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THE EFFECT OF ALKALOIDS AND FLAVONOIDS EXTRACTS OF *VITEX DONIANA* SEED ON SOME MICROORGANISMS

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ABSTRACT: *This research studied the effects of alkaloids and flavonoids extracts of Vitex doniana seeds on some pathogenic bacteria and fungi. The bacteria are: P. aeroginosa, B. subtilis, S. aureaus, E. coli and S. typhi. The fungi are C. albican and A. niger. It was found that the alkaloid and flavonoid extracts of the seed inhibited the above named five bacteria successfully. The alkaloid and flavonoids extracts of the seed cannot inhibit the above mentioned two test fungi. Alkaloid and flavonoids extracts of V. doniana seeds are antibiotic in action. This knowledge can help the new generation pharmacists in their formulation of new drugs to improve health care delivery.*

KEYWORDS: Alkaloids, Flavonoids, bacteria, fungi, *Vitex doniana* seed, microorganisms and extracts.

INTRODUCTION

The long practice of usage of traditional medicine continues to the present day China, India, Korea and many other countries especially in Africa including Nigeria. There is an increased interest in alternative therapies globally (WHO, 2003) and a consistent increase in the use of plant derived products as they are convenient alternatives or complementary to the use of orthodox or synthetic drugs. This is due in part to adverse side effects of conventional drugs, the drift towards consuming 'natural' products as opposed to synthetics, as well as the increasing awareness of the beneficial effects of natural products and high inflation in the third world (Deug, 2004; Jacob *et a*., 2001; Duke, 1970). More than 85% of the world population in developing countries depend on traditional medicine for treatment of a variety of diseases (WHO, 1993). The leaves of *V. doniana* is eaten as vegetable in the eastern part of Nigeria and the fruit is also eaten when riped. Little or nothing is known about the seed. In this research, the author tried to investigate the effect of alkaloids and flavonoids extracts of *V. doniana* seed on some pathogenic microorganisms. *V. doniana* posses various local names. It is called black plum in English, Igbo call it Uchakoro, Nbembe ; Hausa call it Dinya; Yorubas called it Oori-nla, Amharic call it plem and Swatili call it Mfudu, Mfulu, Mfundu, Mfuru and Mfuu. *V. doniana* is a medium sized deciduous tree, about 8-15m high.Leaves are glabrous, about 14-34cm long, usually containing 5 leaflets on stalks, 6-14cm in length. Leaflets are distinctly stalked. The leaf is dark green at the surface and pale grayish-green below or under. Fruit is oblong, about 3cm long, green colour when young, but timing to purplish back on ripening and with a starchy black pulp. Each fruit contains I hard, conical seed 1.5 – 2cm long and 1-2cm wide.Phytochemical constituents of leaf extract of *V. doniana* reveals the presence of glycosides, flavonoids, alkaloids

and fatty acid (Arokiyaraj *et al*., 2009). The antimicrobial properties of different solvent extracts of *V. doniana* leaf was investigated by Ejike *et al*., 2010. Acetone, ethanol, methanol, hot and cold water extracts of the leaves of *V. doniana* showed different zones of inhibition and MIC on *Escherichia coli, Pseudomonas aeroginosa, Salmonella typhi, Bacillus Subtilis* and *Staphylococcus aureus.* According to Kilant (2006), the low MIC and the higher antimicrobial activities of acetone leaf extract of *V. doniana* against *S. typhi* and *E. coli* supports the long usage practice of *V. doniana* in the treatment of dysentery and gastroenteritis.

Experimental Procedure

Sample collection and preparation

The fruits were obtained under the *V. doniana* tree in Igbariam Campus of Anambra State University. The nuts were cracked to obtain the seeds. The samples were thoroughly washed with distilled water, dried under room temperature and mild sunshine for a week and ground with grinder. The finely ground sample was stored in polyethen bottle until needed for analysis.
Alkaloids and flavonoids were extracted from the seeds of

V. doniana using Harbon's method. Each extract was dissolved in 1ml of distilled water in different test tubes and stirred to obtain a homogenous mixture. The sub-cultured agar media, petri-dishes were brought out and allowed to cool. Some incubated dishes were filled with distilled water only as control. The wells/holes were carefully filled with 0.1ml of each extract separately. The dishes were allowed to stand for about 30munites to enable the extracts to be fully diffused and absorbed by the media. The petri-dishes were incubated at 37^0C for 24hours. After incubation, the dishes were brought and the zone of inhibition measured and calculated using meter rule and vennier calipers.

