PHYTOCHEMICAL ANALYSIS ON NEEM (AZADIRACHTA INDICA) LEAVES

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ABSTRACT

Studies were conducted to determine the phytochemicals present in Neem (Azadirachta indica) leaves. The leaves for this work was washed, dried in a shade and then grinded to powder. The grinded leaves sample was soaked in distill water for 24 hours. After the contact elapsed the solvent was filtered to recover the extract. Qualitative analysis was carried out on the extract; the result showed Azadirachta indica contains; saponin, flavonoid and tannin and the absence of Alkaloid.

INTRODUCTION

Neem (Azadirachta indica) is a tropical evergreen tree native to Indian sub-continent (Roxburgh, 1874) most of the plant parts such as fruit seeds, leaves, bark and roots contain compounds with proven antiseptic, antiviral, antipyretic, anti-inflammatory, antiulcer and antifungal uses it has great potential in the fields of pest management, environment protection and medicine, Neem is a natural source of eco-friendly insecticides, pesticides and agrochemical. (Barchmachari, 2004). Neem elicit a variety of effects in insects such as antifeedant, growth retardation, reduced fecundity, molting disorders, morphogenetic defects and changes of behavior (Banchio et al, 2003, Wandscheer et al, 2004). Neem is a better cleans toxins, while promoting healing and improving all body functions. Apart from this, it has parasitic insecticidal, spermicidal properties and hence, destroys a wide range of organisms according to (Dixit 1988). Neem product also showed very good repellent effects on different insects and then earlier observation of Schmutter on neem repellent to desert locust in Sudan was the first trigger to worldwide research on neem insecticides. The world is rich with natural and unique medicinal plants. Medicinal plants are now getting more attention than ever because they have potential of myriad benefits to society or indeed to all mankind, especially in the line of medicine and pharmacological. The medicinal value of these plants lies in bioactive phytochemical constituents that produce definite
physiological action on human body (Akinmoladun et al., 2007). Some of the most important bioactive phytochemical constituents are flavonoids, tannins, saponins, and essential oils, alkaloids, phenolic compounds and many more (Edeoga et al., 2005). These natural compounds formed the foundations of modern prescription drugs as we know today (Goh et al., 1995).

Phytochemical is a natural bioactive compound in plants, such as vegetables, fruits, medicinal plants, flowers, leaves, roots that work with nutrients and fibers to act as a defense system against disease or more accurately to protect against disease. Phytochemicals are divided into two groups which are primary and secondary constituents; according to their functions in plant metabolism. Primary constituents comprises common sugars, amino acids, proteins and chlorophyll while secondary constituents consist of alkaloids flavonoids, saponins, terpenoids and phenolic compounds (Krishnaiah et al., 2007) and many more such as tannins and so on.

Azadiractaindica is chosen to study because, it come in abundant source, easily available, and are already utilized in traditional medicine.

STATEMENT OF PROBLEM

Azadirachta indica plants (leave) are claimed to have a lot of economic value such as medicinal, nutritional and pesticide values. These claims have not been clearly justified. This research is therefore centered on analyzing and justifying the claims made on these plants (leave).

AIM AND OBJECTIVES

i. To describe clearly the extraction process used on this plant.

ii. The aim of the research is to carry out phytochemical analysis on the Azadiracterindica leaves. In other to identify and isolate the phytochemical present in the plant material.

SIGNIFICANCE OF THE STUDY:

By studying the presence of photochemical in Azadirachta indica leaves, the uses of the leaves in traditional treatment can be explained scientifically.

SCOPE:

The phytochemical analysis will be carried out only on the leaves of the Azadirachta indica (Neem) leaves and limited to the study of the following tannin, saponin, flavonoid and Alkaloid.
MATERIAL AND METHOD

Collection and Preparation of Material

The fresh leaves of *Azadirachta indica* were collected at Ngomari area in Maiduguri, Borno State, Nigeria. The sample were dried in shade and was then grinded to fine green powder using pestle and mortar, the grinded sample was then placed into a conical flask.

Apparatus

Pestle, Mortar, Conical flask, separating funnels, Filter paper, Weighing balance, Test tubes
Water bath & Measuring cylinder

Reagents

Distilled water, Hydrochloric acid, Wagner’s reagent, Mayer’s reagent, Magnesium chips, Ferric chloride solution, Lead ethanoate

METHOD

QUALITATIVE ANALYSIS

10g of the *Azadirachta indica* sample was weighted into a labeled conical flask. 100ml of plistilled water was poured into the conical flask to obtain the extract. After 24 hours, the mixture was filtered using filter paper into conical flask. The filterate was concentrated by placing the flask into water bath at 100°C. The resulting filtrate was cooled to room temperature; qualitative test was then carried out on the cool solution.

PREPARATION OF WAGNER REAGENT

1.3g of iodine crystal and 2.0g of potassium iodide was dissolved in water in a 100ml volumetric flask and the solution was made up to 100ml.

