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## Review Article

# Neem A Nature's Drugstore: An Overview

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### ABSTRACT

Reasonably priced goods. Salmonella and E. coli are tested using a variety of techniques, including the zone of inhibition (ZOI) method, biochemical, haematological, bacteriological, and This study investigates how well neem, which is derived from the Azadirachta indica neem tree, works as a biopesticide (using both oil and seed cake) to manage autumn armyworm infestations in maize fields in Ghana's Upper East Region's Nabdram District. July 2018 Monitoring of fall armyworm damage in a demonstration maize field plot Both prior to and following neem treatments. After two weeks, no fall army worms were detected in the area sprayed with neem oil, however they were discovered in the neem cake and Control portions. Dental caries is an infectious post-eruptive bacterial disease that damages the mineralised teeth and is marked by a gradual demineralisation process. Tissue. It is associated with Krimi Dant in Ayurveda and is described as teeth discolouration brought on by a vitiated Vata Dosha. Caries in the teeth Is continuously rising, and treatment is costly and impractical. Choice for the underprivileged. Therefore, a suitable Ayurvedic measure, it is affordable and readily available for use. As a natural source of flavonoids, polyphenols, isoprenoids, sulphurous, and polysaccharides, neem leaves are crucial for scavenging free radicals and halting the progression of disease. Neem has been the subject of extensive research to create non-toxic production performance tests.


### INTRODUCTION

In the management of insect pests, several botanical insecticides have demonstrated positive results in recent years. Neem Azadirachta indica Arch. (Meliaceae) is one of them, showing potential for use in integrated pest management (IPM) programs and offering wide-ranging control

over more than 200 species of insect pests (Ascher, 1993). In India, neem seed kernel extracts have been tested against 106 species of insect pests alone.<sup>1</sup> Neem, scientifically known as Azadirachta indica, is an evergreen tree belonging to the Meliaceae family. It is highly valued for its health-promoting effects due to its abundant antioxidants.

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The tree contains a variety of beneficial compounds including Nimbin, Nimbidine, Nimbolide, and Limonoids, which contribute to its disease-treating properties. The first polyphenols Flavonoids isolated from fresh neem leaves are Quercetin and  $\beta$ -sitosterol, and they are recognized for their antifungal and antibacterial functions.<sup>2</sup> Neem-based extracts have various effects on insects, including repelling, deterring feeding, retarding growth, disrupting molting, interfering with progeny development, and inhibiting oviposition (National Research Council, 1992; Schmutterer, 1995). Previous studies have shown that while all parts of the neem tree possess pest control properties, the seeds contain the highest concentration of active ingredients.<sup>3</sup> The most potent insecticidal compound in neem seeds is azadirachtin (C<sub>36</sub>H<sub>44</sub>O<sub>16</sub>), a tetranor triterpenoid, which leads to growth disruption, molting inhibition, egg sterilization, and other effects (Schmutterer, 1995). In Thailand, neem has the potential to be economically significant and

can be practically utilized in numerous rural areas.<sup>4</sup> Biswas and colleagues (2002) have demonstrated that extracts from different parts of the neem tree (bark, seed, leaf) possess properties such as anti-inflammatory, anti-pyretic, and analgesic effects, as well as immunostimulant, hypoglycemic, antiulcer, anti-fertility, anti-malarial, antibacterial, antifungal, anti-viral, anti-carcinogenic, anti-oxidant, and hepatoprotective effects.<sup>5</sup> The native *Azadirachta indica* tree known as neem (Juss) gets its name from the Sanskrit word “Nimba,” while the Arabic word “azad” is the source of the generic name.<sup>6</sup> Neem tree products have two uses: as an environmentally benign insecticide and as fertilizer.<sup>7</sup> Flowers are lovely, fragrant, and in abundant. Green, ellipsoidal drupes with a single seed mature from June to August.<sup>8</sup>

