



Natural and health benefits of *Azadirachta indica*

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Abstract

Neem a deep rooted, medium-sized, usually evergreen tree, *Azadirachta indica* of the family Meliaceae. Normally it attains a height of 15-20 m with a diameter of 60- 80 cm. Generally it branches early, forming a large, fairly dense and rounded crown of bright green foliage with compound glabrous leaves. Though it is usually evergreen, yet it becomes deciduous in drier regions. Flowers are small, sweet and scented. Fruits are small and one seeded. Bark is moderately thick, furrowed, dark grey outside and reddish brown inside. The heartwood is red, hard and durable. Neem is an indigenous tree species of Bangladesh and is found in abundance in the Barind Tracts of the country. It is planted all over the country, more especially in the drier part. It is also the native species of dry forest areas of India, Pakistan, Sri Lanka, Malaysia, Indonesia, Thailand, and Myanmar.

Neem is considered as one of the most valuable multi-purpose plant species. The wood is durable and used for house building, furniture and many other purpose eg carts, axles, yokes, helms, oars, boxes, agricultural tools, drums etc.

The bark, gum, leaves and flowers are all used in herbal medicine. Scientific interest in Neem is based on its traditional uses for insect pest control.

Keywords: Introduction, medicina uses, Conclusion.

Introduction

Azadirachta indica commonly known as neem, nintree or Indian lilac, is a tree in the mahogany family Meliaceae. It is one of two species in the genus *Azadirachta*, and is native to the Indian subcontinent, i.e. India, Nepal, Pakistan, Bangladesh, Sri Lanka and Maldives. It is typically grown in tropical and semi-tropical regions. Neem trees also grow in islands located in the southern part of Iran. Its fruits and seeds are the source of neem oil. Neem is a fast-growing tree that can reach a height of 15–20 metres (49–66 ft), and rarely 35–40 metres (115–131 ft). It is evergreen, but in severe drought it may shed most or nearly all of its leaves. The branches are wide and spreading. The fairly dense crown is roundish and may reach a diameter of 20–25 metres (66–82 ft). The neem tree is very similar in appearance to its relative, the Chinaberry (*Melia azadirachta*)^[4]. The opposite, pinnate leaves are 20–40 centimetres (7.9–15.7 in) long, with 20 to 30 medium to dark green leaflets about 3–8 centimetres (1.2–3.1 in) long. The terminal leaflet often is missing. The petioles are short. The (white and fragrant) flowers are arranged in more-or-less drooping axillary panicles which are up to 25 centimetres (9.8 in) long. The inflorescences, which branch up to the third degree, bear from 250 to 300 flowers. An individual flower is 5–6 millimetres (0.20–0.24 in) long and 8–11 millimetres (0.31–0.43 in) wide. Protandrous, bisexual flowers and male flowers exist on the same individual tree. The fruit is a smooth (glabrous), olive-like drupe which varies in shape from elongate oval to nearly roundish, and when ripe is 1.4–2.8 centimetres (0.55–1.10 in) by 1.0–1.5 centimetres (0.39–0.59 in). The fruit

Skin (Exocarp) is thin and the bitter-sweet pulp (mesocarp) is yellowish-white and very fibrous. The mesocarp is 0.3–0.5 centimetres (0.12–0.20 in) thick. The white, hard inner shell (endocarp) of the fruit encloses one, rarely two, or three, elongated seeds (kernels) having a brown seed coat.

Pollen grains of *Azadirachta indica* The neem tree is often confused with a similar looking tree called bakain. Bakain also has toothed leaflets and similar looking fruit. One difference is that neem leaves are pinnate but bakain leaves are twice- and thrice-pinnate.

Cultivation

The neem tree is noted for its drought resistance. Normally it thrives in areas with sub-arid to sub-humid conditions, with an annual rainfall of 400–1,200 millimetres (16–47 in). It can grow in regions with an annual rainfall below 400 mm, but in such cases it depends largely on ground water levels. Neem can grow in many different types of soil, but it thrives best on well drained deep and sandy soils. It is a typical tropical to subtropical tree and exists at annual mean temperatures of 21–32 °C (70–90 °F). It can tolerate high to very high temperatures and does not tolerate temperature below 4 °C (39 °F). Neem is one of a very few shade-giving trees that thrive in drought-prone areas e.g. the dry coastal, southern districts of India, and Pakistan. The trees are not at all delicate about water quality and thrive on the merest trickle of water, whatever the quality. In India and tropical countries where the Indian diaspora has reached, it is very common to see neem trees used for shade

Lining streets, around temples, schools and other such public buildings or in most people's back yards. In very dry areas the trees are planted on large tracts of land.

