



ISSN (E): 2320-3862  
ISSN (P): 2394-0530  
[www.plantsjournal.com](http://www.plantsjournal.com)  
JMPS 2022; 10(5): 131-140  
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Received: 15-06-2022  
Accepted: 18-07-2022

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## A complete review on medicinal plant: Margosa Tree

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**DOI:** <https://doi.org/10.22271/plants.2022.v10.i5b.1476>

### Abstract

Neem, also known as *Azadirachta Indica*, is a fast-growing tropical evergreen tree that has long been valued for its therapeutic properties. One of such plants that offers a variety of advantages is neem. Due to its extensive therapeutic capabilities, neem is often referred to as "The village drugstore." Neem has become popular in modern medicine due to its extensive use in Ayurveda, Unani, and homoeopathic treatments. Neem produces a wide range of chemically diverse and structurally complex physiologically active chemicals. From various neem plant components, more than 140 distinct chemicals have been discovered. The Neem tree's entire anatomy, including its leaves, flowers, seeds, fruits, roots, and bark, has historically been used to treat a variety of conditions, including eczema, ringworm, acne, inflammation, hyperglycemia, chronic wound infections, diabetic foot, gas gangrene, fever, skin diseases, and dental issues. Numerous effects have also been investigated, including those that are antibacterial, antifungal, antiparasitic, anticancer, immunomodulatory, anti-microbial, hepatoprotective, and gastro protective.

**Keywords:** *Azadirachta indica*, neem, antimicrobial, azadirachta, antioxidant, phytochemical, eczema, hyperglycaemia, diabetic foot

### Introduction

*Azadirachta Indica* is an evergreen tree that is commonly planted all throughout the Indian subcontinent. It is sometimes referred to as Indian neem (Margosa tree) or Indian Lilac. Neem (*A. indica*) has long been valued by Ayurveda as a treatment for a variety of illnesses, mostly because of its exceptional antibacterial action. Neem is frequently used in Ayurveda and homoeopathic treatments, and it has gained popularity in contemporary medicine. The neem tree's Sanskrit name, "Arishtha", translates to "Reliever of Sickness" in English. Another name for it is "Sarba-roga-nibarini". In India, neem trees are still referred to as "Village Dispensaries." Neem tree parts can all be used medicinally and are therefore profitable to use. Significant progress has been made in the last fifty years regarding the biological and medicinal uses of neem. It is currently recognised as a crucial source of distinctive natural compounds, both for the production of industrial goods and pharmaceuticals to cure a variety of ailments. The bio-chemical component of the medicinal plant that has a specific physiological impact on the human body is what makes it therapeutically effective. The plant's bioactive isolates include salanin, nimbin, nimbolide, azadirachtin, guanine, and meliacin. Meliacin is responsible for the neem seed oil's bitterness. The smell of the oil is caused by tiglic acid (5-methyl-2-butanoic acid), which is generated from neem seeds. Triterpenoids, which are organic compounds, are these chemicals. The active components are soluble in organic solvents including hydrocarbons, alcohols, and other alcohols but are mostly lipophilic and only weakly hydrophilic. Due to the rising adverse effects of chemical medications, the use of medicinal plants for treating common disorders has gained exceptional current significance over time. Numerous studies on the biological functions of certain neem components, the pharmacological properties of neem extract, clinical studies, and potential medical uses for neem are currently accessible, according to this perspective. Agents derived from natural sources, particularly plant sources, have been the primary source of medicine for millennia <sup>[1, 2, 3, 4, 5]</sup>.

### 2. Synonyms of Neem

*Azadirachta Indicarvar. minor* Valetton  
*Azadirachta Indicarvar. siamensis* Valetton  
*Azadirachta Indicasubsp. vartakii* Kothari, Londhe & N.P. Singh  
*Meliaazadirachta* L.  
*Meliaindica* (A. Juss.) Brandis