## (2).Morphology of Neem



**Fig:- Morphology of Neem<sup>9</sup>**

## (3). MATERIALS AND METHODS

### 3.1.Study area

Owing to the study’s narrow objectives, the study domain was restricted to Uttar Pradesh, which has the highest density of neem trees. The extent of neem tree distribution was reported in nearly every Uttar Pradesh district. The Jhansi district’s neem tree population was roughly 1.5 lakh

### 3.2Preparation of the adsorbent

Mature neem leaves were gathered from several tall neem trees in the Indian district of Morigaon,

and they were repeatedly cleaned with water to get rid of dust and soluble contaminants and were first given time to dry in the shade at room temperature. And after that for 30 hours at 333–343 K in an air oven when the leaves crisped. These were finely ground into a powder. In a machine grinder to produce powdered neem leaf (NLP). After sieving the NLP, the 53–74  $\mu$ m fraction was split apart. This portion was given a second wash using double distilled water until all colour was removed from the washings

and Turbidity. Following several hours of drying at room temperature, the NLP was kept fresh in glass containers to be utilised as an Absorbent.<sup>10</sup>

### 3.3 Morphological study

Morphological observations were conducted on live plants that were obtained from eighteen herbal shops and gathered during seven field trips. Studies on morphology (flowers, stem, leaf, and root) were also derived from Analyses of 20 specimens from the herbarium at ISL Herbarium of QAU, Islamabad. Additional details from Plant taxonomic and floristic sources confirmed Features of morphology (Hooker, 1875; Tutin & Nasir & Ali, 1974; Heywood, 1972; 1975). Morphological Analyses carried out with a

binocular stereo zoom Light microscope (Kyowa, Japan, Model SZF) with eye WF 10 x 10/20 piece. Evaluation of the morphology of flowers Was made easier by rehydrating dried flowers in hot water. Using dishwashing liquid. Every field photo that is displayed was shot. By the writer with a Sony DSC-W50 digital camera.

### 4. Characteristic of Neem :-

It was observed that the colour of the neem oils extracted from the seed, entire fruit, and flesh varied, appearing greenish-brown, greenish-yellow, and golden-yellow, respectively. All neem oil had an unpleasant and bitter smell.

### 5. Part Of Neem Plant

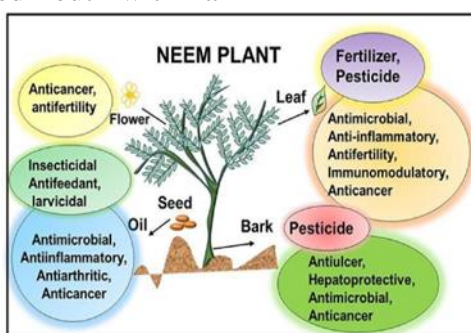


Fig:-Part of Neem Plant

#### 5.1. Leaf

Numerous studies have documented the therapeutic potential of various NLEs and isolated compounds against various illnesses, such as cancer<sup>9–11</sup>, ulcer<sup>6,31</sup>, diabetes<sup>12, 13</sup>, etc. Nonetheless, various phytochemicals found in

neem leaves treat illnesses by focussing on important signalling pathways related to the pathophysiology.<sup>13</sup> Used to treat Skin infection, acne, boils, burns, & other Skin problems.



Fig:-Leaf Of Neem

#### 5.2. Seeds

The hulled neem seeds utilised in this study were gathered in January 2021 from a farm in Jigawa State, Nigeria's Ringim Local Government Area. The hulled neem seeds were thoroughly cleaned

three times before usage in order to get rid of any dirt or solid contaminants. After that, it dried. For around a month at ambient temperature without light until it achieved steady Moisture content (two pulped neem seeds and a neem tree are shown on

Plate 1).<sup>15</sup> Since seed moisture content was thought to be a crucial factor in decortication, the characteristics of the seed at various moisture

contents were identified. To acquire Varying seed moisture levels:



**Fig:- Neem Of Seeds**

the accepted practice Become the standard (Coskun et al., 2005). Five wetness level Were collected for research.<sup>16</sup>