Medicinal Uses

Neem leaf is used for leprosy, eye disorders, bloody nose, intestinal worms, stomach upset, loss of appetite, skin ulcers, diseases of the heart and blood vessels (cardiovascular disease), fever, diabetes, gum disease (gingivitis), and liver problems. The leaf is also used for birth control and to cause abortions. The bark is used for malaria, stomach and intestinal ulcers, skin diseases, pain, and fever. The flower is used for reducing bile, controlling phlegm, and treating intestinal worms.

The fruit is used for hemorrhoids, intestinal worms, urinary tract disorders, bloody nose, phlegm, eye disorders, diabetes, wounds, and leprosy. Neem twigs are used for cough, asthma, hemorrhoids, intestinal worms, low sperm levels, urinary disorders, and diabetes. People in the tropics sometimes chew neem twigs instead of using toothbrushes, but this can cause illness; neem twigs are often contaminated with fungi within 2 weeks of harvest and should be avoided. The seed and seed oil are used for leprosy and intestinal worms. They are also used for birth control and to cause abortions. The stem, root bark, and fruit are used as a tonic and astringent.

Some people apply neem directly to the skin to treat head lice, skin diseases, wounds, and skin ulcers; as a mosquito repellent; and as a skin softener. Inside the vagina, neem is used for birth control. Neem is also used as an insecticide. Dental plaque. Early research suggests that applying neem leaf extract gel to the teeth and gums twice daily for 6 weeks might reduce plaque formation. It also might reduce the number of bacteria in the mouth that can cause plaque. However, using a mouth rinse containing neem extract for 2 weeks does not appear to reduce plaque or gingivitis. Insect repellent. Early research suggests that applying extract of neem root or leaf to the skin helps repel black flies. Also, applying neem oil cream to the skin seems to protect against some types of mosquitos. Ulcers. Some research suggests that taking 30-60 mg of neem bark extract twice daily by mouth for 10 weeks helps heal stomach and intestinal ulcers. Psoriasis. Early research suggests that taking neem extract by mouth for 12 weeks, along with daily sun exposure and the application of a coal tar and salicylic acid cream, reduces the severity of psoriasis symptoms in people. Fever.

- Upset stomach.
 - Breathing conditions.
 - Malaria.
 - Worms.
 - Head lice.
 - Skin conditions and diseases.
 - Heart disease.
 - Diabetes.
 - Birth control (contraception).
 - Other conditions.
- How to work

Neem contains chemicals that might help reduce blood sugar levels, heal ulcers in the digestive tract,

prevent conception, kill bacteria and prevent plaque formation in the mouth.

Concerns

Neem is POSSIBLY SAFE for most adults when taken by mouth for up to 10 weeks, when applied inside the mouth for up to 6 weeks, or when applied to the skin for up to 2 weeks. When neem is taken in large doses or for long periods of time, it is POSSIBLY UNSAFE. It might harm the kidneys and liver. Children: Taking neem seeds or oil by mouth is LIKELY UNSAFE for children. Serious side effects in infants and small children can happen within hours after taking neem oil. These serious side effects include vomiting, diarrhea, drowsiness, blood disorders, seizures, loss of consciousness, coma, brain disorders, and death.

Pregnancy and breast-feeding: Neem oil and neem bark are LIKELY UNSAFE when taken by mouth during pregnancy. They can cause a miscarriage.

Not enough is known about the safety of neem during breast-feeding. Stay on the safe side and avoid use.

“Auto-immune diseases” such as multiple sclerosis (MS), lupus (systemic lupus erythematosus, SLE), rheumatoid arthritis (RA), or other conditions: Neem might cause the immune system to become more active. This could increase the symptoms of auto-immune diseases. If you have one of these conditions, it's best to avoid using neem.

Diabetes: There is some evidence that neem can lower blood sugar levels and might cause blood sugar to go too low. If you have diabetes and use neem, monitor your blood sugar carefully. It might be necessary to change the dose of your diabetes medication.

Reduced ability to have children (infertility): There is some evidence that neem can harm sperm. It might also reduce fertility in other ways. If you are trying to have children, avoid using neem.