### 3. Taxonomical Classification

Kingdom: Plantae

Subkingdom: Tracheobionta

Division: Magnoliophyta

Class: Eudicot

Subclass: Rutinae

Order: Rutales

Family: Meliaceae

Tribe: Melieae

Genus: *Azadirachta*

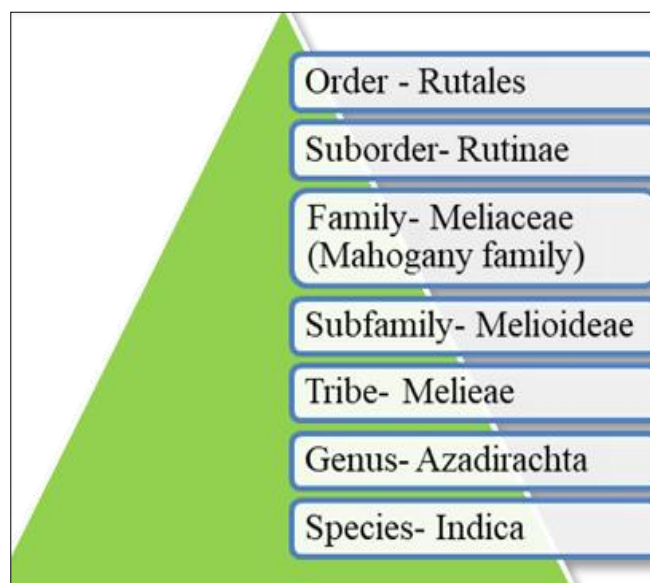


Fig 1: Taxonomy of neem plant [6].

### 4. Morphology of neem plant.

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 azedarach*). [7].

### 5. Therapeutic Role of Neem Plant

Since the dawn of civilization, medicinal plants have been an integral part of human society's efforts to combat disease. Over 2000 years, Neem is one of the most versatile medicinal plants in India and its neighbouring countries, with a wide range of biological activity. The neem leaves, flowers, fruits, seeds, roots, and bark of the neem tree have immense therapeutic value and been used to treat inflammations, infections, fever, skin diseases, and dental problems. Some of the medicinal properties of the various parts of the neem tree are listed below [8-9].

**Seeds:** Neem oil and cake are obtained from neem seeds. Neem oil is used as analgesic, anti-helminthic, anticholinergic, antihistaminic, antipyretic, antiviral, antiprotozoal, insecticides, bactericidal, insect repellents, fungicides and as veterinary medicines. Neem cake is used as animal feed, soil protectant, soil fertilizer and soil neutralizer.

**Leaves:** Neem leaves have antiemetic, antifungal, anticlotting agent, anti-helminthic, anti-tuberculosis, antitumor, antiseptic, antiviral, insecticides, nematicides, insect repellents activity.

**Twigs:** Twigs are used as oral deodorant, tooth cleaners, toothache reliever.

**Bark:** Neem bark has antidermatic, antiallergenic, antiprotozoal, antitumor and antifungal property.

**Flowers:** Neem flowers have analgesic and stimulant property.

### 6. Phytochemicals and Biological activity of Neem plant

Neem can be defined as the "storehouse" of a number of phytochemicals. There were more than 300 phytochemicals extracted from the neem tree [10, 11, 12].

Isoprenoids and non-isoprenoids are the two most significant groups of phytochemicals that have been identified from different regions of neem. The most well-known isoprenoids are vilasinins, triterpenoids, limonoids, and Csecmeliacins, whereas proteins, carbohydrates (polysaccharides), sulphur compounds, tannins, polyphenolics like flavonoids and their glycosides, dihydrochalcone, coumarin and aliphatic compounds, and phenolic acids are non-isoprenoids [10, 12, 13].

Neem trees have several phytochemicals in their leaves, fruit, seeds, oil, roots, bark, and twigs that have been proven to have antibacterial, antiviral, antifungal, anti-inflammatory, antiplasmodial, antiseptic, antipyretic, anti-diabetic, and anti-ulcer qualities [14].

Numerous biologically active substances, including triterpenoids, alkaloids, flavonoids, carotenoids, phenolic compounds, steroids, and ketones, can be extracted from the neem tree. The first substance to be researched is nimbin. Other phytochemicals produced from neem include nimbolide, azadirachtin, azadiradione, gedunin, and azadirone [15].

The phytochemicals' intricate structure has resulted in a wide variety. Azadirachtin A–G is composed of seven isomeric chemical components. The most effective of them is azadirachtin E [16].

Neem leaves are often utilised by Indian tribal people at the household level to treat minor dermal ailments like cuts and wounds [17].

