International Journal of Applied and Universal Research **E-ISSN No: 2395-0269**
Volume VIII, Issue I, Sept.- Oct. 2021 **Available online at: www.ijaur.com**

"STUDIES ON MEDICINAL PROPERTIES OF NEEM (AZADIRACHTA INDICA): A REVIEW"

Abhishekh Srivastava
Department of Botany
Govt. Swami Vivekanand College Teonthar, Rewa (M.P.)

ABSTRACT*: - Azadirachta indica*, commonly known as Neem, has attracted worldwide prominence in recent years, owing to its wide range of medicinal properties. Neem has been extensively used in Ayurveda, Unani and Homoeopathic medicine and has become a cynosure of modern medicine. Neem elaborates a vast array of biologically active compounds that are chemically diverse and structurally complex. More than 140 compounds have been isolated from different parts of Neem. All parts of the neem tree- leaves, flowers, seeds, fruits, roots and bark have been used traditionally for the treatment of inflammation, infections, fever, skin diseases and dental disorders. The medicinal utilities have been described especially for Neem leaf. Neem leaf and its constituents have been demonstrated to exhibit immunomodulatory, anti-inflammatory, antihyperglycaemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic and anticarcinogenic properties. This review summarises the wide range of pharmacological activities of Neem leaf.

KEYWORDS: Azadirachta indica, Neem, Neem leaf, Pharmacological activities and Phytochemicals.

INTRODUCTION:-

The plant product or natural products showan important role in diseases prevention and treatment through the enhancement of antioxidant activity, inhibition of bacterial growth, and modulation of genetic pathways. The therapeutics role of number of plants in diseases management is still being enthusiastically researched due to their less side effect and affordable properties. It has been accepted that drugs based on allopathy are expensive and also exhibit toxic effect on normal tissues and on various biological activities. It is a largely accepted fact that numerous pharmacologically active drugs are derived fromnatural resources includingmedicinal plants. Various religious documents such as Bible and Quran also supported the herbs role in health care and prevention. Islamic perspective also confirms the herbs role in diseases management and Prophet Mohammed recommended various plants/fruits in the diseases cure.

Neem ingredients are applied in Ayurveda, Unani, Homeopathy, and modern medicine for the treatment of many infectious,metabolic, or cancer diseases. Different types of preparation based on plants or their constituents are very popular in many countries in diseases management. In this vista, Neem (*Azadirachta indica*), a member of the Meliaceae family, commonly found in India, Pakistan, Bangladesh, and Nepal, has therapeutics implication in diseases cure and formulation based on the fact that neem is also used to treat various diseases. *Azadirachta indica* has complex of various constituents including nimbin, nimbidin, nimbolide, and limonoids and such types of ingredients play role in diseases management through modulation of various genetic pathways and other activities. Quercetin and ß-sitosterolwere first polyphenolic flavonoids purified from fresh leaves of Neem and were known to have antifungal and antibacterial activities. Numerous biological and pharmacological activities have been reported including antibacterial, antifungal, and anti-inflammatory. Earlier investigators have confirmed their role as anti-inflammatory, antiarthritic, antipyretic, hypoglycemic, antigastric ulcer, antifungal, antibacterial, and antitumour activities and a review summarized the various therapeutics role of Neem. This review summarizes the role of Neem and its active ingredients in the diseases prevention and treatment through the modulation of various biological pathways.

BOTANICAL DESCRIPTION OF NEEM:-

Neem tree belongs to the family Meliaceae which is found in abundance in tropical and semitropical regions like India, Bangladesh, Pakistan, and Nepal. It is a fast-growing tree with 20–23m tall and trunk is straight and has a diameter around 4-5 ft. The leaves are compound,

imparipinnate, with each comprising 5–15 leaflets. Its fruits are green drupes which turn golden yellow on ripening in themonths of June - August. Taxonomic position of *Azadirachta indica* (neem) is classified in Table 1.

Table 1: Taxonomic position of *Azadirachta indica* (Neem).

Order	Rutales
Suborder	Rutinae
Family	Meliaceae
Subfamily	Melioideae
Tribe	Melieae
Genus	*Azadirachta*
Species	*Indica*

A. indica commonly known as neem, is a large, evergreen tree, 12-18m in height and 1.8-2.4m in girth, with a straight and long, spreading branches forming a board crown, commonly found throughout the greater part of India.

Stem and Bark: Stem has a girth 1.8-2.4m and the bark is rough, hard, grey or dark grey, reddish brown inside with numerous oblique furrows and scattered tubercles.

