

REVIEW ON NEEM (*Azadirachta indica*) SINGLE TREE AND MULTIPLE QUALITIESRENU SINGH^{a1} AND CHANDRA SHEKHAR SINGH^b, DEEPAK KUMAR SRIVASTAVA^c^aDepartment of Botany, T.D.P.G. College, Jaunpur, Uttar Pradesh, India^bDepartment of Botany, R.R.P.G. College, Amethi, Uttar Pradesh, India^cPrincipal, Career Convent Girls P.G. College, Lucknow, Uttar Pradesh, India

ABSTRACT

Neem has incredible healing qualities in terms of human health. It has been proven to have anti- ageing, antibacterial, antifungal, antiseptic, antiviral, anti-inflammatory, antipyretic, antiulcer qualities and also contain analgesic compounds. Neem is a fast- growing evergreen popular tree found commonly in India, Bangladesh, Myanmar, Pakistan, Africa and America. This review gives a birds eye view mainly on the biological activity and its preventive, promotive medicinal uses and applications over all this review also tell you that how 'single tree multiple qualities'.

KEYWORDS: *Azadirachata indica*, Biological Activity, Medicinal Uses, Antiviral

Neem has many vernacular names all over the world which include.

English name - Margosa tree

Hindi - Neem

Sanskrit - Nimb, Arishta

Gujarati - Leemdo

Marathi - Kadunimb

Nigerian - Dogon yar

Persian - Azad - darakhte

Arabic - Azad - darakhtul

In India the tree is known as Divine tree, Nature Drugstore, village pharmacy and Panacea of all diseases.

Neem has incredible healing qualities in terms of human health. It has been proven to have anti- ageing, anti - bacterial, antifungal, antiseptic, antiviral, anti-inflammatory, antipyretic, antiulcer qualities and also contain analgesic compounds (Chaudhari *et al.*, 2015).

CHEMICAL COMPOSITION

To give a brief back ground chemical investigations of neem were undertaken by Indian Pharmaceutical chemists, whereby they isolated acidic principle in neem oil, which they named as 'Margosic acid (Henry and Burnell, 1996).



Figure 1: Tree of the Margosa and Nimboli

Leaves mainly yield quercetin (flavonoid) and Nimbo-Sterol (B- sitosterol) as well as number of liminoids (nimbin and its derivatives). Quercetin is known to have anti-bacterial and antifungal properties. This may perhaps account for the curative properties of leaves for sores and scabies.

Limonoids like nimocinolids and isonimocinolide affect fecundity in house flies. They also show mutagenic properties in mosquitoes producing intermediates. Fresh matured leaves yield an odorous viscous essential oil which exhibits antifungal activity against fungi.

The trunk bark contains nimbn, nimbinin, nimbidin, nimboesterol essential oil, tannins, a bitter principle margosine. The bark contains tannins and non-tannins. It is anti-inflammatory Polysacchoride consisting of glucose, arabinose and fructose. The bark also yields an antitumor Polysaccharides.

The tree exudes a gum, which on hydrolysis yields, L-arabinose, L-fucose, D-galactose and D-glucuronic acid. The sap is reported to be Seed is very important both because of its high lipid content as well as the occurrence of a large number of bitter principles (Azadirachtin, azadiradione (Puri, 1999), fraxinellone, nimbin, salannin, salannol, etc.) in considerable quantities. Azadirachtin has proven effectiveness as a pesticide against about 200 insect species and is reported as non-toxic to humans (Sidhu *et al.*, 2003).

The composition of neem cake after the extraction of oil varies widely depending on the raw material used for expelling. The range of the proximate composition in percentage are crude protein, carbohydrates, crude fibre, fat, ash, acid insoluble ash. The neem cake is rich in most of the amino acids. It is a potential source of organic manure and contains many plant nutrients.

Properties

Neem the legendary medicinal tree of India has grown with the human settlement all over the country and has been an integral part of the Indian way of life for centuries. The history of the neem tree is inextricably linked to the history of the Indian civilization.

The neem tree has for a very long time been a friend and protector of the Indian villager. For ages Indians have trusted this tree to fortify their health and remedy scores of diseases. In addition it has been used for protecting food and stored grains and as a fertilizer and natural pesticide for the fields (Prakash and Srivastava, 2008).

