A Review on Traditional plant *Azadiracta indica*: Natural Source for Disease curability and Health Promotion

ABSTRACT

Neem (*Azadiracta indica*)is a medicinal plant, mostly found in the Himalayan region. The neem leaf is commonly and historically used in medicine to treat a variety of illnesses such as eyedisorders, nose bleeding, loss of appetite and liver problems etc. Because of its various pharmacological and therapeutic effects, it is included in the Ayurvedicpharmacopoeia. As a result, this reviewprovides current information on ethno medicinal uses, phytochemistry, pharmacological effects, adverse effects of *Azadirachta indica* with future advancement.Several references were checked for identification, in-depth literature including online databases, documents, and blogs. Around 29% of the compounds in *Azadiracta indica* have been isolated and characterised. The limonoids in the neem tree have a wide variety of antimicrobial and insecticidal properties. Complex azadirachtin, salaninare active principles extracted from neem seed. These metabolites' biochemical pathways in the neem tree are completely unknown. *Citrus sinensis* is related to the neem tree phylogenetically. 62 percent of neem genomic were anchored into citrus chromosomes according to comparative study. The azadirachtin, nimbin, salanin and nimbidin from neem tissues were quantified by using LC-MS. This paper shows the various use of neem in different disorder.

Keywords- Neem, herbal plant, use, traditional, chemical constituent.

1. INTRODUCTION

The mahogany treei.e.*Azadirachta indica* also known as Neem,Indianlilac; belongs to the Meliaceae family. It belongs to genus Azadirachta and is endemic to the subcontinent of India(Faccin-Galhardi et al., 2012). Tropical and semi-tropical climates are ideal for growing

it. This tree can also found in Southern Islands. Fruit and seed partis used to make Neem oil(Faccin-Galhardi et al., 2012).

2. Home remedies of Neem

2.1 Antifungal and antibacterial paste: The leaves of neem can be used to cure fungal and bacterial infections. Make a paste of tree leaves and apply into the infection for relief. Paste of Neem leaves is also used for treating chicken pox boils(Roshan & N. K. Verma, 2016).
2.2 Neem oil: The calcium and other mineral content is very high in neem leaves. Neem oil can be applied on body especially legs and hands for stronger bones. Also oil from neem is beneficial for patients with arthritis as it relieves the pain and reduces the inflammation(Roshan& N. K. Verma, 2016).
2.3 Natural Insecticide: Neem leaves are excellent mosquito and insect repellent. Burn neem leaves to keep mosquitoes away from your home and surroundings. This trick is mostly used by cattle rearers to keep all sorts of insects away from the cattle(Patel et al., 2016).
2.4 Oral health: Chewing neem leaves is beneficial for maintaining good oral health. It keeps the infections away from your gums, gives you fresh breath, lessens tooth decay, kills bad bacteria in your mouth and maintains the pH level of your saliva(Patel et al., 2016).
2.5 Boost immunity with Neem tea: Neem tea boost immunity in body against diseases such as common cold and fever. It is found in studies that neem tea can be as effective as quinine for treatment of malaria affected cells in the body(Brahmachari, 2004).
2.6 Homemade toothbrush: Smallbranches or twigs can be used for brushing your teeth. The same has been used for decades now and the same benefits can be availed by using neem toothpaste now-a-days (Agrawal et al., 2020).
2.7 Hair mask: Neem hair mask has a very healthy and lasting effect on your hair. It makes your hair strong and shiny. Prepare a paste of neem leaves and apply the same into your hair for better results. The same can also be used to treat dandruff and fungal infections of your scalp (Deepmala et al., 2017).
2.8 Removes acne: Neem oil removes acne and provides relief when applied on skin acne. Due to its anti-inflammatory properties, neem oil is found very effective for curing dry skin, itchiness, pimples etc(Plants et al., 2013).

Table 1: Different Doses in Ayurveda

S.NO.	DOSAGE FORM	QUANTITY	REFERNCE
1	Powder	3-6 gm	(Bhowmik et al., 2011).
2	Juice	10-20ml	(Bhowmik et al., 2011).
3	Decoction	20-50 ml	(Bhowmik et al., 2011).

