



Original Research Article

PRELIMINARY PHYTOCHEMICAL SCREENING OF METHANOLIC EXTRACT OF AFRICAN PEACH (*NAUCLEA LATIFOLIA*) LEAVES

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ABSTRACT

Some plants have medicinal properties and can serve as useful materials for herbal medicine if properly researched. The present study evaluated the phytochemicals present in *Nauclea latifolia*. Methanol was used to obtain extracts from the plant leaves. Phytochemical screening revealed the presence of saponins, flavonoids, glucosides, n-olates, protein and amino acids while tannins, triterpenes and steroids were absent in *N. latifolia* leaves. These chemical constituents might be responsible for the antimicrobial activity observed in the plant as reported in the literature. The results are a good indication that the plant could be utilized for possible antimicrobial agents. The practitioners of traditional medicine can serve as an additional source of health care to mankind and thus, justifies the use of the plant parts in ethno medicine.

INTRODUCTION

The use of herbal medicine for the treatment of diseases and infections is as old as mankind (WHO, 1985). Medicinal plants have served as valuable starting materials for drug development in both developing and developed countries (Odey *et al.*, 2012). Today, more than 80 per cent of the people living in Africa depend on medicinal plants and animal based medicines to satisfy their healthcare requirements (WHO, 2000). In developing countries like Nigeria, many people are poor and cannot afford the high cost of medication and have no

alternative for primary health care. In recent times, herbal medicines have received much attention as sources of lead compounds since they are relatively safe for human use, environment friendly, cheap, easily available and affordable. The World Health Organization supports the traditional medicine provided they are proven to be efficacious and safe. The growing interest in herbal medicine demands information on the various plant preparations used in the treatment of diseases (Sarwar *et al.*, 2011). Scientific evaluation of medicinal plant is important to the discovery of novel drugs and also helps to assess toxicity risks associated with

the use of herbal preparations and other conventional drugs of plant origin.

Nuclea latifolia (Rubiaceae) is a straggling shrub found in the humid tropical rainforest zone or in savannah woodlands of West and Central Africa. It is an ever green multi-stemmed shrub that grows up to an altitude of 2m, with flowers joined to the calyces. The plant parts used for medical preparations are leaves, bark, roots, stem and fruits. The fruits are syncarpous (Edet *et al.*, 2005). It has sweet scented flower heads. It produces red fruits that resemble a large, rather hard strawberry, with many seeds which have a pleasant taste but act as emetic if eaten in excess. The plant is called African peach in English, Tafashiya in Hausa, Uburu inu or nbitinu in Igbo and Egbesi in Yoruba, Mbom-mbog in Akwa Ibom and Cross River States (Burkill, 1997). It is mainly prepared in the form of powder, concoction and decoction. The active constituents of the plant can be extracted by decoction, aqueous extraction, solvent extraction and can be used in powdered form. The methods of administration are internal, particularly by oral absorption and external: poultice/topical application or bathing. The stem bark of *Nauclea latifolia* is bitter in taste. It yields tannins used in dyeing fabrics (Simplice *et al.*, 2011).

Traditionally, in West and South Africa, infusions and decoctions of the stem bark and leaves of the plant are used for the treatment of malaria, stomach ache, fever, diarrhea and nematodes infections in human and animals. In Kano, Nigeria, it is used as a chewing stick and as a remedy against stomach ache and tuberculosis (Deeni and Hussain, 1999). In Hong Adamawa State, concoctions, infusions and decoctions from stem bark and roots are used against jaundice, fever, stomach ache, and dysentery. The Fulani in Mubi use the leaves to de-worm their cattle. The bark is chewed as a mouth antiseptic, to relieve bad taste resulting from indigestion and as a vermifuge.

When taken in excess, it is emetic, purgative, emmenagogic and even abortifacient (Burkill, 1997). The roots are also used to induce abortion and as a purgative (Vasileva, 1969).

