WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Comparative Phytochemical Analysis for Flavonoid and Tannin Composition in the Leaves, Roots, Flowers and Barks of *Azadirachta Indica* (Neem) A. Juss

Eremrena, P.O. and Anyanwu-Frank, S.

Department of Plant Science and Biotechnology, Faculty of Science, University of Port Harcourt, P.M.B.5323, Choba, Port Harcourt, Rivers State, Nigeria.

*Email: peter.eremrena@uniport.edu.ng

A B S T R A C T

Phytochemical analysis involves the screening of plants for the presence and/or quantity of predetermined plant chemicals. Medicinal plants like Azadirachta indica are usually the subjects of such screenings. The research was carried out at the Plant Biotechnology Laboratory, Faculty of Science in the University of Port Harcourt, Rivers State, Nigeria. The flavonoid and tannin composition of the roots, barks, flowers and leaves of Azadirachta indica were analysed quantitatively using Bhom and Kocipal-Abyazan, and Folin-Denis methods of analysis respectively. The percentage compositions were determined. The result revealed that the leaves contained 4.50% flavonoid and 3.42% tannin, the bark contained 3.98% flavonoid and 10.87% tannin, the roots contained 3.70% flavonoid and 3.49% tannin, and, the flowers contained 5.18% flavonoid and 1.24% tannin. The bark contained the most tannins and the flowers contained the most flavonoids. The presence of these metabolites in such quantities proves the usefulness of all four parts of the plant in the treatment of various diseases, use for feed/forage and vital sources of the mentioned secondary metabolites.

Keywords: Phytochemical Analysis, Flavenoid, Tannin, Bark, Neem

INTRODUCTION

Medicinal plants have been used for centuries before the initiation of orthodox medicine. Leaves, fruits, flowers, stems, roots and bark can all be ingredients of herbal medicines. The medicinal value of these plants lies in their components of phytochemicals which produce a definite physiology action on the human body. The therapeutic efficiency of these medicinal plants has been attributed to the presence of various phytochemicals such as tannins, flavonoid and other secondary metabolites. Studies have demonstrated that many of these phytochemicals contribute as antioxidant, anti-inflammatory, antitumor, anti-mutagenic, anti-carcinogenic, antiviral and antibacterial agents (Prasanna *et al*., 2017) Screening of phytochemicals involves the extraction, screening and identification of bioactive substances (plant chemicals) in plants.

Azadirachta indica (A. Juss) is a medium to large size evergreen tree of the tropical to sub-tropical regions of the world and is native to India. It is commonly known as the Neem tree, or "Dogoyaro' in most parts of Nigeria. Although it is mostly grown as a shade tree because of its characteristic wide-spreading branches, it is also known to have medicinal properties.

Plants produce a wide variety of secondary metabolites which are used either directly as precursors or as lead compounds in the pharmaceutical industry. The World Health Organization (WHO) estimates that up to 80% of the world's people rely on plants for their primary healthcare, since western pharmaceuticals are often expensive, inaccessible or unsuitable and are always accompanied with various side effects. According to them, medicinal plants would be the best source to obtain a variety of drugs. Extracts from various parts of the Neem plant (*A. indica*) are most consistently recommended in ancient medicinal texts for gastrointestinal upsets, diarrhea, intestinal infections, skin ulcers and malaria. It is, therefore, imperative to evaluate the chemical constituents of these parts of the Neem plant.

MATERIALS AND METHODS

Collection and Preparation of Materials

Samples of fresh leaves, roots, barks and flowers were obtained from the *Azadirachta indica* trees found in the University Park of the University of Port Harcourt (popularly known as 'Abuja Campus).

After collection, the samples were crushed. The flowers and leaves were crushed using a mortar and pestle, while the bark and root samples were crushed using a grinder.

Flavonoid Test

5g of each sample were extracted repeatedly with 80% alcohol (methanol) at room temperature. The solutions were filtered (Whatman -42, 125mm). The filtrates were later transferred into crudes and evaporated into dryness over a water bath then weighed to a constant weight. (Bhom and Kocipal-Abyazan,1994)

Test for Tannin Using Folin-Denis Method

0.lg of each sample were weighed into 100ml conical flasks. 50ml of distilled water were added to each flask and the mixtures were boiled gently on a hot plate for 1 hour. While still warm, the boiled mixtures were filtered (Whatman -42) into 50ml volumetric flasks. The filtrates were left to cool and then diluted to volume.