The triterpenoid nimbin, which is contained in neem seed oil, has the highest level of biological activity. It has qualities that are fungicidal, antiseptic, anti-inflammatory, antipyretic, and antihistamine [15].

**Table 1:** Neem Phytoconstituents & their Biological Activity

Neem Phytoconstituents	Source	Biological activity
Nimbidin	Seed oil	Anti-inflammatory, Antiarthritic, Antipyretic, Hypoglycaemic, Antigastric ulcer, Spermicidal Antifungal, Antibacterial, Diuretic.
Sodium nimbidate		Anti-inflammatory.
Nimbin	Seed oil	Spermicidal.
Nimbolide	Seed oil	Antibacterial, Antimalarial
Gedunin	Seed oil	Antifungal, Antimalarial
Azadirachtin	Seed	Antimalarial
Mahmoodin	Seed oil	Antibacterial.
Gallicacid, (-) epicatechin and catechin	Bark	Anti-inflammatory, immunomodulatory.
Margolone, margolonone and isomargolonone	Bark	Antibacterial
Cyclic trisulphide and cyclic tetrasulphide	Leaf	Antifungal
Polysaccharides		Anti-inflammatory
Polysaccharides GIa, GIb	Bark	Antitumour
Polysaccharides GIIa, GIIIa	Bark	Anti-inflammatory
NB-II peptidoglycan	Bark	Immunomodulatory

### 6.1 Phytochemicals Present in Neem Leaves

Neem is frequently used in Ayurveda and has gained popularity on the current medical scene. More precisely than

any other part of the neem tree, The medicinal activities of neem leaves have been described<sup>[12, 18]</sup>.



**Fig 2:** Bio-activity of the compounds extracted from neem leaf<sup>[29]</sup>.

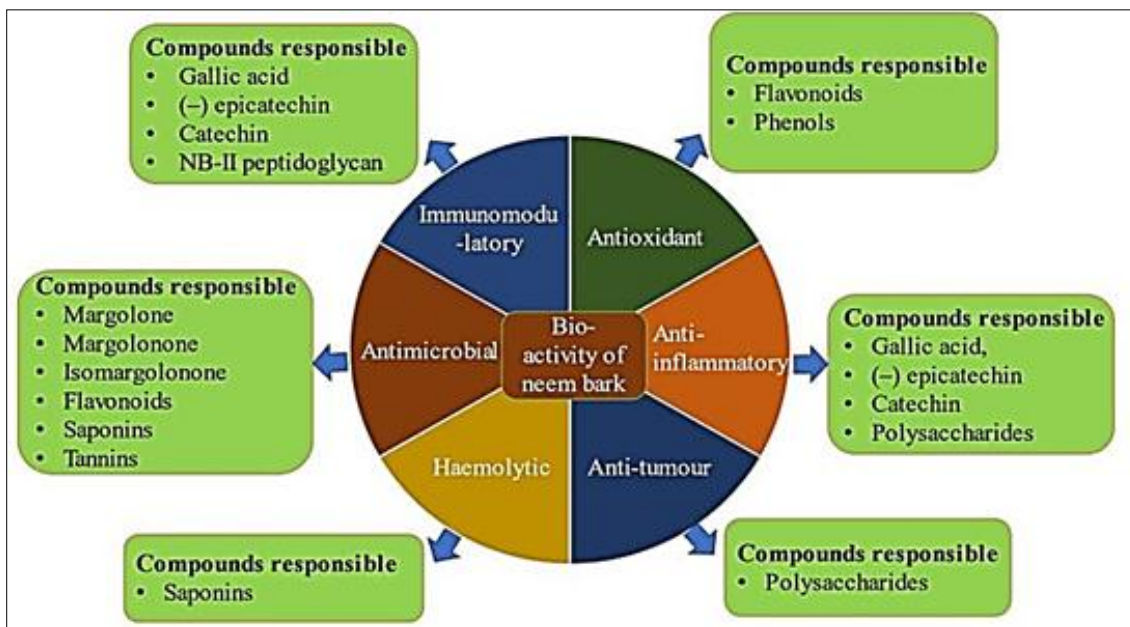
The discussion that follows will only cover the pharmacological effects of neem leaves. Neem leaves are accessible all year long. Because it is so simple to extract the phytochemicals, neem is a common element in both traditional and contemporary therapeutic treatments. More than 200 chemicals have been discovered in the neem tree's various parts, with the leaves contributing more than 50 substances. Water, carbohydrates, proteins, minerals, calcium, and phosphorus are all present in fresh young neem leaves<sup>[19]</sup>. Tyrosine, alanine, cysteine, glutamic acid, glutamine, and other types of amino acids and fatty acids are abundant in neem leaves. Neem leaf extracts and components have

antibacterial and anticarcinogenic properties<sup>[20, 21]</sup>.