3. Botanical Description

Neem trees are present in at least 30 countries throughout Asia, including India, Burma, Thailand, Bangladesh, Cambodia, Indonesia, Iran, Malaysia, Nepal, Pakistan, Sri Lanka, and Vietnam, as well as Africa, Australia, and Central and South America(El-Hawary et al., 2013).

4. Taxonomy of Neem Plant

Kingdom: Plantae
Subkingdom:Tracheobionta
Super Division: Spermatophyta
Division:Magnoliophya
Subclass: Rosidae
Order: Sapindales
Family: Meliaceae
Genus: *Azadiracta indica*(El-Hawary et al., 2013).

5. Morphology

The tree is estimated at height of 15-20 metres and has a lifespan of around 200 years (Crentsil et al., 2011). Because of its strong roots, the branches of treeare spread out widely and forming the crown of oval shape. The bark of the neem tree is brownish in colour.The leaves are green in colour, but they have a purple-red colour when the plant is young (Remedio et al., 2015). *Azadiracta indica* produces small, fragrant white flowers about 25 centimetres long. The yellow fruit is small and edible (Remedio et al., 2015).

6. Geographical Description

Neem is thought to be indigenous to the Indian subcontinent and dry areas of South Asia. It has spread to parts of Africa, the Caribbean, and a number of South and Central American countries(Tinghui, X., Wegener, M., Shea, O. M., Ma-Deling, Shea, 2001).

