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Preliminary Phytochemical and Antimicrobial Screening of the Leaf Extracts of *Baphia Nitida* (Sandal Leaf)

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ABSTRACT

Fresh leaves of *Baphia nitida* were extracted using ethanol and distilled water. The phytochemical analysis of the leaf showed the presence of alkaloids, tannins, phenols, saponins and flavonoids in both the ethanol and water extracts. The antibacterial activity of the ethanol and water extracts showed clear zones of inhibition against *Staphylococcus aureus*, *Pseudomonas aureginosa*, *Salmonella typhi*, *Escherichia coli*, while the antifungal activity showed clear zones of inhibition against *Aspergillus niger*, *Penicillium notatum*, *Fusarium oxysporum* and *Candida albicans*. Therefore the pharmacological screening of *Baphia nitida* showed that it could be used for the treatment of diarrhea, dysentery, skin rashes and acne.

Keywords: Phytochemicals, *Baphia Nitida*, Antimicrobial screening.

INTRODUCTION

So many plants in our environment are of great medicinal value. The healing power of medicinal plants was explored by people since ages. These days, many people are resorting to the use of traditional methods to treat ailments. This has further given a boost to the commercial production of these plants products and the rate of consumption has increased.^[1] World Health Organization (WHO) has estimated that about 85% of the world's population depends mainly on traditional medicines for their health care, thus medicinal plants are now used for curative and preventive power in combined form with other health care products.^[2] Among the numerous plants and herbs used for curing ailments in Nigeria is the plant under study in this research *Baphia nitida*. This plant is used for treatment of various ailments like sun burns, scars, skin rashes, acne, dysentery and diarrhoea.

DESCRIPTION OF THE PLANT

This plant is a shrub with many stems or can exist as a small tree up to 9m tall with dense branches forming a distinct elevated crown. Its leaves are leathery, alternate and simple with a measurement of 5-21cm x 3-9cm[1].

The flowers of *Baphia nitida* are bisexual with lengths of 3-17mm. It is white in colour with a yellow centre. The calyx is 10mm long, the corolla is 1-2cm in diameter, and the filament is up to 7mm long. The fruit is a compressed pod which is 8-16.5cm x 1-1.5cm and it has 1-4 seeds in each[2].

EXPERIMENTAL ISOLATION AND IDENTIFICATION

The leaves of *Baphia nitida* used for this study were collected fresh and healthy from Amamputu village of Uli in Ihiala Local Government Area of Anambra state. It was then taken to a botanist, Dr. Obi Ogonnaya in National Root Crops Research Institute, Umudike,, who identified it as *Baphia nitida* [3].

EXTRACTION

The fresh leaves of the plant were thoroughly washed with clean water, dried at room temperature for seven days. The dried leaves were pulverized using laboratory mill(ED-5 Arthur Thomas, USA) and stored in airtight container for further use. The phytochemical Analysis was done using Harborne (1998)[4] methods .^[4] while the microbial analysis was done using the methods of Byrant, 1972[5].

RESULTS AND DISCUSSION

The results of the analysis of the active constituents present in the leaves of *Baphia nitida* are given in the tables 1- 4.

Table 1: Result of Phytochemical Analysis of *Baphia nitida* Extracts

| Phytochemicals | Ethanol extracts | Aqueous Extract |
|-------------------|------------------|-----------------|
| Alkaloids | + | + |
| Flavonoids | + | + |
| Tannins | + | + |
| Saponins | + | + |
| Phenols | + | + |

Table 2: Results of Quantitative Estimates of Phytochemical Constituents of *Baphia nitida* leaf Extracts.

| Phytochemicals | Quantity(%W/V) |
|-------------------|----------------|
| Alkaloids | 1.23 ± 0.01 |
| Flavonoids | 0.44 ± 0.02 |
| Tannins | 0.37 ± 0.006 |
| Saponins | 1.253 ± 0.008 |
| Phenols | 0.247 ± 0.006 |

Table 3: Results of Antimicrobial Activity of Extracts from *Baphia nitida* Leaf.

| Bacteria type | Zones of inhibition(mm) | |
|-------------------------------|-------------------------|-----------------|
| | Ethanol extract | Aqueous extract |
| <i>Staphylococcus aureus</i> | 22.33 | 16.67 |
| <i>Pseudomonas aureginosa</i> | 15.67 | 12.50 |
| <i>Salmonella typhi</i> | 15.83 | 10.50 |
| <i>Escherichia coli</i> | 23.33 | 15.67 |

Table 4: Results of antifungal activity of *Baphia nitida*.

| Fungi type | Zones of inhibition(mm) | |
|----------------------------|-------------------------|-----------------|
| | Ethanol extract | Aqueous extract |
| <i>Aspergillus niger</i> | 14.00 | 12.67 |
| <i>Penicillium notatum</i> | 14.67 | 10.67 |
| <i>Fusarium oxysporum</i> | 9.67 | 7.50 |

| | | |
|-------------------------|-------|-------|
| <i>Candida albicans</i> | 17.33 | 12.30 |
|-------------------------|-------|-------|

DISCUSSION

The results showed that alkaloids, flavonoids, tannins, saponins and phenols were present in the two extracts and that the best solvent for extraction was ethanol. These phytochemicals that are found in the leaf of *Baphia nitida* has been known to show medicinal as well physiological activities[6].

Antimicrobial screening showed that the leaf extract had high activity against bacterial species (table 3). Susceptibility of bacterial organism to the extracted fraction depended on species and concentrations. The highest activity was marked against *Staphylococcus aureus* and *Escherichia coli*. The extracts of the leaf showed high inhibition against fungi like *Aspergillus niger*, *Penicillium notatum*, *Fusarium oxysporum* and *Candida albicans*.

Generally, flavonoids which can be found in *Baphia nitida*, function as protection against allergies, inflammation, ulcer and tumors[7]. They also have antioxidant property which provides their anti-inflammatory actions[8]. *Baphia nitida* contain saponins which are responsible for its haemolytic property. Alkaloid can help fight against malaria, motion sickness, hypertension, snakebite and mental illness[9]. The tannin and phenol present in the leaves act as a defense mechanism in plants pathogens and herbivores, in hostile environmental conditions. This explains the Antifungal and antibacterial activities of *Baphia nitida* against different strands of fungi and bacteria respectively.

CONCLUSION

The phytochemical analysis of *Baphia nitida* showed that the plant contained alkaloids, tannins, saponins, phenols and flavonoids. Its Antimicrobial screening confirmed that the

plant extracts had some effect on both bacteria and fungi. The result of the screening confirmed that the best solvent for the extraction was ethanol, which had the highest inhibitory zone concentration and that the extracts were highly bactericidal and fungicidal and of broad spectrum activity.

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