Organ transplant: There is a concern that neem might decrease the effectiveness of medications that are used to prevent organ rejection. Do not use neem if you have had an organ transplant.

Surgery: Neem might lower blood sugar levels. There is a concern that it might interfere with blood sugar control during and after surgery. Stop using neem at least 2 weeks before a scheduled surgery.

Interactions

Lithium Interaction Rating: Moderate Be cautious with this combination. Talk with your health provider. Neem might have an effect like a water pill or "diuretic." Taking neem might decrease how well the body gets rid of lithium. This could increase how much lithium is in the body and result in serious side effects. Talk with your healthcare provider before using this product if you are taking lithium. Your lithium dose might need to be changed.

Medications for diabetes (Antidiabetes drugs) Interaction Rating: Moderate Be cautious with this combination. Talk with your health provider. Neem might decrease blood sugar. Diabetes medications are also used to lower blood sugar. Taking neem along with diabetes medications might cause your blood sugar to go too low. Monitor your blood sugar closely. The dose of your diabetes medication might need to be changed.

Some medications used for diabetes include glimepiride (Amaryl), glyburide (Dia Beta, Glynase Pres Tab, Micronase), insulin, pioglitazone (Actos), rosiglitazone (Avandia), chlorpropamide (Diabinese), glipizide (Glucotrol), tol but amide (Orinase), and others.

Medications that decrease the immune system (Immunosuppressants) Interaction Rating: Moderate Be cautious with this combination. Talk with your health provider. Neem might increase the immune system. By increasing the immune system, neem might decrease the effectiveness of medications that decrease the immune system.

Some medications that decrease the immune system include azathioprine (Imuran), basiliximab (Simulect), cyclosporine (Neoral, Sandimmune), daclizumab (Zenapax), muromonab-CD3 (OKT3, Orthoclone OKT3), mycophenolate (Cell Cept), tacrolimus (FK506, Prograf), sirolimus (Rapamune), prednisone (Deltasone, Orasone), corticosteroids (glucocorticoids), and others.

Considerations

The appropriate dose of neem depends on several factors such as the user's age, health, and several other conditions. At this time there is not enough scientific information to determine an appropriate range of doses for neem. Keep in mind that natural products are not always necessarily safe and dosages can be important. Be sure to follow relevant directions on product labels and consult your pharmacist or physician or other healthcare professional before using.

Conclusion

Azadirachta indica is an important plant species and is in demand for planting in every climatic condition for multipurpose uses. In the plant propagation through macro cloning there is a need to maximize the output in term of higher successive rate and to minimize the input for multiplication at large scale to achieve the desired goal. Now no such propagation methods are available for *Azadirachta indica* using hard wood, semi hard wood and mini-cuttings. In the present case, vegetative propagation through hard wood, semi hard wood and mini-cuttings was found to be a very promising method. Present experiment indicates the important role of determining the optimal rooting media and plant growth regulator in the process of vegetative propagation of hard wood, semi hard wood and mini-cuttings. In conclusion, sand was found to be superior in the propagation of *Azadirachta indica* cuttings when compared to the other medium components in most root parameters determined. The outcome also showed that, among the different auxin used, IBA showed best results as compared to IAA & NAA. The formation of healthy plants after successfully hardening under outdoor conditions showed that *Azadirachta indica* could be successfully propagated by using hard wood, semi hard wood and mini cutting techniques. Plants were successfully hardened and planted in the field. These plants exhibited good survival (95-98%) in field condition. The new method described above seems to be important for the nursery industry because of its advantages: Extension of propagation season by utilizing the relatively free months of monsoon, higher yields of rooted cuttings per stock plant, by using the hard wood, semi hard wood and minicuttings system and high rooting percent using rooting hormones. The present

investigation was undertaken to develop micropropagation technique for in vitro growth and multiplication of *Azadirachta indica* through axillary bud break. For the first time a complete micro propagation protocol with standardized medium composition and plant growth regulators using nodal segment from mature tree of *Azadirachta indica* has been developed. A detailed stepwise procedure for axillary bud break, shoot multiplication, in vitro rooting, hardening & acclimatization and field plantation was standardized for *Azadirachta indica*. Various physical and chemical conditions have been standardized for in vitro culture conditions using axillary buds (nodal segments) from mature (30 – 35 year) tree. A 100% axillary bud break, 12.90 multiplication rate and 100% in vitro rooting was obtained. A very high rate of transplantation (95-98%) and plant survival in field was obtained in *Azadirachta indica*. Therefore, the finding of the present investigation proves to be a noteworthy study for *Azadirachta indica*.