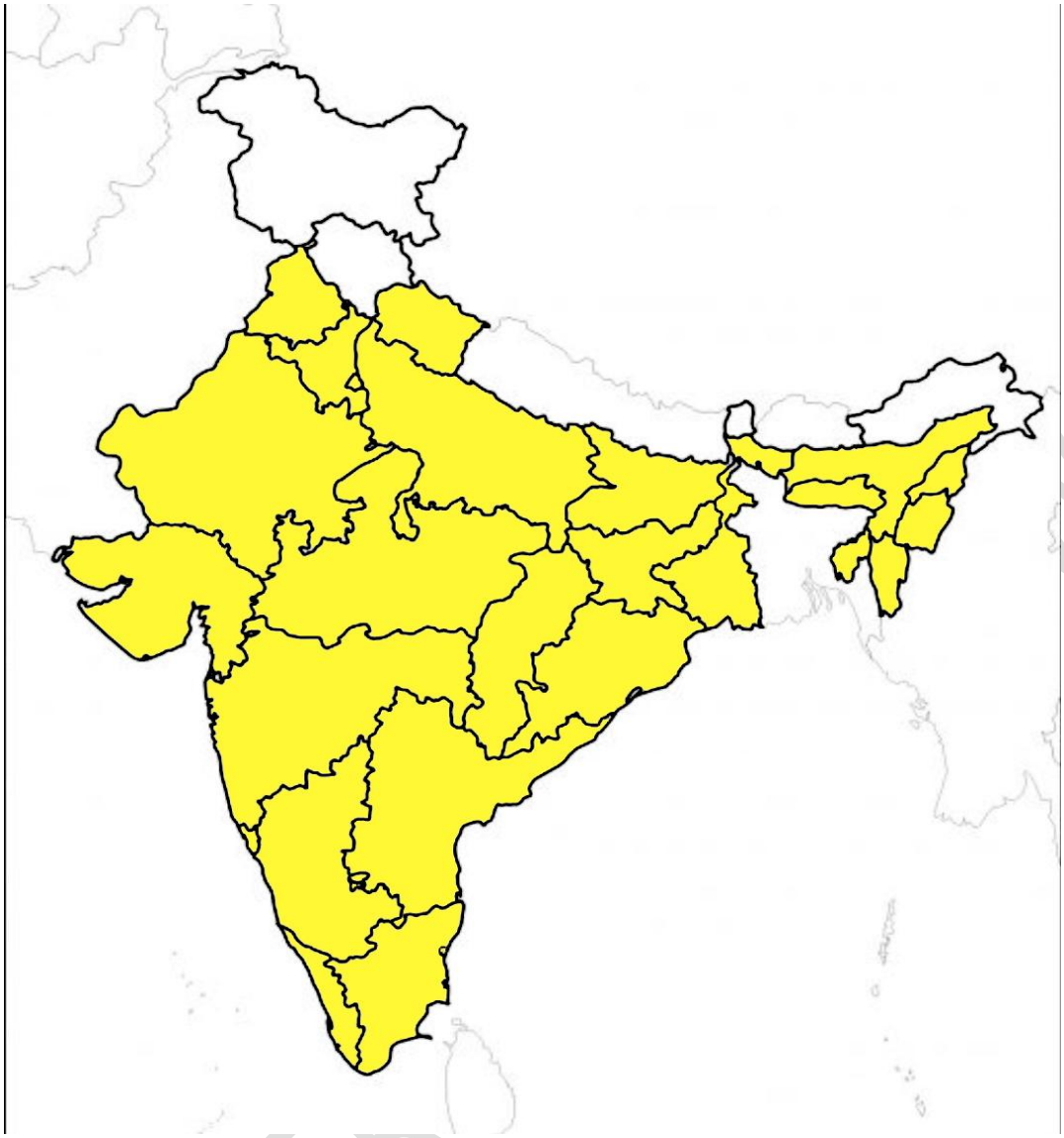


Figure 1- Azadiracta indica'snatural habitat.The yellowish shaded area in graph represents Natural habitat of this plant in India.

7. Parts of Neem plant

It is an evergreen tree that can be found in Egypt. It's a fastest grown tree with widely spaced branches, a short, straight trunk with a diameter of 0.8e1.2 m, rough bark, and flowers in May that can reach a height of 5e15 m.

7.1 Leaf: The petiolate, alternative, compound imparipinnate leaf measures 38e45 cm in length and has 7e19 leaflets. The petiole is green in colour, long and cylindrical, and has a swollen, enlarged core. It has a length of 6e9cmand a width of 0.1e0.3 cm. The rachis is a long, cylindrical, green-coloured structure measuring 15e20 cm long with a diameter of 0.15e0.3 cm.

7.2 Stem: The branches of neem are brown in colour, hard, cylindrical, with rough surfaces covered with moderately thick brown bark and 1.5e 3.5 m in length and they are considered as old branches. The young branches are green in colour with fibrous fracture. The stem possesses a characteristic odour and a bitter taste.

7.3 Bark: The bark of neem is brown in colour, hard, moderately thick, curved, quill in shape and silvery brown inner bark, the outer bark shows longitudinal and transverse wrinkles and fissures. The bark is odourless and has an astringent bitter taste.

7.4 Fruit: A. indica is a plant that is found mostly over India. The fruits are smooth, edible, measure[1.2 to 2.0] cm in length. Fruit of neem production beginning as 3-5 years.Epicarp is a brown and thin epidermis. Mesocarp is [0.3-0.5] cm thick pulp which is sweet and yellowish andalso Fibrous. Endocarp is the part of fruit, that are white ,shell is hard and elongated seed with a brown seed coat(Subapriya & Nagini, 2005).

Figure 2 (A) &(C) leaf (B) Stem(D)&(E) Tree of *Azadiracta indica*.

