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RESEARCH PAPER ON NEEM (AZADIRACHTA INDICA)

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ABSTRACT

Neem (Azadirachta indica) is a well-known medicinal plant widely used in traditional and modern medicine. It contains numerous bioactive compounds such as azadirachtin, nimbin, and quercetin which exhibit antimicrobial, anti-inflammatory, and antioxidant properties. Various parts of neem including leaves, bark, seeds, and flowers are used for treating multiple diseases. This paper reviews the phytochemistry, pharmacological activities, and therapeutic applications of neem. Neem also plays an important role as a natural pesticide and in healthcare systems.

KEYWORDS: Neem, Azadirachta indica, Medicinal plant, Antioxidant, Pharmacology, Herbal medicine.

1. INTRODUCTION

Neem (Azadirachta indica), belonging to the Meliaceae family, is native to the Indian subcontinent and has been used for centuries in traditional medicine systems like Ayurveda and Unani. It is often called the “village pharmacy” due to its wide range of therapeutic uses. More than 80% of people in developing countries rely on plant-based medicines, and neem plays a significant role in this system.

2. Botanical Description

Scientific Name: Azadirachta indica

Family: Meliaceae

Common Name: Neem

Height: 15–20 meters

Parts Used: Leaves, bark, seeds, fruits, flowers

Neem is a fast-growing evergreen tree widely distributed in tropical and subtropical regions.

3. Phytochemistry of Neem

Neem contains more than 150 bioactive compounds. Major constituents include:

Azadirachtin

Nimbin

Nimbidin

Quercetin

Limonoids

These compounds are responsible for neem's medicinal properties such as antibacterial, antifungal, and antioxidant effects.

4. Pharmacological Activities

4.1 Antibacterial Activity

Neem extracts inhibit the growth of harmful bacteria and are used in treating infections and dental problems.

4.2 Anti-inflammatory Activity

Neem reduces inflammation and is useful in treating arthritis and skin diseases.

4.3 Antioxidant Activity

Neem neutralizes free radicals and protects cells from damage.

4.4 Anticancer Activity

Studies suggest neem compounds have chemo preventive properties and may help in cancer treatment.

4.5 Antifungal and Antiviral Activity

Neem is effective against fungi and viruses, making it useful in skin and immune-related disorders.

5. Medicinal Uses of Neem

Neem is widely used in treating:

Skin diseases (acne, eczema)

Diabetes

Fever

Dental problems

Liver disorders

Digestive issues

Different parts of neem are used in various forms like powder, oil, extract, and decoction.

6. Agricultural Uses

Neem is used as a natural pesticide and insect repellent due to azadirachtin. It is eco-friendly and reduces the use of chemical pesticides.

7. Advantages of Neem

Natural and eco-friendly

Low toxicity

Easily available

Multi-purpose medicinal use

8. Limitations and Side Effects

Excess consumption may cause toxicity

Neem oil can be harmful in large doses

Not recommended for pregnant women without medical advice

9. CONCLUSION

Neem is a powerful medicinal plant with a wide range of pharmacological activities. Its bioactive compounds make it highly valuable in modern medicine, agriculture, and pharmaceutical industries. Further research can help in developing new drugs based on neem extracts.

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