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Phytochemical screening of *Azadirachta indica* (Neem) (Meliaceae) in Maiduguri, Nigeria

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ABSTRACT: Fresh matured leaves of *Azadirachta indica* (neem) were collected, air dried and aqueous-extracted to screen for some active chemical constituents. Saponins had high scores in the extract, tannins and glycosides indicated moderate scores, while alkaloids, terpenes, flavonoids, reducing sugars, pentoses and whole carbohydrates showed low scores. Anthraquinones, ketones and monosaccharides were not detected from the extract. It was concluded that the extract contains pharmacologically active constituents.

Keywords: Neem; Phytochemical, Screening, *Azadirachta indica*, Nigeria

Introduction

Neem (or Nim) which belongs to the family Meliaceae, originated from South Asia, but grows widely in India, Pakistan and other tropical and sub-tropical parts of the world (Bokhari and Aslam, 1985; Von Maydell, 1986). The tree was introduced in Nigeria from Ghana, and it was first grown from the seeds in Maiduguri, in the then Bornu Province (now Borno State), Nigeria, in 1928 (National Research Council, 1992; Nwoeabia, 1994).

The Neem tree is significant in Nigerian forestry because it constitutes the largest population of trees, especially in the Northern States. It was nicknamed 'Dogon Yaro' after the first caretaker of the Neem tree Nursery in Maiduguri.

Neem is a moderate sized to large, usually evergreen tree, with a fairly dense crown and glabrous leaves divided into leaflets. The bark is fairly thick, furrowed longitudinally or obliquely and is dark grey outside and reddish brown inside. The tree in Maiduguri flower throughout the year but fruits during the cold harmattan season which corresponds with the winter of temperate climates. The fruits are yellowish green when ripe and have a sweetish pulp containing one seed. In Northern Nigeria, the neem plant is used in traditional circles for the treatment of general body pain after child delivery, pyorrhea, and intestinal worms (Bokhari and Aslam, 1985). Based on this traditional and other uses of *Azadirachta indica*, this study was conducted to ascertain its potentially pharmacologically active components.

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Materials and Methods

The experimental plant: Fresh matured neem plant leaves were obtained from the University of Maiduguri campus and identified by a botanist. The leaves were air dried under shade and hand crushed to obtain a 2.2 Kg powder.

Extraction of plant material: Extraction was carried out in 700ml distilled water at 60°C for 8 hours using the soxhlet extractor. Extract was then concentrated on an aluminium tray and stored at room temperature (27°C).

Phytochemical screening: The phytochemical analysis of the extract of *Azadirachta indica* leaves for alkaloids, saponins, tannins, glycosides, anthraquinones, terpenes, and flavonoids was carried out using the methods described by Harborne (1973; 1993); Sofowara (1982) and Trease and Evans (1983). The powdered leaf was extracted with the required solvent and necessary reagent added to the right quantity of the extract. All observations were recorded.

Results

The result of the phytochemical screening for active substances is shown in Table 1. Saponins showed high scoring in the extract while tannins and glycosides indicated moderate scores. Alkaloids, terpenes, flavonoids reducing sugars, pentoses, and whole carbohydrates showed low scores. Anthraquinones, ketones and monosaccharides were not detected from the extract.

Table 1: Phytochemical components of Neem leaf aqueous extract.

Components	Test	Scoring
Alkaloids	Dragendorff's	+
Saponins	Frothing	+++
Tannins	Ferric chloride	++
Glycosides	Salkowski's	++
Combined		
anthraquinones	Borntrager's+Sulphuric acid	-
Anthraquinone		
derivatives	Borntrager's	-
Terpenes	Lieberman-Buchard	+
Flavonoids	Pew's	+
Reducing sugars	Fehling's	+
Ketones	Standard	-
Pentoses	Standard	+
Monosaccharides	Barfoed's	-
General		
Carbohydrates	Molisch's	+

Key:- - = not detected.

+ = low concentration

++ = moderate concentration

+++ = high concentration

Discussion

The phytochemical test results indicated high scores for saponins, moderate scores for tannins and glycosides while alkaloids, terpenes and flavonoids had low scores. According to Anyanwu and Dawet (2005) these constituents found in plants are known to have anti protozoal and anti bacterial activities. Flavonoids especially, are of a potential benefit to human health (Jouad *et al.*, 2001).

Azadirachtin extracts from the seeds, leaves and bark of the Neem tree has been reported to have strong biological activities against insect pests, but with very low toxicity to mammals and the environment, generally (Umar *et al.*, 2002; Makeri *et al.*, 2007; Wikipedia, 2007). Registered Neem insecticide formulations Neemros® and Neemroc EC® have also been found to be effective against insect pests of vegetables but safe to their natural enemies (Akol *et al.*, 2001).

Therefore, the wide use of the neem plant is attributable to the presence of these bioactive compounds, which may explain its many traditional uses against various ailments. Further research is recommended on this as a confirmation.

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