### 5.3 Flowers

Making neem flower extract (MENF): Neem blossoms were purchased from Bangkok's neighbourhood markets. The flowers were cut off their stalks and cleaned using Distilled and tap water, followed by lyophilization to produce Around 10% of the dried flowers. Materials that have been freeze-dried Were ground into a powder and

removed using methanol. The suspension left in the room (20 ml/g) Temperature overnight. Methanolic extract was Gathered using paper filtering, and the extraction process was Carried out by the same circumstance. Two methanol Portions were combined, then rotated to vaporise them. Evaporator device (Buchi R-200) at 400–450 degrees Celsius till Dryness. The amount of dried extract obtained by freeze drying Neem flowers made up roughly 25%.<sup>17</sup>



**Fig:-Flowers of Neem**

### 5.4. Barks

After being collected, neem bark was properly cleaned with distilled water to get rid of any dirty impurities, and it was then sun-dried. After that, it was diced into little bits.<sup>18</sup> Clear, brilliant amber-colored gum that is exuded from the bark gathers in tiny rips or shards. “Margosine” is the name of the bitter alkaloid found in it. Leaves bitter principles as well. However in little amounts that are far more soluble in water. This material is the

resin's hydrate. 10% of seeds Up to 31% of a bitter yellow fixed oil with a pronounced disagreeable smell Bitter flavour. The bark's volatile fatty acids are made up of A combination of oleic and stearic acids with a trace of lauric Acid. Nimbin produced from trunk bark is 0.4%, 0.001 nimbinin, and 0.04%. Nimbidin and 0.02% of essential oil. Terpenoids tetracyclic And the stem bark has yielded its derivatives.

Tricyclic diterpenoids in addition to<sup>18</sup> liminates fleas and ticks from dogs, treats diabetes AIDS, cancer, heart disease, herpes, allergies, ulcers, hepatitis, and a number of other ailments. It also fights against skin infections including eczema, psoriasis, scabies, and acne.



**Fig:-Leaf Of Neem**



**Fig:-Benefits Of Neem**

## 7.- Pharmacological Activities

### -Antioxidant activity

A study was conducted to assess the antioxidant activity of many extracts made from different neem tree sections.<sup>20</sup> The findings imply that leaf extracts, Bark from stems and flowers has strong antioxidant action. Additionally, it was discovered in another study that ethanolic floral and seed oil extracts had superior free radical-scavenging capabilities. Additionally, it was found in a comparative study that the bark had more complex phenolic contents than leaves with stronger antioxidant activity.<sup>21</sup>

### Wound-healing effect

The traditional medicine has long recognised the ability of neem leaves to heal wounds. Neem oil's therapeutic benefits for chronic, nonhealing wounds were investigated in one study, and the Findings indicated that 50% of wounds healed after 8 weeks of treatment. Was seen in about 44% of individuals .In an additional investigation, the

neem leaf aqueous extract was utilised to assess the wound-healing properties, resulting in a noteworthy decrease in the largest diameter wounds.<sup>21</sup>

### Anti-inflammatory effect

Studies have indicated that neem plants have an anti-inflammatory effect. Nimbidin from neem trees was used orally in an experiment based on rat models to assess its anti-inflammatory response. Evaluations have also been conducted on the anti-inflammatory properties of neem fruit skin and its particular component, azadiradione.<sup>22</sup> The findings showed that the rats given a dose of this fruit at a rate of 100 mg/kg Azadiridone and skin extract shown notable anti-inflammatory properties.<sup>21</sup>

### Nephroprotective effect

Animals used in experiments are also given cisplatin to cause nephrotoxicity. Neem leaf extract in methanolic form has demonstrated noteworthy defence against nephrotoxicity caused

by cisplatin since this extract displays anti-inflammatory, antioxidant, and other free radical-scavenging action.<sup>21</sup>

