



Review Article

Report Review on Neem

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ABSTRACT

Neem scientifically appertained to as azadirachta indica is frequently saluted with the title of the phenomenon tree because of its remarkable diversity of remedial uses this phenomenal tree is of great value not just in the ancient art of ayurveda but also in contemporary medical practices proving its versatility and efficacy across colorful disciplines of health and heartiness well known in numerous traditional systems of drug similar as ayurveda unani and other systems of conventional mending neem shops are famed for their vast range of useful parcels these include antiviral antifungal antibacterial anti-inflammatory and indeed anticancer parcels making it a authentically multifaceted botanical asset a comprehensive review composition has been made available offering a thorough check that explores both traditional sundries and scientific knowledge about neem this report provides a detailed account of the colorful angles of neem similar as its operations the styles involved in its medication detailed evaluations of its efficacy as well as the benefits and downsides related to its use in addition this report examines the growing significance of neem in colorful major sectors similar as pharmacology husbandry and particular body care products and its growing significance in ultramodern practices[1].

INTRODUCTION

Neem (*Azadirachta indica*), commonly referred to as the "village pharmacy" of India, is a tree that is famous for its extensive applications and deeply rooted cultural significance. Native to the Indian subcontinent, neem has survived in tropical and subtropical regions for millennia. Its long history of use in traditional medicine systems—ranging from Ayurveda, Siddha, Unani, and other indigenous folk remedies—has cemented its role as an intrinsic component of holistic healing

practices. The most surprising aspect of neem is the fact that nearly every part of the plant is medicinally active. Leaves, bark, roots, seeds, fruits, and flowers have all been utilized in various ways to treat a myriad of health ailments, from acute infection to chronic inflammatory diseases. Traditionally, the neem tree has been used to treat a wide range of diseases ranging from dermatological infections, pyrexia, and malaria to oral and gastrointestinal diseases [2]. In ancient Ayurvedic texts, neem is referred to as "Sarva

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Roga Nivarini," or "the remedy for all diseases." Its applications are not limited to internal remedy; neem twigs have been used traditionally, and continue to be used, as toothbrushes, and neem paste is widely used topically for wound healing and dermal irritations. Its naturally bitter taste and astringent properties have been associated with detoxification processes both physically and metaphysically, as documented in classical texts. Modern scientific studies have begun to validate many indigenous assertions. The increased international interest is due to the complex and diversified phytochemical profile of neem. The multidimensional nature of the compounds such as azadirachtin, nimbin, nimbolide, quercetin, and salannin has exhibited an enormous range of biological activity. Antimicrobial, antiviral, antifungal, anti-inflammatory, antioxidant, anticancer, and even immunomodulatory activity [2] are some of the biological activities of these compounds. It is the reason why researchers are so interested in neem because it has the potential to target multiple pathways—most of its bioactive compounds interact with multiple biological systems instead of targeting a single cellular pathway, thus making it difficult for the pathogens to develop resistance. Additionally, the neem tree is the very essence of ecological sustainability. The hardy, drought-resistant tree requires minimal cultivation and can thrive on poor soil. Its use in ancient agricultural methods and organic pest control measures—more specifically as a natural soil conditioner and pest repellent—speaks of its value not just in medicine but in sustainable farming as well. Now the neem legacy is widening, and its uses have spread to industries like pharmaceuticals, nutraceuticals, personal care products, veterinary medicine, and organic farming. With the world's attention today centered on ecofriendly and sustainable medicine, neem has emerged as a potential contender that bridges indigenous knowledge and current scientific developments. However, with all its widespread use, wider and standardized clinical trials are needed to close the gap between traditional use of

neem and internationally accepted therapeutic regimens. The present review tries to explore the wide therapeutic spectrum of neem by reviewing its medical uses, preparation, benefits, limitations, and scientific research status [2].

