

Phytochemical Testing of *Azadirachtolide indica*

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Abstract

Neem *Azadirachta indica* is a useful traditional medicinal plant growing in Nigeria, India, and America. The phytochemicals and the biopesticide components present were ascertained. The results showed that saponins, steroids and terpenes were mostly present, while tannins and glycosides were moderately present, and alkaloids, flavonoids, phenols and oxalic acid were least present. The presence of this phytochemical could account for the therapeutic uses of neem.

Keywords: Bio Pesticidal; Neem; Phytochemicals; Therapeutic

1. Introduction

Neem plant is a native of India, where it is known as divine tree; "life giving tree". It belongs to malice family. Away From India, it is commonly found in Africa and America. It occurs naturally in tropical region and sub-tropical zones. However, it can still be planted or cultivated. Neem tree is an incredible therapeutic plant that has been declared the Tree of the 21st century by the United Nations Numerous organic compounds found in the plant kingdom have been



Figure 1 Picture of *Azadirachtolide indica* Crude Plant

employed for medical purposes and may be the basis for the creation of new drugs with high efficacy in treating a range of pathological disorders in the years to come. The neem plant is regarded as one of the most abundant sources of pharmaceutical intermediates, chemical entities, nutraceuticals, dietary supplements, folk medicine, and medications

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for both modern and traditional medicine. Regarding synthetic drugs. Through extensive research, a few of the phytochemicals found in neem plants have been identified, separated, and measured. These bioactive chemicals have provided leads in the development of several life-saving drugs, which are in use today. Ancient medical literature generally advocates extract from *Azadirachta indica*, also known as Dogon Yaro in some regions of Nigeria. The leaves are used as a medication for fever, eczema, and diabetes. Determining the phytochemical components of the neem plant and connecting them to some of its traditional uses was the aim of this study.

1.1. Plant Profile

Table 1 Plant Profile

kingdom	plantae
order	Rurales
suborder	Retinae
family	Melicia
Sub family	Meloidae
Tribe	Melee
genus	Azadirachtolide
species	Indica

1.2. Chemical constituents

Azadirachta indica L. (neem) shows therapeutic role in health management due to rich source of various types of ingredients. Azadirachtin is the primary active ingredient, followed by sodium nimate, gadin, solanine, quercetin, nimonin, nimbi, nimbi din, and libido. Leaves contain ingredients such as nimbi, immanence, 6-desacetylnimbinene, Nimba diol, imboiled, ascorbic acid, n-hexaconazole and amino acid, 7-desacetyl-7-benzoylazadiradione, 7-desacetyl-7-benzoylgedunin, 17-hydroxyazadiradione, and nimbies. Fresh neem leaves were used to purify the polyphenolic flavonoids quercetin and β -sitosterol, which were shown to have antibacterial and antifungal qualities. The seeds of the plant also contain important components including gadin and azadirachtin.

1.3. Medicinal uses

- **Treats Acne:** -Neem has an anti-inflammatory property which helps reduce acne. *Azadirachta indica* also helps reduce skin blemishes.
- **Nourishes Skin:** -Neem is a rich source of Vitamin E which helps repair damaged skin cells.
- **Treats Fungal Infections:** -Neem has scientifically proven antifungal property which helps treat fungal infections.
- **Useful in Detoxification:** -Neem can prove useful in detoxification both internally and externally. Consumption of neem leaves or powder stimulates kidneys and liver increasing the metabolism and eliminating the toxins out of the body. Externally, neem scrubs or paste can be used to remove germs, bacteria, dirt, etc from your skin preventing rashes and skin diseases.
- **Increase immunity:** -Neem's antibacterial and antimicrobial properties are well-known. These qualities are very important for increasing immunity.
- **Insect & Mosquito Repellent:** - To keep the insects away, you can burn some neem leaves. Additionally, this works well against certain mosquito species. Neem is the most effective home remedy for treating the early stages of malaria among all of them.
- **Guards Against Digestive Disorders:** -Because of neem's anti-inflammatory qualities, a number of gastrointestinal disorders, including flatulence, stomach ulcers, and constipation, are less likely to occur.
- **Handles Injuries:** - Neem leaves are used to treat wounds because of their antibacterial qualities.
- **Reduces Dandruff:** - Shampoos and conditioners frequently include neem. The antifungal and antibacterial qualities of *Azadirachta indica* assist to strengthen your hair and get rid of dandruff.
- **Lessens Joint Pain:** - Application of neem oil or extract on the afflicted region might help alleviate pain and discomfort. As a result, it is frequently used to treat arthritis.
- **Skin exfoliation:** - Neem works wonders as an exfoliator. It aids in clearing the skin's surface of dead cells, which inhibits the development of imperfections.