RESULTS AND DISCUSSION

Table 1: Result of Antibacterial Effects of Alkaloid Extract from the Seeds of *V. doniana*

Test bacteria	Zone of inhibition (mm)	
	Alkaloids	Control distilled H_2O
P. eroginosa	0.16±0.11	NA
B. subtilis	0.20±0.10	NA
S. aureus	NA	NA
E. coli	0.10±0.01	NA
S. typhi	0.53±0.01	NA

Note:
NA = No Action
mm = milimetre

Table 2: Result of Antifungal Effect of Alkaloid Extracted from the Seeds of *V. doniana*

Test fungi	Zone of Inhibition (mm)	
	Alkaloids	Control Distilled H_2O
C. albican	0.15±0.01	NA
A. Niger	0.12±0.12	NA

Note:
NA = No Action
mm = milimetre

Table 3: Result of Antibacterial effects of Flavonoids Extracted from the Seed of *V. doniana*

Test bacteria	Zone of Inhibition (mm)	
	Flavonoids	Control Distilled H_2O
P. aeroginosa	5.20±0.11	NA
B. Subtilis	1.26±0.02	NA
S. subtilis	2.36±0.02	NA
E. coli	0.37±0.01	NA
S. typhi	7.08±0.01	NA

Note:
NA = No Action
mm = milimetre

Table 4:

Test fungi	Zone of Inhibition (mm)	
	Flavonoids	Control Distilled H_2O
C. albican	NA	NA
C. Niger	NA	NA

Note:
NA = No Action
mm = milimetre

DISCUSSION

Antibacterial effects of *V. doniana* seeds had been studied and it portrayed the fact that it is very effective in inhibiting the growth of some pathogenic microorganisms. In this study, alkaloids and flavonoids extracted from *V. doniana* seed were used individually to inhibit some pathogenic bacteria and fungi. It was found that these phytocompounds extracted from the seeds of *V. doniana* are medicinal and could be used to cure the diseases caused by these microorganism.
Table 1 showed the result of antibacterial effect of the alkaloid extracted from *V. doniana* seeds. The result showed that the alkaloid extract can inhibit the four out of the five test bacteria. These

are: *P. aeroginosa, B. subtilis, E. coli* and *S. typhi*. It has no effect on *S. aureus.* Table 2 indicated that the extract had no effect on the two test fungi. These are *C. albican* and *A. niger*. It order words, the extract cannot be used to cure the diseases caused by these two fungi. Table 2 showed the result of antibacterial effect of flavonoids extracted from the seeds of *V. doniana*. One could see at a glance that flavonoid extract can inhibit all the test five pathogenic bacteria. These are *P. aeroginosa, B. subtilis, S. aureus, E. coli* and *S. typhi*. Table 4 portrayed the fact that flavonoid extract had no effect on the two test fungi just like the alkaloid extract.

CONCLUSION

This research pointed out that the seed of *Vitex doniana* is medicinal. The alkaloid and flavonoids extracts of the seed is very effective in inhibiting the growth of five test bacteria. These are *P. aeroginosa, S. subtilis, S. aureus, E. coli* and *S. typhi*. The two phytocompounds cannot inhibit the two test fungi. These are: *C. albican* and *A. niger*. It is therefore recommended that the alkaloids and flavonoids extracts of *V. doniana* seed should be studied in more detail.
Characterization of the alkaloids and flavonoids extract should be studied using necessary reagents or chemicals. Structural elucidation of the alkaloids and flavonoids extracts should be analyzed using these equipments: infra ray spectroscopy (IR), ultraviolet ray spectroscopy (UV), Gas chromatography-mass spectroscopy (GCMS) and nuclear magnetic resonance. These analysis will help to identify the active alkaloids and flavonoids present in *V. doniana* seed. Their structure will also be identified. This will assist the pharmacists in the formulation of new drugs to improve the health care of the masses.

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