Leaves: The leaves as alternate, impair pinnate and 20-38 cm long. The leaflets are 8-19 cm alternate or opposite. Leaves are ovate-lanceolate, oblique or sub foliate, glossy and bluntly serrate.

Flowers : The flowers are hermaphrodite. White or pale yellow, small, scented and numerous. Flowers are very lax and in axillary panicles.

Calyx: The calyx is five lobed. The sepals are small in size.

Petals: The petals are five in number, polypetalous. Stamina tube is a little shorter than the petals. There are 9-10 lobes at the apex; the lobes are truncate, again slightly toothed. The anthers are within the tube opposite to and shorter than the lobes.

Ovary : The ovary is called, style elongate, slender and stigma shortly cylindrical. There are two collateral ovules in each cell.

Fruit: The fruit is one seeded, drupe and endocarp is woody.

Seeds: The seeds are ellipsoid, cotyledons thick, fleshy cordate at base and radical superior.

METHODOLOGY:-

The databases used to get information from journals and articles are Google, PubMed, Science Direct, Scopus and Google Scholar. For the search of primordial and current Unani Classical literature author visited Library of Regional Research Institute of Unani Medicine (RRIUM), Srinagar, J & K, India.

MEDICINAL USES OF NEEM:

Various parts of the Neem tree have been used as traditional Ayurvedic medicine in India. Neem oil and the bark and leaf extracts have been therapeutically used as folk medicine to control leprosy, intestinal helminthiasis, respiratory disorders, constipation and also as a general health promoter. Its use for the treatment of rheumatism, chronic syphilitic sores and indolent ulcer has also been evident. Neem oil finds use to control various skin infections. Bark, leaf, root, flower and fruit together cure blood morbidity, biliary afflictions, itching, skin ulcers, burning sensations and pthysis

Immunostimulant activity: The aqueous extract of Neem bark and leaf also possesses anticomplement and immunostimulant activity. Neem oil has been shown to possess activity by selectively activating the cell-mediated immune mechanisms to elicit an enhanced response to subsequent mitogenic or antigenic challenge.

Hypoglycaemic activity: Aqueous extract of Neem leaves significantly decreases blood sugar level and prevents adrenaline as well as glucose-induced hyperglycaemia. Recently, hypoglycaemic effect was observed with leaf extract and seed oil, in normal as well as alloxan-induced diabetic rabbits.

Antiulcer effect: Neem leaf and bark aqueous extracts produce highly potent antiacid secretory and antiulcer activity.

Antifertility effect: Intra-vaginal application of neem oil, prior to coitus, can prevent pregnancy. It could be a novel method of contraception.

Antimalarial activity: Neem seed and leaf extracts are effective against both choroquin-resistant and sensitive strain malarial parasites.

Antifungal activity: Extracts of Neem leaf, Neem oil seed kernels are effective against certain fungi including Trichophyton, Epidermophyton, Microspor Trichosporon, Geotricum and Candida.

Antibacterial activity: Oil from the leaves, seed and bark possesses a wide spectrum of antibacterial action against Gram-negative and Gram-positive microorganisms, including M. tuberculosis and streptomycin resistant strains. In vitro, it inhibits Vibrio cholerae Klebsiella pneumoniae, M. tuberculosis and M. pyogenes. Antimicrobial effects of Neem extract have been demonstrated against Streptococcus mutans and S. faecalis.

Antiviral activity: Aqueous leaf extract offers antiviral activity against Vaccinia virus, Chikungemya and measles virus.

Anticancer activity: Neem leaf aqueous extract effectively suppresses oral squamous cell carcinoma induced by 7, 12-dimethylbenz anthracene, as revealed by reduced incidence of neoplasm. Neem may exert its chemopreventive effect in the oral mucosa by modulation of glutathione and its metabolizing enzymes.

Antioxidant activity: The antioxidant activity of Neem seed extract has been demonstrated in vivo during horse-grain germination.

Effect on central nervous system: Varying degrees of central nervous system (CNS) depressant activity in mice was observed with the leaf extract. Fractions of acetone extract of leaf showed significant CNS depressant activity.