According to Trease and Evans (2002), *Nauclea latifolia* contains diverse phytochemicals such as alkaloids, flavonoids, steroids and glycosides, cardiac glycosides, terpenes, cyanogenic glycosides, carbohydrates, anthraquinone, polyphenols, saponins, tannins, phlobatanins, resins and balsams. Other alkaloids isolated from the plant include nauclefine, nauclefine, naucleidinal and epinaucleidinal, augustine and card- ambine (Hotellier *et al.*, 1979). Furthermore, five monoterpene indole alkaloids, naucleamides A to E, were found to be present in the bark and wood of the plant. Naucleamide E was the unique monoterpene indole alkaloid possessing a pentacyclic ring system with an amino acetal bridge (Shigemori *et al.*, 2003). The present study seeks to investigate the phytochemicals present in *N. latifolia* using methanol as the extraction solvent.

MATERIALS AND METHODS

Nauclea latifolia leaves were collected from an abandoned farm at the University of Cross River, Calabar. The leaves were washed in distilled water, air – dried at room temperature for 4 weeks. The air-dried leaves were grounded with a hammer mill into powder. The extraction of *N. latifolia* leaves was done according to the modified method of Olusola *et al.*, (2018). One hundred and eighty grammes (180g) of the fine powder of the plant leaves were soaked in 1000 ml of methanol for 72 hours. The plant leaves were aseptically mixed with ethanol and methanol, stirred at regular interval (every 3 hours), filtered using a sterile muslin cloth after which the extraction was obtained, air- dried and store at 25°C until used.

Test for saponins: 1 mL extract was

shaken vigorously with 20 mL of distilled water in a graduated cylinder for 15 minutes. Persistence of froth indicated the presence of saponins.

Test for tannins (Gelatin test): 1% gelatin solution containing 10% sodium chloride solution was added to the extract. Formation of white precipitate indicated the presence of tannins.

Test for flavonoids (Shinoda's test): to the test solution, a small piece of magnesium ribbon was added followed by drop wise addition of concentrated hydrochloric acid. Pink-to-magenta red color indicated the presence of flavonoids.

Test for glycosinolates (Keller-Killiani's test): 2 mL extract was treated with 1 mL of glacial acetic acid containing few drops of FeCl₃ solution. To this, 2 mL of concentrated H₂SO₄ was poured from the side carefully. The formation of reddish brown at the junction of two layers and the formation of bluish green at upper layer indicated the presence of deoxysugar and hence glycosinolates.

Tests for steroids (Liebermann Burchard Test): 1 mL of the extract was taken in a test tube and then 2 mL of acetic anhydride and few drops of conc. H₂SO₄ were added to it. Green coloration was the indication for the presence of steroids while red colour of the same test indicates the presence of triterpenes.

Test for proteins (Ninhydrin test): Few drops of Ninhydrin reagent were added to the extract. Appearance of blue color indicated presence of amino acid.

Millon's test: Crude extract when mixed with 2 mL of Millon's reagent, white precipitate appeared which turned red upon gentle heating that indicated the presence of protein.

RESULTS

Preliminary phytochemical screening of *N. latifolia*, leaves for primary and secondary metabolites showed the presence of saponins, flavonoids, glucosinolates, protein and amino acids while tannins, triterpenes and steroids were absent in *N. latifolia* (Table 1).

Table 1: Phytochemical screening of *N. latifolia* leaves

Parameters	Value
Saponins	++
Tannins	-
Flavonoids	+++
Glucosinolates	+
Triterpenes and steroids	-
Proteins and amino acids	+

Keys: +++ present in high quantity, ++ moderately present, + present in low quantity, - negative or not present.

DISCUSSION

Plants with medicinal properties are very important to man because of their rich chemical contents. The results of phytochemical screening revealed the presence of glucosinolates, saponins, flavonoids and protein and amino acids in *N. latifolia* leaves. The results of this study was in accord with Okwori *et al.*, (2008) and Bamidele *et al.*, (2014) who reported the presence of flavonoids, glucosinolates, saponins, protein and amino acids, carbohydrate, resins, and alkaloids.

