

The ethanolic extract of root exerted antibacterial activity againstE. coli, S. flexneri, P. aeruginosa, S. typhi, K. pneumonia,S. boydii, S. aureus, and E. faecalis with 9.05–15.77 mminhibition range, where S. typhi showed maximum inhibition followed by S. flexneri (15.50 mm) at 200 mg/mlwith MIC 0.20 and 0.39 mg/ml, respectively (Joshiet al., 2013). Similarly,petroleum ether, ethyl acetate, and methanol extracts fromthe stem bark and leaves exhibited antimicrobial activityagainst selective microbes among Gram-positive bacteria,that is, B. polymyxa, B. subtilis, B. megaterium, S. lutea, andS. aureus; Gram-negative bacteria such as V. mimicus,V. cholera, S.

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typhi, S. boydii, S. flexneri type-1, S. dysenteriae,P. aeruginosa, K. pneumoniae, E. coli, and P. vulgaris (Bobbyet al., 2012).

Finally, according to present study, A. lebbeck is still an excellent source of phytochemicals with a variety of biological activities that have exceptional therapeutic effects for people all over the world. Furthermore, the processes of these active phytochemicals must be the focus of future research in order to facilitate their possible enrolment for drug discovery, as the pharmacological physiological characteristics of the isolated compounds with known bioactivities are very limited.

REFERENCES

[1]. Abdul-Hafeez, E.Y.; Karamova, N.S.; Ilinskaya, O.N. (2014) Antioxidant activity and total phenolic compound content of certain medicinal plants. Int. J. Biosci. 5, 213–222.

[2]. Ali, M.T.; Haque, S.T.; Kabir, M.L.; Rana, S.; Haque, M.E. (2018) A comparative study of in vitro antimicrobial, antioxidant and cytotoxic activity of Albizialebbeck and Acacia nilotica stem bark. Bull. Fac. Pharm. Cairo Univ. 56, 34–38.

[3]. Avoseh O. N., Mtunzi F. M., Ogunwande I. A., Ascrizzi R., and Guido F. (2021). "Albizialebbeck and Albiziazygia volatile oils exhibit anti-nociceptive and anti-inflammatory properties in pain models," Journal of Ethnopharmacology, vol. 268, Article ID 113676.

[4]. Bajpai A, Wal P, Srivastava A, Yadav AK, Srivastava A.(2024) A Comprehensive Review of the Phytochemicals, Nutritional Values, and Therapeutic Applications of Albizialebbeck, Current Drug Therapy; Volume 20, Issue , e15748855338072.

[5]. Balkrishna A, Sakshi, Chauhan M, Dabas A, Arya V. (2022). A Comprehensive Insight into the Phytochemical, Pharmacological Potential, and Traditional Medicinal Uses of Albizialebbeck (L.) Benth.Evidence-based Complement.Altern.Med. 2022.

[6]. Bobby M. N., E. G. Wesely, and M. A. Johnson, (2012) "In vitro antibacterial activity of leaves extracts of AlbizialebbeckBenth against some selected pathogens," Asian Pacific Journal of Tropical Biomedicine, vol. 2, no. 2, pp. S859–S862.

[7]. Cane J.H., Schiffhauer D. (2003). Dose-response relationships between pollination and fruiting refine pollinator comparisons for cranberry (Vacciniummacrocarpon [Ericaceae]). Am. J. Bot. 90, 1425–1432. Canto-Aguilar, M.A., Parra-Tabla, V., 2000.

[8]. Elshiekh Y.H., Alagbash R.E., Ali R.A., Saad F.O., Musharaf M. (2020) Phytochemical constituents, antibacterial screening and antioxidant activity of Albizialebbeck (L.) Benth (Seed). N. A. J. Adv. Res. Rev. 7, 035–040.

[9]. Farag M., El Gamal A., Kalil A., Al-Rehaily A., El Mirghany O., El Tahir K. (2013) Evaluation of some biological activities of Albizialebbeck flowers. Pharmacol. Pharm., 4, 473–477.

[10]. Haramohan M. Effect of Shirishadropsin allergic conjunctivitis: A clinico-pathological evaluation. Int. J. Res. Ayurveda Pharm, 2017;8(Suppl 1):35-39.

[11]. Ibrahim OHM, Abdul-Hafeez EY. (2023) The Acetone Extract of Albizialebbeck Stem Bark and Its In Vitro Cytotoxic and Antimicrobial Activities. Horticulturae. 9(3):1–14.