Colour Development

Pipettes were used to transfer aliquots of each sample into 50ml volumetric flasks. Water was added until the flasks were two-thirds full and 2.5ml of Folin-Denis (FD) reagent were added. l0ml of sodium carbonate solution were added after the FD reagent. The mixtures were, then, diluted to volume. They were placed in a water bath at room temperature for 20 minutes.

RESULTS AND DISCUSSION

The quantitative phytochemical analysis of the leaf, stem-bark, flower and root samples of *Azadirachta indica* revealed that the bark contained the highest percentage of tannins while the flowers contained the highest percentage of flavonoids. The roots contained the least percentage

of flavonoids and the flowers contained the least percentage of tannins. (Table 1)

Table 1. Results for Flavonoid and Tannin Test

S/N	Sample Identity	Flavonoid (%)	Tannin (%)
1.	Leaf	4.50	3.42
2.	Bark	3.98	10.87
3.	Root	3.70	3.49
4.	Flower	5.18	1.24

Medicinal plants are a reservoir of chemical agents associated with therapeutic properties. The plant product or natural products show an important role in diseases prevention and treatment through the enhancement of antioxidant activity, inhibition of bacterial growth and modulation of genetic pathways. The therapeutic role of a number of plants in diseases management is still being enthusiastically researched due to their less side effect and affordability (Alzohairy, 2016).

A. indica leaves contain a wide range of biologically active and diverse phytochemical constituents. Many scientific studies are reporting that *A. indica* leaves have medicinal and pharmacological properties (Ravi *et al.*, 2015).

CONCLUSION

The bark of *A. indica* has the highest tannin content and its flowers have the highest flavonoid content.

Knowing the percentage composition of flavonoids and tannins in various parts of the Neem plants, and their benefits/toxicity, exploitation of these properties will be very easy.

References

Ahmed S. and Grainge M. (1986) Potential of the Neem Tree (Azulirachtaindica) for Pest Control and Rural Development. *Economic Botany* 40(2); 201-209,

Alpana D. and Bhagyashree D., (2017) Extraction of Phytochemicals and Study of Antimicrobial

Properties of *Azadirachta indic*a (Neem). *Indian Journal of Scientific Research* 12(2), 053-055.

Alzohairy, M. A. (2016). Therapeutics Role of *Azadirachta indic*a (Neem) and Their Active Constituents in Diseases Prevention and Treatment. *Evid. Based Complement. Altern. Med.*

Boham, B.A. and Kocipal-Abyazan, R. (1994) Flavonoids and Condensed Tannins from Leaves of Hawaiian vaccinium. vaticulatum and V. calycinlum. Pacific Science, 48, 458-463.

Folin, O. and Denis, W., On phosphotungstic-phosphomolibdic compound of a color reagents, *J. Biol. Chem.*, 1912, vol. 12, pp. 239–243.

Prasanna R., Manomani P. and Mukesh G. (2017) Preliminary Phytochemical Analysis of

Hibiscus, *Rosa sinensis and Azadirachta indica*(Neem) leaves extract. *Global Journal of Engineering Science and Researches 4(12): 34-37.*

Ravi K., Bharavi K., Ravi K. P. and Vamsi K. B. (2015) Phytochemical Screening and

Antibacterial Activity of Ethanol Extract of Leaves and Twigs of AzadirachtaindicaA.

Juss. UK *Journal of Pharmaceutical and Biosciences* 3(6): 55-59.

Mohammed A. A. (2016) Therapeutics Role of *Azadirachta indica* (Neem) and Their Active

Constituents in Diseases Prevention and Treatment. *Evidence- Based Complementary and Alternative Medicine*

Nwali O. N.. Idoko A., Okolie J. E., Ezeh E., Ugwudike P. O. Rita O. N., Ezenwali M. O., Odo

L. A., Ani P. N. and Okolie S. O. (2018) Comparative Analysis of the Phytochemical

Compositions of Leaf, Stem-Bark and Root of *Azadirachta indica* (Neem). *Universal Journal of Pharmaceutical Research* 3(5): 46-50.

Susmitha S., Vidyamol K. K., Ranganayaki P. and Vijayaragavan R. (2013) Phytochemical

Extraction and Antimicrobial Properties of *Azadirachta indica* (Neem). *Global Journal of Pharmacology* 7(3): 316-320.