PREPARATION OF MAYER’S REAGENT
1.3g of mercuric chloride and 5.0g of potassium iodide was dissolved in distilled water in a 100ml volumetric flask and the solution was made up to 100ml.

TEST FOR ALKALOIDS

i. 1ml of 1% HCL was added to 3ml of the extract in a test tube.
   - The mixture was heated for 20 minutes in a water bath.
   - While heating, it was shaken continuously.
   - The mixture was cooled and filtered.

ii. 1ml of the filtrate from (a) above was added to 0.5ml of Mayer’s reagent.
    Observation: No change occur

iii. 1ml of the filtrate from (a) above was added to 0.5ml of Wagner’s reagent.
    Observation: No change occur

TEST FOR SAPONIN

Fronthing test

- 3ml of the extract was diluted with 2ml of distilled water and was pound into a test tube. The mixture was shaken vigorously.

Observation: - A persistent fronthing was observed. The fronthing was persistence in the extract.

Note: Forth is a mass of small bubbles especially on the surface of a liquid.

TEST FOR FLAVONOIDS

Shinoda’s test

a. -3 pieces of magnesium chips was added to 3ml of the extract.
   - Few drops of concentrated Hclwas added.

    Observation: A pink, orange colouration was observed.

    Lead ethanoate test
b. To 3ml of the extract, 3ml of lead ethanoate was added.

Observation: a bluecoloured precipitate was observed.

TEST FOR TANNINS

- 2ml of the extract in a test tube was boiled gently for 2 minutes and allowed to cool.
- 3 drops of ferric chloride solution was added to the extract.

Observation: Blue green precipitate was observed.

RESULTS AND DISCUSSION

Table 1: Analysis result of *Azadirachta indica*

<table>
<thead>
<tr>
<th>S/N</th>
<th>Parameter</th>
<th>Distilled water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saponin</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Flavonoid</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Alkaloids</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Tannin</td>
<td>+</td>
</tr>
</tbody>
</table>

DISCUSSION OF THE RESULT

Table 1 above shows the phytochemical analysis result of *Azadirachta indica* (Neem) aqueous leaves extract, whereby saponin, flavonoid and tannin was present in the extract while, Alkaloid was found to be absent in the extract.

Effect of Saponins, Flavonoids and Tannins

*Azadirachta indica* leaves are used to prevent damage caused by free radicals in the body by neutralizing them. This can be explained by the presence of flavonoids in *Azadirachta indica* leaves, as flavonoids are known to act as antioxidant. Antioxidants neutralize highly unstable and extremely reactive molecules, called free radicals, which attack the cells of human body every day (Stauth, 2007). Free radical damage is believed to contribute to a variety of health problems, including cancer, heart disease and aging (Stauth, 2007).

*Azadirachta indica* is also used to heat hyperglycaemia (sotheewaran et al., 1998), and saponins have been found to be potentially useful for the treatment of hyperglycaemia (Olaleye, 2007;
Malinow et al., 1977). The presence of saponins in *Azadirachta indica* is also another reason why the leaves are used traditionally to cleanse and purify blood because one of saponins medicinal uses is as a gentle blood cleanser (Kenner and Requena, 1996). *Azadirachta indica* are used as toothbrush since ancient time in India, Bangladesh and palaistan (Chellaiah et al, 2006). Apart from that, *Azadirachta indica* oil also is a very popular as a traditional dentifrice. The oil form the seeds have been found to be anti-inflammatory and aids healing in gingivitis. This can be explained due to the presence of saponins and flavonoids, as both constituent show anti-inflammatory properties (Kenner and Requina, 1996). From research, chewing of 8 – 10 neem leaves early in the morning for twenty four days protects the body from disease like diabetes and hypertension (Conrick 2007) neem leaves is used to treat dysentery and other intestinal disorder (Akinpelu and Onakoye, 2006). The presence of tannins also aids in wound healing (Okwu and Josiah, 2006).

**SUMMARY**

The phytochemical analysis result shows the presence of saponin tannin, flavonoid and the absence of Alkaloid flavonoid acts as an antioxidant (Stauth, 2007) saponin is used to treat hyperglycaemia (Sotheewaren et al., 1998) and tannin aids in wound healing (Okwu and Josiah, 2007).

**CONCLUSION**

This research work has revealed further potentials of *Azadirachta indica* in the area of pharmacology as potential source of useful drugs. This study therefore has provided some biochemical basis for ethno pharmacological uses of *Azadirachta indica* leaves in the treatment and prevention of various diseases and disorders. The phytochemical screening on the qualitative analysis shows that the leaves of *Azadirachta indica* are rich in flavonoids, tannins and saponins, which are popular phytochemical constituents.

**RECOMMENDATION**

1. *Azadirachta indica* plant should be cultivated in residential compounds and schools where it can be easily collected and use.
2. It should be consumed as remedy to some illness and diseases.
3. Research should be carried out on antimicrobial affects
4. Research should be carried out on the variety of the plant in area where the plant was
5. Further research should be carried out on the root, bark, and seed of the plant.

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