Table 2: Useof different part of plant

S.No.	PART	USE
1	Leaf	Leprosy, Eye disorder, Intestinal worms, Skin ulcer.
2	Twing	Cough,Masses,Urinary disease, and Diabetes.
3	Bark	Analgesic, antipyretic.
4	Fruit	Urinary disorder, Eye problems, Leprosy,skin infection .
5	Gum	Ringworms, Wounds etc .
6	Seed	Leprosy and Intestinal worms (X.Tinghui et al .,2001)

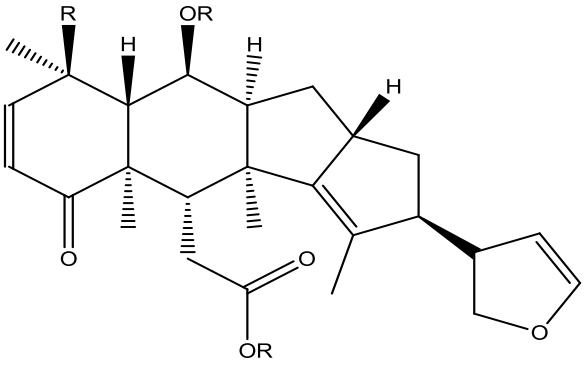
Table 3:Product available in the market

PDRODUCT	USE	REFERNCE
Erina	Cleanser.	(X.Tinghui et al .,2001).
Erina-EP	Shampoo.	(Sharma & Kumar Sharma, 2014).
Liver 52 protec	Animal health.	(Dwiti, 2016).
Pilex	Hemorrhoids.	(Balaji, 2017).
Purim	Acute and chronic dermatitis.	(Balaji, 2017).
Scavum	Scavon vet cream.	(Nicoletti et al., 2012).
Talekt	Dermatitis.	(Doshi et al., 2020).
R Com Tab.	Trauma,Ankylosing Spondylitis, Gout.	(Balaji, 2017).
Sabo dent	Spongygums, Gingivitis, Tooth ache.	(Lokanadhan et al., 2012).
Suvarna Hair	Flaky Dandruff, Alopecia.	(Lokanadhan et al., 2012).
Derma fex	Psoriasis, Dermatitis, Bacterial Infection.	(Lokanadhan et al., 2012).
Hemojos	Psoriasis, Acne vulgaris, Leprosy.	(Sahito et al., 2003).
Ayuseptic	Wound Healing.	(Sahito et al., 2003).

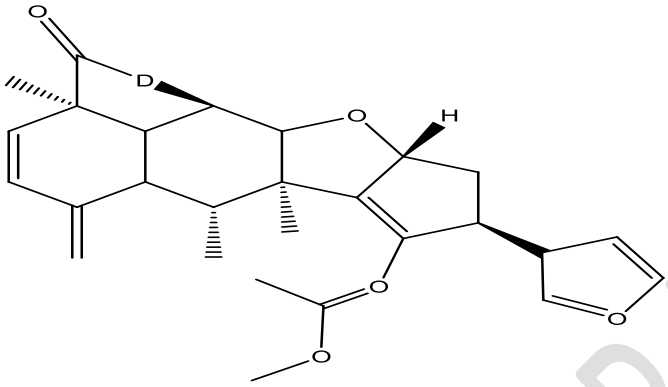
8. CHEMICAL CONSTITUENT

Nimbin, Nimbolide , Nimbilin, Catecgichin, Epicatechin, Palmitic acid, Azadirachtin, limonoids are active constituent of neem plant which shows different activity for different purpose (Hussein & JinHo, 2017).