The earliest authentic record of its medicinal use is available in Arthashastra of Kautilya in 4th century BC. Every part of Neem (leaves, seeds bark, fruit, flower, twig, gum, root and kernel) is utilized in curing various human ailments. In Homeopathy more than 70 neem based available drugs have been reported from neem and in unani medicine, it is used as blood purifier.

Margosa Oil

Its seeds contain up to 45% of stable oil. It also contains Sulphur, alkaloid, resin, glycosides and fatty acids (Schroeder, 1992). Neem contains amino acids. Its resin part contains tannin, calcium, potassium and iron salts.

Margosa Toddy

In some of the old margosa trees, when the trees become excited a liquid very similar to liquor starts exuding out of the tree. In a few trees this liquid exudes all through the year. When the tree exudes the liquid exudes all through the year. This liquid is known as toddy of margosa tree. It is sweet and sour in taste, unctuous and pungent. This toddy is a rare medicine. It is blood purifier and very effective in curing skin disorders.



Figure 2: Margosa Toddy

Margosa Gum

Neem also provide gum which contain lot of proteins and used as natural fabric dye to colour silk threads. It is also used as bulking agent for preparation of special food (for Diabetes).

Leaves

Leaves are used to cure eye troubles, small pox, leprosy, intestinal worms and ulcer. Dried leaves are used to protect woolen clothes and against stored rice grain pests (Singh, A.K., Singh, R., Singh, C.S. (2017). The young twigs are used in cough, asthma and piles.

Seed Kernel

It is useful in leprosy and intestinal worms apart from well-known Pesticidal Properties.

Neem Bark

The Bark is very useful in skin diseases. It is regarded as bitter tonic, antipyretic and astringents. It is also used in thirst, nausea, vomiting, ulcer as well as against malarial vector (Sanderson, K. (2007).

Neem Seed Oil

Neem seed oil contain upto 45% of a brown and bitter oil which is also known as oil of Margosa. The oil is yellow to brown in colour and contains acids (Yash *et al.*, 2000), glycerides, nimbedin, nimbin and azadirachtin. It has many therapeutic uses but can also serve as fuel for lamps and for soap production. Neem oil kills human sperms. Nim-76 has been identified as sperm killing agent and National institute of Immunology has prepared a cream 'Praneem' for curing sex diseases. It also provides protection against fungal disease especially powdery mildew.

Neem Cake

Neem Cake is the main byproduct of neem seed and is used as fertilizer. Neem cake is very effective in controlling insects and other pests. The cake contains salanin, nimbin and azadirachtin as major compounds.

Neem Toddy

Some old neem trees start oozing liquid which is called as 'Neem Ka Neera'. This liquid is colourless, light sweet in taste, bitter in smell and contains gum, phosphorus and protein. It is highly effective in skin diseases, blood pressure and ulcers.

Industrial Uses of Neem

Neem supports industries profitably like neem insecticide, pesticide, fumigant, fertilizer, manure, compost, urea coating agent, soil conditioner, biocontrol agent, hair products, medicine, oral hygienic products, insects' repellent coil, skin products, gel, tea, spray, candles, incense stick, soap etc.

Homemade neem-based recipes

- 2% of Neem oil and 98% of coconut oil act as mosquito repellent for 12 hours when applied on skin.
- Kerosene lamp containing 1% neem oil reduce mosquito biting activity.
- Chewing of 8-10 neem leaves early in the morning for 24 days protects body from diseases like diabetes, hypertension and skin problem.

Besides traditional uses the neem tree is of great importance for its anti-desertification properties and possibly as good as carbon dioxide sink.

Bioactive Constituents

The neem tree contains more than 100 bioactive ingredients and it is rich in proteins. Its bitter taste is due to an array of complex called limonoids. The most important bioactive principle is azadirachtin (repellent and growth regulator), gdnunin (anti-bacterial), nimbin (anti-inflammatory), nimbidin (anti-bacterial), nimbidal (anti-malarial) and (anti-pyretic), salanin (repellent) and sodium nimbinatate (spermicide).

The insecticidal ingredient found in the neem tree is azadirachtin, a naturally occurring substance that belongs to an organic molecule class called tetranortriterpenoids.

It is structurally similar to insect hormones called 'ecdysones. which control the process of metamorphosis as the insects pass from larva to pupa to adult.

Azadirachtin seems to be an ecdysone blocker. It blocks the insect's production and release of these vital hormones. Insects then will not molt thus breaking their life cycle. It is served as a feeding deterrent for some insects. Depending on the stage of life cycle, insect death may not occur for several days.

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