Saponins are glycosides with a distinctive foaming property. When present in foods, saponins are inactivated by cholesterol in the human body which makes them rather effective in the human mucus membranes. For this reason, saponins have been used in sneezing powders, emetics and cough syrups to facilitate expectoration (Egwim, Elem and Egwuiche, 2011). The results from this study showed the presence of saponins in moderate quantity. The findings agrees favourably with the results presented by Oliver *et al.*, (2010) which reported the presence of saponins in methanol and water extract of the leaves, bark and roots of *N.*

latifolia plant. Another report by Ajayi *et al.* (2016) argues that saponins are not present in the methanolic extract of the fruits and roots but rather present in the stem of the plant.

Tannins are complex phenolic acids naturally present in many plants. Tannins are highly effective in preventing urinary tract infections by preventing *E. coli* bacteria from adhering to the walls of the urinary tract. This anti-adhesive property makes it effective in the treatment of stomach ulcers as well as improves cardiac health. Other literatures have reported the positive effects of tannins in blood clotting and blood pressure, etc. However, the presence of tannins was not detected in the methanolic extract of *N. latifolia* as presented in this study. The findings of this study agree with Adejoh *et al.* (2018) but disagree with the reports of Iteku *et al.* (2020) and Malami *et al.* (2019). The presence of tannins have also been reported in the methanol and water extract of the leaves, bark and roots (Oliver *et al.*, 2010); methanolic extract of the fruit, stem and roots (Ajayi *et al.* 2016).

Flavonoids are phenolic compounds with potential health benefits. It has have been known to provide protection against inflammation, oxidative damages that can lead to diseases such as diabetes, cancer and dementia, etc. High intake of dietary flavonoids is generally regarded as safe. The presence of flavonoids in this study was detected in very high quantity. This report is in line with the findings of Iteku *et al.* (2020); Adejoh *et al.* (2018); Malami *et al.* (2019) and Maitera *et al.* (2011).

Glucosinolates are sulphur-containing glucosides with nutritional effects and are mainly found in cruciferous plants. Glucosinolates have anti-biotic effects and helps to fight against bacterial, viral and fungal infections in the intestines and other parts of the body. A number of studies

have also suggested that diets rich in cruciferous vegetables may lower risk of certain cancers. The presence of glucosinolates was detected in this study, this indicates that *N. latifolia* has antibiotic properties and can inhibit certain micro-organisms (Nyong *et al.* 2021). The results competes favourably with Malami *et al.* (2019) and Maitera *et al.* (2011) who also detected the presence of glocosinolates in the methanol extract of the leaves, bark and roots of *N. latifolia* plant.

Triterpenes are a class of chemical compounds composed of three terpene units with molecular formula $C_{30}H_{48}$, triterpene is the precursor to all steroids. Triterpenes are used for medical purposes due to their anti-inflammatory, analgesic, cardiogenic and sedative effects. Research has shown that excess intake of steroids can increase the risk of heart diseases, stimulate the growth of certain cancers and worsen other medical problems. Triterpenes and steroids were not detected in this study. The absence of steroids have also been reported in the methanolic extract of the leaves, stem and roots of *N. latifolia* (Maitera *et al.* 2011). This report however, does not agree with the findings of Iteku *et al.* (2021); Malami *et al.* (2019) and Adejoh *et al.* (2018).

Proteins and amino acids are of great nutritional value and are directly involved in the chemical processes essential for life. They build and repair body tissues including skin, hair, muscles, etc. Proteins and amino acids were detected in this study. This indicates that the plant can serve as a useful herb for body building supplements.

CONCLUSION

The results of this research have shown four active phytochemicals namely; saponins, flavonoids, glucosinolates and proteins. These chemicals constituents might be responsible for the antimicrobial activity observed in the plant as reported in the literature. The

results are a good indication that the plant could be utilized for possible antimicrobial agents. The practitioners of traditional medicine can serve as an additional source of health care to mankind and thus, justifies the use of the plant parts in ethno medicine. This plant could be harnessed for the formulation of cough syrups and for cure of antiviral, anti-allergic, anti-inflammatory as well as an anti-oxidant agent.

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