2. Method and material

- **Material:** -fresh neem leaves, grinder, distilled water, conical flask, filter paper, fan, bowl, Soxhlet apparatus, methanol, freezer.
- **Method:** --The collected *Azedarach indica* leaves were washed under running tap water and rinsed with sterile distilled water to remove a dust and debris. The leaves were separated out from each after wash, segregated and shed dried. The shed dried leaves were powdered using a dry mechanical grinder. The dried powder was passed through the mesh sieve to obtain the fine powder. The fifty grams of leaves powder was added with 250 ml of distilled water. After being securely sealed, the conical flask was allowed to macerate for 48 hours at room temperature. During this time, the contents were shaking every two hours. A muslin cloth was used to filter the contents of the conical flask. Using the small amount of filtrate that was left in the flask, the contents were rinsed twice before being filtered using 1 filter paper one more. The filtrate was moved to a sterile evaporating bowl and left there with a fan to allow the solvent to evaporate. The extract that remained in the bowl after the solvent had completely evaporated This following the solvent's full evaporation.
- **Methanolic Extract-** Soxhlet apparatus was used for extraction purpose with 80% methanol. Different concentration of plant material and solvent were taken. After filling the Soxhlet apparatus with plant material and solvent it was run at 60°C until it gets colorless and continuous flows of water to cool down the condenser. Finally, the extract was collected in airtight bottles and stored at 4°C.

2.1. Preliminary phytochemical screening

Detect the occurrence of different natural substances in the plant. The plant material underwent extraction. Subsequently, these extracts were analyzed using specific phytochemical tests to identify the presence of compounds like sugars, starch, polyphenols, saponins, mucilage, steroids, alkaloids, and flavonoids.

Table 2 Tests for phytochemical screening

Test	OBSERVATION	INFERENCE
(1) Test for alkaloids: a) Dragados's reagent test: b) Wagner's reagent test	Orange to red colour Brown to flocculent precipitation	Presence of alkaloids Presence of alkaloids
(2) Test for glycosides: (a)Benedict's reagent test	appearance of brownish to red colour	presence of glycoside.
(3). TEST FOR DETECTION OF PROTEINS: (a)Xanthopterin test: (b)Biuret test:	appearance of white or yellow Precipitate development of violet to pink colour.	Presence of proteins presence of proteins
4. TEST FOR DETECTION OF TANNINS: (a)Lead acetate test: (b)Ferric chloride test	formation of precipitation development of green colour	presence of tannins. presence of tannins.
(5) Test for Flavonoids:	Pale yellow brown colour	Presence of flavonoids
(6) TEST FOR PHENOLS	Violet colour	Presence of phenols
(7) TEST FOR SAPONIN	Formation of froth	Presence of saponin

2.2. Development of Thin Layer Chromatography

TLC analytical plates covered with 0.2 mm thick silica gel-G were used to evaluate the methanolic extracts. A 4:1:1:1 v/v mixture of butanol, acetic acid, and water was employed as the solvent system. The capillary action causes this combination to migrate on the silica-coated plates. After the coated plate was fully produced, it was allowed to air dry

before being heated for 20 to 25 minutes. To find the spots, a 0.2% freshly made ninhydrin solution was sprayed onto the plate. Its retention factor (Rf) represented the spots' mobility.

3. Result

According to the review, azadirachtolide indica has a wide range of pharmacological effects since it is a rich source of bioactive substances such terpenoids, flavonoids, glycosides, and tannins. The presence of these phytoconstituents in different plant portions was verified by extraction and chromatographic investigations. These substances have strong analgesic, hepatoprotective, antibacterial, antioxidant, and anti-inflammatory properties. The results indicate Azadirachtolide Indica's potential for creating standardized herbal formulations and justify its traditional applications in Ayurvedic, Siddha, and Unani systems.

4. Conclusion

With an emphasis on recent studies, this report summarizes the body of information regarding Azadirachtolide indica. Ayurveda and traditional medicine have made considerable use of the rhizome and its preparations for a variety of therapeutic uses. Azadirachtolide indica is a well-known Ayurvedic remedy with a variety of therapeutic uses that have been reported. Its conventional claims cannot be verified without scientific validation. More research is necessary to examine its therapeutic potential utilizing contemporary methods and parameters, given its significance in traditional Indian medicine. We can then fully utilize this herb's advantages for humanity

Compliance with ethical standards

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No conflict of interest to be disclosed.

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