CONCLUSION:-

It is heartening to see that a traditional Indian plant medicine has now led to several therapeutically and industrially useful preparations and compounds, which generates enough encouragement among the scientists in exploring more information about this medicinal plant. As the global scenario is now changing towards the use of nontoxic plant products having traditional medicinal use, development of modem drugs from Neem should be emphasized for the control of various diseases. In fact, time has come to make good use of centuries-old knowledge on Neem through modern approaches of drug development. For the last few years, there has been an increasing trend and awareness in Neem research. Quite a significant amount of research has already been carried out during the past few decades in exploring the chemistry of different parts of Neem. An extensive research and development work should be undertaken on Neem and its products for their better economic and therapeutic utilization.

REFERENCES:-

1. A. Ali, *Textbook of Pharmacognosy*, Publication and Information Directorate, New Delhi, India, 1993.
2. A. Y. Ketkar and C. M. Ketkar, "Various uses of neem products," in *The Neem Tree*, H. Schmutterer, Ed., pp. 518–525, John Wiley & Sons,Weinheim, Germany, 2004.
3. A. Zong, H. Cao, and F. Wang, "Anticancer polysaccharides from natural resources: a review of recent research," *Carbohydrate Polymers*, vol. 90, no. 4, pp. 1395–1410, 2012.
4. A.Kher and S. C.Chaurasia, "Antifungal activity of essential oils of three medical plants," *Indian Drugs*, vol. 15, pp. 41–42, 1997.
5. B. Sultana, F. Anwar, and R. Przybylski, "Antioxidant activity of phenolic components present in barks of *Azadirachta indica*, *Terminalia arjuna*, *Acacia nilotica*, and*Eugenia jambolana* Lam. trees," *Food Chemistry*, vol. 104, no. 3, pp. 1106-1114, 2007.
6. C. Kokate, A. P. Purohit, and S. B. Gokhale, *Pharmacognosy*, Nirali Prakashan, Maharashtra, India, 2010.
7. G. Brahmachari, "Neem—an omnipotent plant: a retrospection," *ChemBioChem*, vol. 5, no. 4, pp. 408–421, 2004.
8. K. Biswas, I. Chattopadhyay, R. K. Banerjee, andU. Bandyopadhyay, "Biological activities and medicinal properties of neem (*Azadirachta indica*)," *Current Science*, vol. 82, no. 11, pp. 1336-1345, 2002.

9. K. Girish and S. B. S. Neem, "A green treasure," *Electronic Journal of Biology*, vol. 4, pp. 102-111, 2008.

10. M. A. Hossain, M. D. Shah, and M. Sakari, "Gas chromatography-mass spectrometry analysis of various organic extracts of *Merremia borneensis* from Sabah," *Asian Pacific Journal of Tropical Medicine*, vol. 4, no. 8, pp. 637-641, 2011.

11. M. I. Al-Bukhari and S.Al-Bukhari, *The Collection of Authentic Sayings of ProphetMohammad (Peace Be uponHim),Division 71 on Medicine*, Hilal Yayinlari, Ankara, Turkey, 2nd edition, 1976.

12. N. Singh and M. S. Sastry, "Antimicrobial activity of Neem oil," *Indian Journal of Pharmacology*, vol. 13, pp. 102–106, 1997.

13. P. E. Ebong, I. J. Atangwho, E.U. Eyong, and G. E. Egbung, "The antidiabetic efficacy of combined extracts fromtwo continental plants: *Azadirachta indica* (A. Juss) (Neem) and *Vernonia amygdalina* (Del.) (African Bitter Leaf)," *The American Journal of Biochemistry and Biotechnology*, vol. 4, no. 3, pp. 239-244, 2008.

14. R. Paul, M. Prasad, and N. K. Sah, "Anticancer biology of *Azadirachta indica* L (neem): a mini review," *Cancer Biology and Therapy*, vol. 12, no. 6, pp. 467-476, 2011.

15. T. Efferth and E. Koch, "Complex interactions between Phytochemicals. TheMulti-Target Therapeutic concept of Phytotherapy," *Current Drug Targets*, vol. 12, no. 1, pp. 122–132, 2011.

16. T. R. Govindachari, G. Suresh, G. Gopalakrishnan, B. Banumathy, and S. Masilamani, "Identification of antifungal compounds from the seed oil of *Azadirachta indica*," *Phytoparasitica*, vol. 26, no. 2, pp. 109–116, 1998.

17. U. Bandyopadhyay, K. Biswas, A. Sengupta et al., "Clinical studies on the effect of Neem (*Azadirachta indica*) bark extract on gastric secretion and gastroduodenal ulcer," *Life Sciences*, vol. 75, no. 24, pp. 2867–2878, 2004.