### 6.2 Phytochemicals Present in Neem Bark

Similar to neem leaves, neem bark also includes a variety of phytochemicals with various therapeutic benefits. It has excellent anti-skin disease properties. In literature, neem bark is described as being cool, bitter, astringent, and beneficial for conditions like cough, fever, appetite loss, worm illness, skin problems, excessive thirst, and diabetes. Neem bark extract can treat gastroduodenal and gastroesophageal ulcers.

Bark extract is rich in phenols, sterols, triterpenes, and saponins<sup>[30, 31, 32]</sup>.



**Figure 3:** Bio-activity of the compounds extracted from neem bark [5, 36].

Bark also produces c-secomeliacins, limonoides, and a variety of phenolic diterpenoids. Neem bark aqueous extract contains glycosides that have antisecretory and antiulcer effects. Gum and tannins produced by neem bark are used in tanning, tainting, and other procedures [33, 34, 35].

**6.3 Phytochemicals Present in Neem Seed Oil**

Neem seed is a greenish yellow colour with an acidic,

unpleasant taste. It smells repulsively (of garlic). Neem oil is used in veterinary medicine and as an analgesic, anti-helminthic, antipyretic, antiprotozoal, anticholinergic, antihistaminic, antiviral, insect repellent, insecticide, bactericidal, and antifungal. Both neem oil and neem cake are made from neem seeds. Animals are fed the cake, which is also utilised as a soil fertiliser, soil neutralizer, and soil protector.



**Fig 4:** Bio-activity of the compounds extracted from neem seed oil [5].

Numerous phytochemicals, including Mahmoodin, Gedunin, Nimbidin, Sodium Nimbidate, Nimbibin, and Nimbolide, are found in neem oil.

Numerous biological effects of neem oil, such as its

fungicidal, anti-inflammatory, antihistamine, antipyretic, and antiseptic properties, are thought to be caused by nimbin.

A range of oxygen-bearing functional groups, such as enol ether, acetal, hemiacetal, tetra substituted epoxide, and

carboxylic esters, can be found in azadirachtin, a tetra-substituted epoxide. Neem oil has been shown to have immunostimulant action by specifically enhancing cell-mediated immune systems to improve response to upcoming mitogenic or antigenic challenge [37, 38].

## 7. Bioactivity Study of Neem and its Phytoconstituents

Different parts of Neem plant shows different Bioactivities according to their phytoconstituats which are listed in Table no.2.