#### **Antidiabetic effect**

The potential anti-diabetic effects of neem tree extract have also been investigated. Previous research demonstrated that diabetic rats given 250 mg/kg b.w. of neem extract had noticeably lower blood glucose levels.<sup>23</sup> Blood sugar levels were lowered by neem root bark extract at 200 and 400 mg/kg b. w. An increased dosage of this extract (800 mg/kg b. w.) shown a noteworthy decrease in Blood sugar level, and in contrast, it decreased blood sugar by 54%. To exert authority. Additionally, glibenclamide and neem kernel powder were utilised as an antidiabetic medication on experimental animals, either in combination or independently. According to the findings, these two agents either Individually or in combination, greatly reduce the amount of Serum lipids, serum glucose, and serum enzyme activity.<sup>21</sup>

#### **Antimicrobial activity**

Since several studies have demonstrated unequivocally that neem extracts may be helpful in controlling certain foodborne pathogens and other spoiling organisms, neem extracts are rich in antibacterial components.<sup>24</sup> Zones of inhibition have been seen in NLEs, providing more evidence of their antibacterial qualities, and the extract demonstrated a notable Larger inhibitory zones compared to 3% sodium . hypochlorite. The impacts of neem limonoids, including deacetylgedunin, gedunin, azadirachtin, salannin, 17-hydroxyazadiradione, and deacetylnimbin Assessed on *Anopheles stephensi*. Salannin, azadirachtin, and At all doses, deacetylgedunin had excellent bioactivity, while the others Limonoids from neem exhibited reduced activity. Furthermore, azadirachtin was The most effective in every trial, yielding nearly 100% larval Death at a concentration of 1ppm. Neem bark extract's

antiviral activities shown that, at concentrations of 50–100 µg/ml, the bark extract significantly prevented HSV-1 entrance into cells. Neem seed extract's antifungal effectiveness against *Candida* spp. Has also been assessed, and the study's conclusion is that it seems promising.<sup>21</sup>

#### **Anticancerous activity**

Anticancerous aPlant-based or natural products play a crucial role in blocking the formation of tumours by altering cell signalling pathways. The anticancerous properties of neem trees were further evidence of their superior medicinal qualities.<sup>25</sup> A study was designed to investigate the cellular and molecular mechanisms of nimbolide and azadirachtin for cytotoxic effects in the human cervical cancer (HeLa) cell line. The results showed that nimbolide and azadirachtin significantly suppressed the viability of HeLa cells in a dose-dependent manner by inducing cell cycle arrest at G0/G1 phase, p53-dependent p21 accumulation, and downregula.<sup>21</sup>

#### **8. Medicinal Uses**

Every aspect of the tree, including the twigs, seeds, bark, leaves, and roots, has medicinal properties. Neem leaves can help to boost Body's immunity, lower fever, and treat a variety of Foot fungus that are beneficial in treating and preventing termites Neuromuscular discomfort and anticoagulant Antituberculosis, anthelmintic, antitumor, Cosmetics, antiseptic, antiviral, and contraceptive Insecticides, repellents, and neem bark and roots are used to treat diabetes, aids, cancer, heart disease, herpes, allergies, ulcers, and skin infections like acne, psoriasis, scabies, and eczema. They can also be used to manage fleas and ticks on pets. Neem oil has antiviral, bactericidal, antihelmintic, antihistaminic, antiprotozoal, antipyretic, and contraceptive properties. Cosmotics, Insecticides, and Fungicides. Neem branches (Tiny, thin tree branches) serve as mouth fresheners, Tooth cleansers and pain relievers.<sup>26</sup>



## CONCLUSION

This study looked at how antibiotics, neem oil, and Trichoderma affected the fungus and bacteria that cause cherry tomato spoiling. The unique source of many chemicals with a variety of chemical structures is neem, a multipurpose medicinal plant. It can be used for many different things. In both people and animals as a remedy for a number of illnesses brought on by microbes and other elements. It is applied as an insecticide and pesticide. Neem in particular and medicinal plants in general are gifts from nature, and their use should be promoted, especially in the manufacturing of medications, which offers a motivator for alternative medicine and procedures. By evaluating the situation at the village level, new forestry programs that represent the needs and attitudes of small farmers must be implemented. Initiatives frequently assume a top-down strategy by large-city legislators who are disconnected from village life.

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