

Azadirachta indica: A Medicinal Plant with Many Uses for Immunity, Cancer, and Digestive Disorders

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ABSTRACT:-

Azadirachta indica, a tropical plant widely used for its many therapeutic uses, is also referred to as neem. This review focuses on how it may help with digestive issues, cancer prevention and treatment, and immunity enhancement. The plant's bioactive substances, such as azadirachtin, nimbin, and nimbolide, have anticancer, immunomodulatory, and gastroprotective properties. Research reveals that neem can boost immunity, cause cancer cells to undergo apoptosis, and lessen gastrointestinal tract irritation. Its potential for medicinal use is further enhanced by its antioxidant and antibacterial qualities. With an emphasis on Azadirachta indica's possible uses and bioactive components, this thorough analysis highlights the plant's potential as a natural treatment for a range of illnesses. Limitations and future directions for research are also highlighted.

Keywords:- Immunomodulation, Anticancer, Gastroprotection, Immunity, Cancer, and AzadirachtaIndica.

I. INTRODUCTION:-

Neem, or Azadirachta indica, is a tropical plant species indigenous to Southeast Asia and the Indian subcontinent. Because of its many health advantages, neem has been valued in traditional medicine for centuries, giving it the moniker "the village pharmacy." This medicinal plant has been used widely to treat a wide range of illnesses, from fevers and skin diseases to digestive problems and cancer, in Ayurveda, Unani, and traditional African medicine.

Neem has been used for thousands of years, and recent studies have confirmed its remarkable pharmacological profile. It has been demonstrated that the plant's bioactive substances, including as nimbin, nimbolide, and azadirachtin, have immunomodulatory, anticancer, and gastroprotective qualities. These results have

generated a great deal of interest in investigating neem's potential as a homeopathic treatment for a range of illnesses.

The purpose of this review is to present a thorough summary of the medical benefits of Azadirachta indica, with particular emphasis on its:

1. Immunomodulatory effects and possible uses in illnesses involving the immune system.
2. Anticancer characteristics and modes of operation.
3. The role of gastroprotective agents in maintaining digestive health.

Through an analysis of the available data, this review aims to:

1. Emphasize the medicinal potential of neem in the treatment and prevention of various illnesses.
2. Talk about the bioactive substances that give it its therapeutic qualities.
3. Examine the mechanisms of action behind its effects on the immune system, against cancer, and gastroprotection.

Azadirachta indica (Neem Tree) :-



Fig 1:- Azadirachta Indica (Neem Tree)

Description of Botany:-

- Plantae:- Kingdom
- Family:- Meliaceae
- Category:- Azadirachta
- Sort Name:- A. indica
- Common Name:- Indian Lilac, Nimtree, and Neem

Morphological traits:-

1. Tree:- Huge, towering, evergreen tree reaching up to 15 meters Compound, imparipinnate leaves with 8–15 leaflets that are 20–40 cm long
2. Flowers: tiny, fragrant, white, and grouped
3. Fruits: 1.5–2.5 cm long, yellow drupes
4. Seeds: 1-2 cm long, oval, yellow seeds

The subsequent physical characteristics:

1. Tree:- A massive, towering, 15-meter-tall evergreen tree Imparipinnate, compound leaves with 8–15 20–40 cm long leaflets
2. Flowers: little, fragrant, clustered, white
3. Fruits: round, yellow drupes, 1.5–2.5 cm long
4. Seeds: 1-2 cm long, yellow seeds

Since ancient times, neem has been utilized in traditional medicine, especially in:

1. Skin conditions, fever, stomach problems, and insecticidal qualities are all treated by Ayurveda.
2. Unani:- Wounds, respiratory problems, joint discomfort, and skin conditions
3. Traditional African medicine: insecticidal qualities, skin disorders, stomach problems, and malaria

Uses of Folk Medicine:

1. Skin conditions: psoriasis, eczema, and acne
2. Restlessness, fever, and malaria
3. Digestive problems (constipation, diarrhea, bloating)
4. Efficient and repellent against insects
5. Oral health (tooth decay, gum inflammation)
6. Anti-inflammatory and wound-healing characteristics

Ingredients Used:-

1. Seeds
2. Leaves
3. Seed oil
4. Roots
5. Bark

Doctor-Assigned Parameters:-

1. An analysis morphological
2. Evaluation through microscopy
3. Assessment through physicochemistry (ash value, extractive value)
4. Chromatographic analysis (HPLC, GC-MS)

Control of Quality:-

1. Standardization (chemical fingerprinting)
2. Authentication (botanical identification)
3. Stability testing (shelf-life evaluation)

Status of Regulation:-

1. Listed in the UNESCO Medicinal Plants Database
2. Featured in the Indian Ayurvedic Pharmacopoeia
3. Subject to national regulatory bodies (such as the FDA and EMA)

Importance of neem in pharmacognosy:-

1. Effects on Immunomodulation
2. Properties that prevent cancer
3. Effects on Gastroprotection
4. Bioactive Substances and Their Action Mechanisms
5. Therapeutic Uses and Upcoming Projects
6. Final Thoughts

Anticancer Qualities:-

1. Cytotoxic effects on cancer cell lines (colonial, lung, and breast).
2. Induction of apoptosis and cell cycle arrest
3. Anti-metastatic and anti-angiogenic properties

Effects on Immunomodulation:-

1. Immune cell stimulation (macrophages, T-cells)
2. Increasing the production of antibodies
3. Control of the production of cytokines

Protective Aspects for the Stomach:-

1. Reduction of inflammation in the gastrointestinal system
2. Inhibition of microorganisms in the gut
3. Defense against oxidative stress and ulceration

Bioactive Substances:-

1. The Nimbin
2. Embolida
3. Quercetin
4. Azadirachtin

Action Mechanisms:-

1. Modulation of cell signaling pathways
2. The anti-inflammatory and antioxidant properties
3. The regulation of immunity

Applications:-

1. The prevention and treatment of cancer
2. The use of immunotherapy
3. Digestive diseases (peptic ulcers, IBD, and IBS)

Detection and Treatment:-

1. Identification of biomarkers for the detection of cancer;
2. Adjuvant therapy based on neem;
3. Combination therapy with traditional treatments

Prospective Routes:-

1. Clinical trials to determine safety and efficacy
2. Making neem extracts uniform
3. Examining how conventional treatments can work in concert with one another

Restrictions:-

1. Few human studies
2. Variability in the content of neem extract
3. Possible conflicts with prescription drugs

Future Courses:-

1. Human efficacy and safety are established by clinical trials.
2. Standardization to ensure constant quality in neem extracts.
3. Examining how conventional treatments can work in concert with one another.

Restrictions:-

1. Few research using humans.
2. The content of neem extract varies.
3. Possible conflicts with prescription drugs that is standard.

II. CONCLUSION:-

Neem, or *Azadirachta indica*, is an herbaceous plant with a long history of traditional use and a bright future in contemporary medicine. Throughout this review, Neem's:-

1. Immunomodulatory actions, which boost immunity and guard against infections.
2. Anticancer qualities that cause apoptosis and impede the development of cancer cells.
3. Gastroprotective properties that improve gut health and relieve digestive issues.

Neem's bioactive substances, including azadirachtin, nimbin, and nimbolide, have been

found to be important components of the plant's therapeutic qualities. Significant promise exists for the plant's ability to prevent and treat a wide range of illnesses, including as cancer, illnesses linked to the immune system, and digestive problems.

Last Words:-

The therapeutic benefits of *Azadirachta indica* have been used for ages. Neem's potential to enhance human health and well-being is becoming more and clearer as we continue to uncover its mysteries.

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