**Table 2:** Bioactivity Study of Neem and its Phytoconstituents

Plant parts	Activities	Findings of study	Reference
Leaf, flower and stem bark	Antioxidant	Extracts from leaf, flower, and stem bark have higher antioxidant activity	39
Flower and seed	Free radical hunting	Ethanollic extracts of flowers and seed oil were found to possess greater free radical-hunting	40
Leaves	Wound healing	Aqueous extract of leaves presented significant reduction in extended diameter wounds	41
Leaves	Wound healing	Aqueous extracts of neem leaves are theoretical to act biochemically though inflammatory response and neovascularization	42
Fruits skin and its specific ingredient, azadiradione	Anti-inflammatory	Animals treated with 100 mg/kg dose of fruit skin extract and azadiradione showed important anti-inflammatory activities	43
Seed oil	Anti-inflammatory	Oil showed increased inhibition of edema with the progressive increase in dose from 0.25-2 ml/kg body weight	44
Leaf	Hepatoprotective	In addition to this, paracetamol -induced liver gangrene was also found to be reduced as observed macroscopically and histologically	45
Leaf	Hepatoprotective	Leaf extract prevents and opposites the hepatotoxic damage caused by antitubercular drugs	46
Leaf	Neuroprotective	Leaf extract has also been checked to study its neuroprotective effects and its has shown fairly well-organized adaptable effects of	47
Leaf	Nephrotoxicity	Leaf extract has shown significant protective effects against cisplatin-induced nephrotoxicity as this extract exhibits antioxidant, anti-inflammatory, and other free radical-hunting activities	48
Leaf	Immunomodulatory	Neem infusion has been found to successfully improve the antibody titer growth performance when used at the level of 50 ml/l of fresh drinking water	49
Flower	Antifertility	Extract caused a statistically important reduction in the number of ova sheds in the morning of estrus	50
Oil	Antifertility	oil resulted in a block of spermatogenesis without affecting testosterone production	51
Stick	Reduction in plaque and with gums. Treatment of dental caries	Significantly reduce the plaque and with gums scores as compared to baseline. Extracts of neem have a strong antimicrobial properties and told that it can be useful in the treatment of dental caries.	52
Root bark	Antidiabetic	Neem root bark extract (NRE) was given in the dose of 800 mg/kg showed important reduction in blood sugar level. They have reduced the blood sugar level very fastly.	54
Leaf	Cardioprotective	Neem extract shows equipotent cardioprotective activities as compared to Vitamin E	55
Leaf	Antimicrobial	Neem leaf extracts have showed that wider zones of inhibition and further confirming that they contain antimicrobial properties and the extract showed significantly greater zones of inhibition that 3% sodium hypochlorite	56
Seed	Antimicrobial	Minimum inhibitory concentration of seed extracts was 31 µg/mL concentration was noticed to be sufficient for twisting the growth pattern of the organisms tested	57
Bark	Antimicrobial	Bark extract confirmed that neem bark extract significantly blocked HSV-1 entry into cells	58
Leaf	Antitumor	Leaf extract much reduced the incidence of DMBA-induced hamster buccal pouch carcinomas and tumor burden	59

## 8. Pharmacological activities of Neem [62-87]

### 8.1 Antioxidant activity

During the germination of horse-grain, neem seed extract's antioxidant activity was proven in real time.

### 8.2 Antibacterial activity

Neem NE is shown to be hazardous at dosages between 1.2-2 mg/mL and benign at concentrations between 0.7 and 1 mg/ml. The fact that human lymphocytes had lower levels of catalase, SOD, and GSH is evidence that neem NE induces oxidative stress. Neem NE substantially increased DNA damage in human cells when compared to the control (P 0.05). The NE is a potent antibacterial compound that is efficient against the bacterial pathogen *V. vulnificus*, and it has been demonstrated that at lower doses, it is safe for use with human lymphocytes.

### 8.3 Antifungal activity

The ability of neem (*Azadirachta Indica*) extract and neem coupled with copper sulphate and boric acid (NECB) to prevent fungal decay of mango (*Mangifera indica*) and rain tree (*Albizia saman*) wood was investigated. On solid media containing 1.8% (w/w) NE or 5% (w/w) NECB, the growth of the white-rot fungus *Schizophyllum commune* was entirely

suppressed. For *M. indica* and *A. saman*, the average weight losses of NE and NECB treated wood blocks inoculated with *S. commune* were 4.7% and 3.3%, respectively.

### 8.4 Antiviral activity

Neem (*Azadirachta Indica* A. Juss) leaf extract fraction's antiviral and virucidal effects were investigated, as well as any potential mechanisms of action, against viruses belonging to the Cocksackie B group. At a dosage of 1000 micrograms/ml for 96 hours "in vitro," NCL-11 reduced plaque formation in 6 antigenic variants of Cocksackie virus B. In addition to interfering at an early stage of the Cocksackie virus B-4 replicative cycle, virus inactivation, yield reduction, and effect of time of addition experiments revealed that NCL-11 was particularly effective against this particular strain of the virus.

The results revealed that NCL-11 contains a variety of substances that, in addition to flavonoids, triterpenoids, and their glycosides, have antiviral activity against coxsackie B group viruses "in vitro." The trypan blue dye exclusion test demonstrated that the lowest inhibitory concentrations were not harmful to Vero (African green monkey kidney) cells. The subtoxic concentration was 8,000 micrograms/ml and the cytotoxic concentration was 10,000 micrograms/ml.