2. Helpful Applications of Neem:

Antimicrobial activity of Neem is among its best-researched characteristics. Neem extricates are inhibitory against bacterial strains like *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa* and hence demonstrate to be a great sedate for curing skin diseases and wounds [3]. The antifungal properties of this compound make it valuable to treat diseases caused by parasites, such as athlete's foot and ringworm [4]. Remotely connected, neem oil has been appeared to decrease aggravation and deliver alleviation for long-term dermatological conditions like skin inflammation and psoriasis [5]. Neem leaf extricates have been found to show both antipyretic and anti-inflammatory movement comparable to routine nonsteroidal solutions [6]. Besides, they show immunomodulatory exercises, which increase the safe reaction against pathogens [7]. One of the most promising applications of neem is in cancer avoidance and treatment. Different considers demonstrate that neem compounds such as nimbolide cause cancer cells to experience apoptosis but do not hurt typical cells [8]. Besides, neem too controls diabetes. It has been demonstrated by considers that neem leaf powder and neem extricates diminish blood glucose and upgrade affront affectability in creature models [9].

3. Advantages of Neem:

Neem is bountiful and renewable by nature and thus an economic substitute for synthetic pesticides and drugs. Its multi-target mechanism of action inhibits microbial resistance [10]. It can be given in various forms—oil, powder, extract, and decoction—thus offering flexibility of treatment use [11].



Neem has a good safety profile when properly used. Its traditional use indicates that it produces few side effects at low to moderate levels, and it can be grown with minimal reliance on agrochemicals [12]. Its use in cosmetics, oral care products, and disinfectants is a demonstration of its flexibility [13].

4.Limitations and Deficiencies:

While it is beneficial, neem is not constraint-free. Neem oil, in high concentrations, has the potential to cause hepatic toxicity, particularly in children [14]. Oral administration of highly concentrated neem preparations may cause gastrointestinal upset and allergic responses in susceptible individuals [15]. The bitter taste and strong odor could hinder compliance with long-term treatment regimens [16]. In addition, maintaining regular dosing is often problematic due to differences in phytochemical content among different sections of the plant and preparation methods [17]. Also, there are no major clinical trials conducted to ascertain the safety and effectiveness of neem in human beings for specific diseases [18].

5.Neem Preparation Procedures:

Traditional Preparation Techniques-

Step 1: Neem Leaf Decoction

Green neem leaves are thoroughly washed to be free of impurities or dirt. A few of these leaves are boiled in water for 10–15 minutes until a greenish slightly bitter liquid forms. This can be cooled and applied on the skin condition or can be used as a mild antiseptic wash [19].

Step 2: Neem Leaf Paste

For preparing a paste, neem leaves are either pounded or ground with the assistance of a mortar and pestle or a blender after adding a very small quantity of water. The green paste thus derived is generally applied externally on the skin for treating acne, rashes, or infection [19].

Step 3: Neem Oil Extraction

The seeds are sun-dried conventionally, shelled, and cold-pressed to obtain the oil. In a few instances, the process of solvent extraction is utilized, where crushed seeds are soaked in solvents to obtain the oil. It is a conventionally utilized oil which is anti-inflammatory and antimicrobial in nature and is used on skin or scalp in diluted form [19].

Contemporary Preparation Techniques-

Step 4: Solvent-Based Extraction of Bioactive Compounds

New techniques use ethanol or methanol solvents in the process of isolating bioactive compounds from various neem plant parts like bark, leaves, and seeds. The plant material is treated with the solvent for hours to days, filtered, and concentrated to produce potent components like azadirachtin and nimbin [20].

Step 5: Chromatographic Analysis

These compounds are subsequently separated and characterized by chromatographic techniques (e.g., HPLC or GC-MS) to purify, quantify, and identify some bioactive molecules. These analyses are used in quality control of drug and research applications [20].

Step 6: Personal Care Formulation Neem oil is found in many personal care products, ranging from shampoos and soaps to lotions and creams. It is most often mixed with carrier oils like coconut or jojoba to dilute its strength and lower the chances of skin irritation, without losing its medicinal properties [21]. **Step 7: Marketable Goods** Neem today is found in different commercial preparations such as capsules, powders, and tinctures. The preparations are usually made up of standardized extracts in certain strengths and provide a convenient method of taking neem for overall health or some health benefits [22].



6.Evaluation Methods:

Phytochemical analysis of neem involves the determination of terpenoids, flavonoids, and limonoids by High-Performance Liquid Chromatography (HPLC) and Mass Spectrometry (MS) [23]. In vitro studies test neem's antimicrobial, antioxidant, and anticancer properties using agar diffusion, DPPH scavenging, and MTT assays, respectively [24]. Rodent in vivo tests are part of its toxicity profile, immune response, and therapeutic index [25]. Clinical trials are scarce but have shown the superiority of neem mouthwash over chlorhexidine in preventing gingivitis and plaque [26].