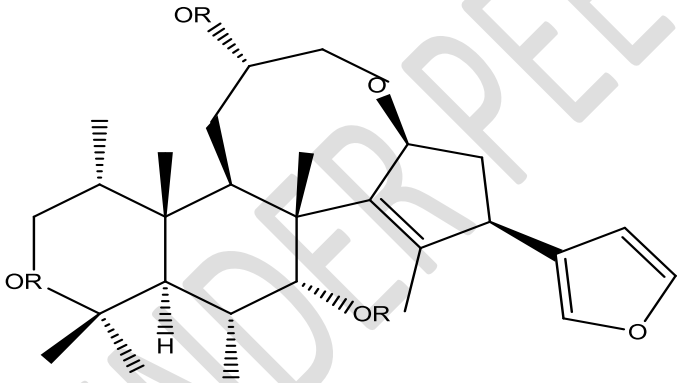
Active Constituent present in Neemare



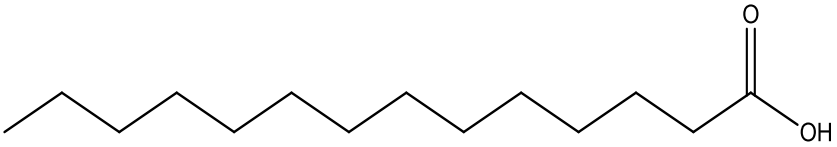
1. Structure of Nimbin



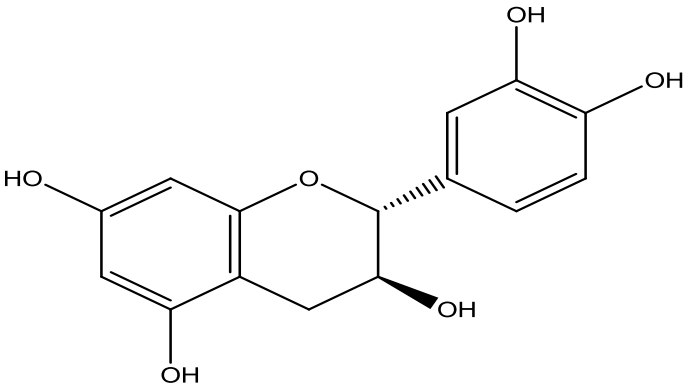
2. Structure of Nimbolide



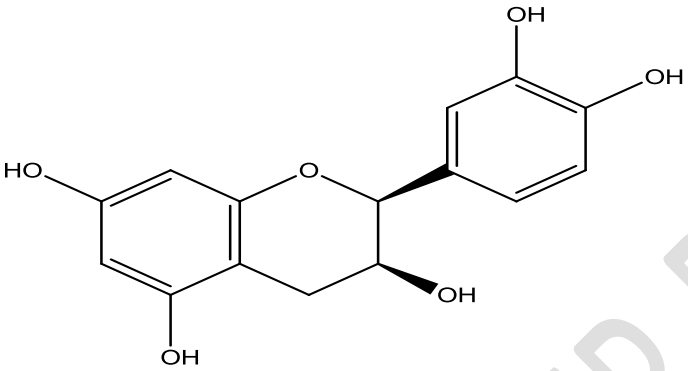
3. Structure of Nimbilin



4. Structure of Palmitic acid



5. Structure of Catechin



6. Structure of Epicatechin

9.CONCLUSION

It is clear from the studies that the ethnomedicinal plant i.e.*A. indica* having ability of prevention and treatinglarge number of human diseases. Modern drugs of neem made for the prevention and treatment of various diseases. Furthermore, various parts of Neem and their extracts have been discovered to be effective pesticides and insecticides.The products of neem are available in the market in very huge amount. It is widely available in most parts of Indian region. The *Azadirachta indica* tree is large perennial tree found in India. Anticarcinogenic properties have been discovered in a variety of neem preparations Methanolic extractof*Azadirachta indica*leafwas discovered very effective as antibacterial and antisecretory agent.Furthermore, Neem extract has been discovered to have anti-haemorrhagic and anti-cancer properties. This review paper helped to understand the uses of Neem in different kinds of disorder with minimal side effect.

NOTE:

The study highlights the efficacy of "Ayurveda" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

REFERENCE

[1] L.C. Faccin-Galhardi,K.Aimi Yamamoto, S.Ray, B. Ray, R.E. Carvalho Linhares, C. Nozawa , The in vitro antiviral property of *Azadirachta indica* polysaccharides for poliovirus. J Ethnopharmacol*142*(1), 86–90(2012).

[2]A.Roshan & N. K. Verma. A brief study onneem *Azardirachta indica* A and its application.Research Journal of Phytomedicine,11(1),1-3 (2015).

[3] G. Brahmachari, Neem - An omnipotent plant: A retrospection. Chembiochem,*5*(4), 408–421(2004).