**8.5 Anti-inflammatory activity**

NSO did not exhibit any discernible anti-inflammatory action at 0.25 ml/kg body weight. NSO demonstrated improved paw edoema inhibition with dosage increases from 0.25 ml to 2 ml/kg body weight. At the 4th hour following the injection of carrageenan, NSO demonstrated greatest (53.14%) edoema inhibition at the dose of 2 ml/kg body weight. Maximum suppression of edoema in the hind paws was demonstrated by aspirin at a dose of 200 mg/kg body weight. The results of this investigation suggest that NSO has considerable anti-inflammatory effects.

**8.6 Antidiabetic activity**

Rats with diabetes caused by a high-fat diet were given the oral effective dose of *A. indica* leaf extract (400 mg/kg body weight [b.wt]) once day for 30 days. Fasting blood sugar, oral glucose tolerance, serum lipid profile, levels of insulin signalling molecules, glycogen, and glucose oxidation in the gastrocnemius muscle were all evaluated at the conclusion of the trial.

**8.7 Hepatoprotective activity**

The purpose of this study was to examine azadirachtin-potential A's to protect the liver from damage caused by carbon tetrachloride (CCl<sub>4</sub>) in rats. The group allocation for the animals used in the hepatoprotective study included a vehicle treatment group, CCl<sub>4</sub> (1 mL (kg body mass)(-1)) treatment group, silymarin (100 g (kg body mass)(-1) day(-1)) + CCl<sub>4</sub> treatment group, and groups treated with azadirachtin-A at different doses (100 or 200 g (kg body mass)(-1) day( On the ninth day, liver tissue was removed for a pathological examination and blood was drawn to measure biochemical markers. After 14 days of treatment, there was no mortality reported in the acute toxicity test with azadirachtin-A (500, 1000, or 2000 g (kg body mass)(-1)); in addition, there were no changes in behaviour, food intake, or organ mass. However, several haematological indicators changed with the larger dose.

**8.8 Analgesic and Antipyretic activity**

Aqueous neem leaf extract was administered to rats once daily for seven days, one hour prior to the administration of formalin, to compare its anti-inflammatory effects to dexamethasone (0.75 mg, intraperitoneally). When using neem, the percentage of paw edoema inhibition was 28, 40, 45, and 58% on day 3, 7 after formalin injection. When using dexamethasone, the percentage was 43, 58, 61, and 65% on day 3, 7 after formalin injection. Each time the decline occurred, it was statistically significant (p 0.001). According to the current study, dexamethasone's anti-inflammatory efficacy is greater than that of neem extract.

**8.9 Anti-hemorrhagic activity**

The extract had minimum bactericidal concentrations of 2.5, > 5, and 10 mg/ml, respectively, and minimum inhibitory concentrations achieved by 50% (MIC<sub>50</sub>) and 90% (MIC<sub>90</sub>). At dosages of 100, 200, 300, 450, and 1800 mg/kg, respectively, neem extract exhibited antisecretory effect on *Vibrio cholerae*-induced fluid secretion in mouse intestine with inhibition values of 27.7%, 41.1%, 43.3%, 57.0%, and 77.9%. At a dose > or = 300 mg/kg, oral administration of the extract prevented *Vibrio cholerae*-induced bleeding in mouse gut. The findings of this study provide some scientific backing for the traditional Indian uses of neem for treating cholera and dysentery among other horrible illnesses.

**8.10 Kidney damage**

The outcomes of this investigation demonstrated that neem (*A. indica*) leaf aqueous crude extract had a dose-dependent protective action against kidney injury brought on by *P. berghei*. It worked best when given at doses of 1,000 and 2,000 mg/kg. Given that this plant may be found in nature for comparatively little cost and has a strong protective effect against malaria, it can be advised for usage.

**8.11 Anti-ulcer activity**

Rats subjected to a 2-hour period of cold restraint stress or given ethanol orally for a 1-hour period were studied to determine the antiulcer effects of aqueous extracts of neem tree leaves. Extracts were given in single or five-dose pretreatment regimens at concentrations of 10, 40, or 160 mg leaf/kg body weight. Neem reduced ethanol-induced damage to the stomach mucosa and the severity of gastric ulcers in stressed rats in a dose-dependent manner.