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References

1. Ashikujaman Syed. Nipah Virus outbreak in the World. *Int. J. Adv. Res. Biol. Sci.* 2018; 5(9):131-138.
2. Ashikujaman Syed. Up Dated Concepts of Cirrhosis'. *Int. J. Adv. Res. Biol. Sci.* 2019; 6(3):7-10
3. Ashikujaman Syed. In-vivo imaging study of distribution of liposoluble fluorescent drugs after epicardium-in-situ administration by ASD. *Int. J. Adv. Res. Biol. Sci.* 2019; 6(6):58-70.
4. Ashikujaman Syed. Immunotherapy: Challenges. *Int. J. Adv. Multidiscip. Res.* 2019; 6(6):26-32.
5. Ashikujaman Syed. Jaundice it is not a disease, it is a symptom of several possible underlying illnesses. *Int. J. Curr. Res. Med. Sci.* 2018; 4(11):16-26
6. Ashikujaman Syed. Alzheimer Disease Research. *Int. J. Curr. Res. Med. Sci.* 2018; 4(11): 40-46.
7. Ashikujaman Syed. 'Snake Bites Problem in over the world'. *Int. J. Curr. Res. Med. Sci.* 2019; 5(2): 16-19
8. Ashikujaman Syed. 'A review of Filariasis'. *Int. J. Curr. Res. Med. Sci.* 2019; 5(2):26-30.
9. Ashikujaman Syed. 'Consanguineous marriages & Risk Factors'. *Int. J. Curr. Res. Med. Sci.* 2019; 5(4):24-30.
10. Ashikujaman Syed. New Concepts of Tumour microenvironment. *Int. J. Curr. Res. Med. Sci.* 2019; 5(6):14-22.
11. MdRashedul Islam Rashed, Ashikujaman Syed, Md Al Sabah, Mia MdMomin. Review of diabetes types and Care. *Int. J. Curr. Res. Med. Sci.* 2018; 4(11):27-32
12. Ashikujaman Syed. Chikungunya Virus: An Infectious Disease. *Int. J. Curr. Res. Biol. Med.* 2010; 3(10):20-30.
13. Ashikujaman Syed. Mixed Connective Tissue Disease (MCTD)' in the World. *Int. J. Curr. Res. Biol. Med.* 2018; 3(10): 48-54.
14. Ashikujaman Syed, SaptarshiPanigrahi ,SomnathSurai. 'Body Check-up in Diabetes Patients'. *Int. J. Curr. Res. Biol. Med.* 2019; 4(3):5-22.
15. Cardiovascular Diseases Big Worry for Bangladesh; <http://bbs.chinadaily.com.cn/blog-2506673-40211.html>

16. Therapeutics Role of *Azadirachta indica* (Neem) and Their Active Constituents in Diseases Prevention and Treatment
Mohammad A. Alzohairy Evid Based Complement Alternat Med. 2016; 2016: 7382506. Published online 2016 Mar 1. doi: 10.1155/2016/7382506 PMID: PMC4791507
17. Neem (*Azadirachta indica*): Prehistory to contemporary medicinal uses to humankind Venugopalan Santhosh Kumar, Visweswaran Navaratnam Asian Pac J Trop Biomed. 2013; 3(7):505–514. doi: 10.1016/S2221-1691(13)60105-7 PMID: PMC3695574
18. Ashikujaman Syed. Immunotherapy: Challenges. Int. J. Adv. Multidiscip. Res. 2019; 6(6):26-32. DOI: <http://dx.doi.org/10.22192/ijamr.2019.06.06.004>
19. Ashikujaman Syed. Antibiotic Use and Resistance. Int. J. Curr. Res. Med. Sci. 2019; 5(4):17-23. DOI: <http://dx.doi.org/10.22192/ijcrms.2019.05.04.003>
20. Ashikujaman Syed. Varicella- Zostervirus. Int. J. Curr. Res. Biol. Med. 2019; 4(4):10-14. DOI: <http://dx.doi.org/10.22192/ijerbm.2019.04.04.002>
21. Ashikujaman Syed. Ebola Virus Disease. Int. J. Curr. Res. Med. Sci. 2019; 5(3):18-23. DOI: <http://dx.doi.org/10.22192/ijcrms.2019.05.03.004>