CONCLUSION:

Neem is still a significant component of traditional medicine and slowly finding a place in evidence-based contemporary therapy. While its anticancer and antimicrobial potential is appealing, further clinical research and standardization is needed for it to be adapted globally. A balance between traditional knowledge and science will decide the place of neem in the era of integrative medicine.[27].

REFERENCES

1. Biswas, K. et al. (2002). Biological activities and medicinal properties of neem (*Azadirachta indica*). *Current Science*, 82(11), 1336-1345.
2. Subapriya, R. & Nagini, S. (2005). Medicinal properties of neem leaves: a review. *Current Medicinal Chemistry*, 12(3), 287-293.
3. Okemo, P. et al. (2001). The antibacterial properties of *Azadirachta indica*. *African Journal of Health Sciences*, 8(1-2), 20-25.
4. Kher, C.P. et al. (2013). Antifungal properties of neem against dermatophytes. *Journal of Ethnopharmacology*, 146(2), 509-512.
5. Sharma, A. et al. (2014). Topical application of neem oil in dermatology. *International Journal of Dermatology*, 53(6), 749-756.
6. Chattopadhyay, R.R. (1998). Possible mechanism of anti-inflammatory activity of *Azadirachta indica*. *Indian Journal of Pharmacology*, 30(2), 104-106.
7. Baral, R. & Chattopadhyay, U. (2004). Neem-induced immunomodulation. *Immunopharmacology and Immunotoxicology*, 26(1), 149-158.
8. Paul, R. et al. (2011). Cancer preventive role of neem. *International Journal of Oncology*, 39(1), 151-159.
9. Pandey, R. et al. (2009). Antidiabetic effect of *Azadirachta indica*. *Indian Journal of Clinical Biochemistry*, 24(4), 367-371.
10. Isman, M.B. (2006). Botanical insecticides, deterrents, and repellents. *Annual Review of Entomology*, 51, 45-66.
11. Srivastava, R. et al. (2013). Neem formulations in traditional medicine. *Journal of Medicinal Plants Research*, 7(14), 746-752.
12. National Medicinal Plants Board (2020). *Neem Monograph*. Government of India.
13. Koul, O. et al. (1990). Neem in personal care: opportunities and challenges. *Cosmetics & Toiletries*, 105, 83-89.
14. Sundar, S. et al. (2010). Hepatotoxicity induced by neem oil ingestion in children. *Pediatrics International*, 52(4), 602-604.
15. Chopra, A. et al. (2004). Allergic response to neem: A case study. *Journal of Allergy and Clinical Immunology*, 113(2), S160.
16. Kapoor, L.D. (1990). *Handbook of Ayurvedic Medicinal Plants*. CRC Press.
17. Gajalakshmi, S. et al. (2012). Phytochemical standardization of neem. *Journal of Pharmacognosy and Phytochemistry*, 1(3), 33-38.
18. Kaur, S. et al. (2016). Need for clinical trials on neem. *Journal of Clinical Trials*, 6(2), 1000251.
19. Nadkarni, K.M. (1976). *Indian Materia Medica*. Popular Prakashan.
20. Harborne, J.B. (1998). *Phytochemical Methods*. Springer.



21. Dutta, A. et al. (2012). Neem oil-based formulations and their dermatological applications. *Asian Journal of Pharmaceutical Sciences*, 7(1), 13-20.
22. HerbalGram (2020). Market survey on neem-based supplements.
23. Wagner, H. & Bladt, S. (1996). *Plant Drug Analysis*. Springer.
24. Bandyopadhyay, U. et al. (2002). Evaluation of antioxidant activity of neem. *Free Radical Biology and Medicine*, 33(11), 1441-1450.
25. Singh, R. et al. (2008). In vivo pharmacological studies of neem extract. *Indian Journal of Experimental Biology*, 46(7), 505-510.
26. Pai, M.R. et al. (2004). Evaluation of neem mouthwash. *Indian Journal of Dental Research*, 15(1), 15-18.
27. World Health Organization (WHO). (2020). *Guidelines on Traditional Medicines*.

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