**8.12 Antibone resorption**

We used adult female Sprague-Dawley rats that weighed between 140 and 180g. Three main experimental groups were present. For three weeks, group 1 rats received 1 g/kg of an alcoholic Neem flower extract by gavage, and the impact on the estrous cycle was examined. At 9 a.m. and 6 p.m. on proestrus, group 2 rats received 1 g/kg of Neem flower alcoholic extract; the effect on the quantity of ova shed on the morning of estrus was then noted. On days 1 through 5 postcoitum, rats in Group 3 were given 1 g/kg of an alcoholic extract of the Neem flower. The effects on implantation, abortifacient properties, and potential teratogenic effects on the foetuses were observed. The control groups were all matched.

**8.13 Immunoregulation activity**

Neem bark and leaf aqueous extract also has immunostimulant and anticomplementary effects. Neem oil has been demonstrated to be active by specifically engaging the immunological processes of the cell to produce an improved response to a future mitogenic or antigenic stimulus.

**8.14 Hypoglycaemic activity**

Neem leaf aqueous extract dramatically lowers blood sugar levels and guards against adrenaline-and glucose-induced hyperglycemia. Recently, both normal and diabetic rabbits induced with alloxan showed hypoglycaemic effects with leaf extract and seed oil.

**8.15 Effect on central nervous system**

The leaf extract was found to have varying degrees of central nervous system (CNS) depressing action in mice. Significant CNS depressing activity was reported in leaf fractions of acetone extract<sup>[1]</sup>.

**8.16 Nephrotoxicity**

Leaf extract has shown significant protective effects against cisplatin-induced nephrotoxicity as this extract exhibits antioxidant, anti-inflammatory, and other free radical-hunting activities<sup>[2]</sup>.

**8.17 Antifertility activity of Flower and Oil**

Extract caused a statistically important reduction in the number of ova sheds in the morning of estrus. Oil resulted in

a block of spermatogenesis without affecting testosterone production [23, 64].

### 8.18 Cardioprotective

Neem extract shows equipotent cardioprotective activities as compared to Vitamin E [49].

### 8.19 Reduction in plaque and with gums and Treatment of dental caries

Significantly reduce the plaque and with gums scores as compared to baseline. Extracts of neem have a strong antimicrobial property and told that it can be useful in the treatment of dental caries [9, 34].

### 8.20 Antitumor activity of Leaf

Leaf extract much reduced the incidence of DMBA-induced hamster buccal pouch carcinomas and tumor burden. Treatment with leaf extract inhibited MNU-induced mammary tumor progression and treatment was also highly effective in reducing mammary tumor burden and in suppressing mammary tumor progression even after the cessation of treatment. Leaf extract gives 50% inhibition at a dose of 100 µg/ml in both PC-3 (bone metastasis) and LNCaP cells (lymph node carcinoma of the prostate) (human cell) [12, 37, 56].

### 8.21 Wound healing effect

Since ancient times, neem has been used for its ability to heal wounds. Neem oil's therapeutic effects are long-lasting. It exhibits the best ability to heal wounds. Neem is also used to cure burns on the skin. Neem is a great first aid for minor wounds and injuries because of its antibacterial and healing characteristics. According to certain findings, neem leaf extract accelerated the healing process of wounds or boosted inflammatory reactions and neovascularization [38].

## 9. Conclusion

Neem leaves are used extensively in daily life. An essential source of compounds with anti-microbial, antioxidant, anti-tumor, anti-malarial, anti-fungal, anti-inflammatory, and antiviral effects is *Azadirachta Indica* extract. It has a wide range of chemically diverse phytoactive components. They promote healthy blood flow and blood filtration. Different sections of neem contain the primary compounds that we have isolated from neem. The utilization of plant extracts as medicinal agents is gaining more and more attention. Neem is a plant with pharmacological potential for usage as a cure-all. Mango is a potential source of anticancer, anti-diabetic, anti-inflammatory, and antibacterial medications, in addition to being utilised for cardio protection, radioprotection, memory recognition, and many other things, according to the literature review. More attention is being paid to medicinal plants and phytochemicals as a potential alternative to negative side effects of chemical medications for the prevention and treatment of various ailments. In recent years, the development of neem treatments has benefited from this pharmacological investigation.

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