[4]S.M. Patel, K.C. Nagulapalli Venkata, P. Bhattacharyya, G. Sethi, A.Bishayee , Potential of neem (*Azadirachta indica* L.) for prevention and treatment of oncologic diseases. Semin Cancer Biol. 40-41, 100–115(2016).

[5]S.Agrawal, D.BablaniPopli, K. Sircar,A. Chowdhry, A review of the anticancer activity of *Azadirachta indica* (Neem) in oral cancer.J Oral BiolCraniofac Res.*10*(2), 206–209(2020).

[6] D.Bhowmik, J.Y. Chiranjib, K.K. Tripathi,K.P.S. Kumar, Herbal Remedies of Azadirachta indica and its Medicinal Application. Herbal Remedies of *Azadirachta indica* and its Medicinal Application.*3*(4), 62–72(2011).

[7]M.Plants,W. Anti, C.Activity, C, International Journal of Universal. 2, 285–297(2013).

[8]S.S. El-Hawary, M.E. El-Tantawy, M.A.Rabeh, W.K.Badr, DNA fingerprinting and botanical study of Azadirachta indica A. Juss. (neem) .*2*(1), 1–13(2013).

[9]K.B. Crentsil, B.K. Archibold, A. Jacob, A, Morphological studies of Neem (*Azadirachta indica* A. Juss.) seed and physicochemical properties of its oil extracts collected in Accra metropolis of Ghana.Elixir Appl. Botany (39), 4951–4953(2011).

[10]R.N. Remedio, P.H. Nunes, L.A. Anholeto, P.R. Oliveira, M.I. Camargo-Mathias, Morphological effects of neem (*Azadirachta indica* A. Juss) seed oil with known azadirachtin concentrations on the oocytes of semi-engorged *Rhipicephalus sanguineus* ticks. Parasitol Res. *114*(2), 431–444(2015).

[11] X.Tinghui, M.Wegener, O.M.Shea, W.M.O. Ma-Deling, Shea, World Distribution and Trade in Neem Products with Reference to their Potential in China. 1–15(2001).

[12] R.Subapriya,S. Nagini, Medicinal properties of neem leaves: A review. Current Medicinal Chemistry.*5*(2), 146–149(2005).

[13]R.Sharma, M. Kumar Sharma, Phytogeographical Distribution of *Azadirachta indica* in Churu District, Rajasthan. International Journal of Geology, Agriculture and Environmental Sciences.2(1), 35–37(2014).

[14] M.Dwiti, Online market survey of formulations of Nimba. Journal of Pharmacognosy and Phytochemistry. 5(6), 105–109(2016).

[15] P.Balaji, Fruit yield and economic analysis of selected tree species (sts) under agroforestry system in Tamil Nadu.51(2017).

[16]M.Nicoletti, O.Maccioni, T.Coccioletti, S. Mariani, F. Vitali, Neem Tree (*Azadirachta indica* A. Juss) as Source of Bioinsectides. Insecticides - Advances in Integrated Pest Management.1-20(2012).

[17] P.Doshi, N. Nisha, A.I. A.Yousif, K. Korosi, R. Ban, G.Turoczi, Preliminary investigation of effect of neem-derived pesticides on Plasmoparahalstedii pathotype 704 in sunflower under in vitro and in vivo conditions. Plants.*9*(4), (2020).

[18] S. Lokanadhan, P.Muthukrishnan, S. Jeyaraman, Neem products and their agricultural applications. Journal of Biopesticides. *5*(SUPPL.), 72–76(2012).

[19]S.R. Sahito, M.A.Memon,T.G. Kazi, G.H. Kazi, M.A. Jakhrani,Q.U. Haque, G.Q.Shar, Evaluation of mineral contents in medicinal plant Azadirachta indica (Neem). Journal of the Chemical Society of Pakistan. 25(2), 139–143(2003).

[20] K.A. Hussein, J.JinHo, Chemical composition of neem and lavender essential oils and their antifungal activity against pathogenic fungi causing ginseng root rot. African Journal of Biotechnology. *16*(52), 2349–2354(2017).