[12]. Islam S., Shajib M. S., Datta B. K., & Rashid, M. A. (2018).Neuropharmacological Activities of Methanol Extract of Albizialebbeck (L.)Benth. Bangladesh Pharmaceutical Journal, 21(2), 80–86.

[13]. Joshi A., N. Sengar, S. Prasad, R. Goel, A. Singh, and S. Hemalatha, (2013) "Wound-healing potential of the root extract of Albizzialebbeck," PlantaMedica, vol. 79, no. 09, pp. 737–743.

[14]. Khan M.A. (2016). Introduction of Importance of Medicinal Plants and Herbs.National health portal, India.

[15]. Latif A, Malik SA, Saeed S, Zaka SM, Sarwar ZM, Ali M. (2019) Pollination biology of Albizialebbeck (L.) Benth.(Fabaceae: Mimosoideae) with reference to insect floral visitors. Saudi J. Biol. Sci. [Internet]. King Saud University; 26(7):1548–52.

[16]. Meshram G. G., Kumar A., Rizvi W., Tripathi C. D., and Khan R. A. (2015). "Central analgesic activity of the aqueous and ethanolic extracts of the leaves of Albizialebbeck: role of the GABAergic

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and serotonergic pathways," Zeitschriftf¨urNaturforschung C, vol. 70, no. 1-2, pp. 25–30.

[17]. Nikhat S, Fazil M. A Review on Dalk (Massage) with Special Reference to the Prescribed Mediciations. Traditional and Integrative Medicine, 2017; 2(1):39-52.

[18]. Note, O.P.; Jihu, D.; Antheaume, C.; Zeniou, M.; Pegnyemb, D.E.; Guillaume, D.; Chneiwess, H.; Kilhoffer, M.C.; Lobstein, A. (2015) Triterpenoidsaponins from Albizialebbeck (L.) Benth and their inhibitory effect on the survival of high grade human brain tumour cells.Carbohydr. Res. 404, 26–33.

[19]. Phoraksa O, Chimkerd C, Thiyajai P, Judprasong K, Tuntipopipat S, Tencomnao T, Charoenkiatkul S, Muangnoi C, Sukprasansap M. Neuroprotective Effects of Albizialebbeck (L.) Benth. Leaf Extract against Glutamate-Induced Endoplasmic Reticulum Stress and Apoptosis in Human Microglial Cells. Pharmaceuticals (Basel). 2023 Jul 10;16(7):989.

[20]. Rabia A.A. (2005). Urinary diseases and ethanobotany among pastoral nomads in the Middle East.Jornal of Ethanobiology and Ethanomedicine, 1:4.

[21]. Saleem U, Raza Z, Anwar F, Chaudary Z, Ahmad B. Systems pharmacology based approach to investigate the in-vivo therapeutic efficacy of Albizialebbeck (L.) in experimental model of Parkinson's disease. BMC Complement Altern Med. 2019 Dec 5;19(1):352.

[22]. Sharma T, Rani C, Kumar D, Kumar H, Deep A. (2022). Phytochemical screening and traditional medicinal potential of AlbiziaLebbeck (L.)Benth: An update. TMR Mod. Herb. Med. 5(4):23.

[23]. Shrivastava J, RatnaMadhuri T., Shah A. Chromatographic Profiling and Cytotoxic studies of Extracts of BuchananialanzanSpreng and AlbizialebbeckBenth.Research Journal of Pharmacy and Technology. 2024; 17(1):103-108.

[24]. Srivastava P.K. and Pandey A.K. (2015). Natural Products and Derivatives: Biological and Pharmacological activities. Biochem.Cell. Arch. 15(1): 1-38.

[25]. Viana, E.O.R.; Cruz, M.d.F.S.J.; da Silva, M.J.; Pereira, G.M.; da Silva, B.P.; Tinoco, L.W.; Parente, J.P. (2019). Structural characterization of a complex triterpenoidssaponin from Albizialebbeck and investigation of its permeability property and supramolecular interactions with membrane constituents.Carbohydr. Res. 471, 105–114.

[26]. Zameer S.U., Bilal M., Fazal M.I., Sajjad A. (2017). Foraging behavior of pollinators leads to effective pollination in radish Raphanussativus L. Asian J. Agric. Biol. 5, 221–227.