Studies on Phytochemical and Antimicrobial Evaluation of Extracts of *Boswellia Dalzielii* Hutch

***D. Kubmarawa, A. George, M. I. Kidah and M. B. Gabdo**
Department of Chemistry, Federal University of Technology,
P.M.B. 2076
Yola, Adamawa State, Nigeria.

* Corresponding author.

Abstract
Ethanol and water extracts of powdered roots, stem, leaves and fruits of *B. dalzielli* were screened for basic phytocompounds and antimicrobial activity using disk diffusion method against *S. typhi, P. aeruginosa* and *E. coli*. Phytochemica analyses showed positive test for saponins, tannins, phenols, alkaloids and volatile oils. Ethanol extracts of roots, leaves and fruits inhibited the growth of *S. typhi* and *E. coli* at concentration of 8.00 mm and 7.00mm respectively. The results are aqueous extract of seeds inhibited the growth of E. coli only at a concentration of 7.00mm justify the use for the treatment of diarrhoea and dysentry.

Keywords: Phytocompounds, antimicrobial activity, *Boswellia dalzielli*.

* Corresponding author.

Introduction

Boswellia dalzielii belongs to the family of Burseracea (Keay, 1989). The specie extents from Ivory Coast to Central Africa. The Plant is locally called Soma (Lala) Hanno (Hausa) and Janauhi (Fulani). It has characteristics of pale brown, smooth peeling off in their ragged papery patches and a slash reddish brown exuding a whitish resin. Medicinally, a bark decoction is drunk for gastro-intestinal problems and for fever, jaundice and rheumatism. The gum resin is used as a stomachic and for veneral diseases. A root decoction is drunk for syphilis. The root and bark are used as an antitode to arrow poison (Irvine, 1961). The bark decoction is also taken for urinary disorders (Gill, 1992). The leaves are used for the treatment of bilharziasis in Niger. The plant is used in Nigeria for the treatment of diarrhoea, dysentery and stomach constipation.

Thus this antimicrobial study was embarked upon to authenticate the claim by traditional healers of its potency and to identify the phytocompounds that may be responsible.

Materials and Methods

a) Plant Material

The plant material is obtained from Yola and identified by Forestry Institute of Nigeria, Ibadan with voucher specimen number (F.H.I. 42474).

b) Extraction of the bioactive agents

20g of the powdered plant material (roots, stem bark and seeds) were soaked in 200 ml of ethanol. The beakers were sealed with aluminium foil and kept for 48 hrs. The extract was filtered and concentrated using water bath. The same procedure was followed for aqueous using fresh samples.

c) Phytochemical screening

The methods used were as described by Odebiyi and Sofowora (1978).

1) Test for Saponins
T0 5ml of the extract was vigorously shaken with 10 mls of water in a test tube. Frothing which persisted was taken as an evidence for the presence of saponins.

2) Test for Tannins
To the extract was added 4ml of water and drops of ferric chloride. Green precipitate was an indication for the presence of tannins.

3) Test for Flavanoids
To the extract was added a small quantity of magnesium chips and drops of concentrated HCI down the side of the test tube. A reddish coloration was an indication of the presence of flavanoids.

4) Test for Alkanoids
To the extract was added picric acid; orange coloration was taken as evidence of the presence of alkaloids.

5) Test for Volatile Oils
The extract was dissolved with 90% ethanol and drops of faric chloride were added. A green coloration was taken as an indication of presence of volatile oils.

6) Test for Phenols
Equal volume of the extract was added to equal volume of ferric chloride, a deep bluish green solution was an indication for the presence of phenols.

7) Test for Glycosides

To a 5 ml of the extract was added 25ml of dilute H_2SO_4 into test tube, boil for 15 minutes, cool and neutralise with 10% HaOH and 5ml of Fehling's solution A and B was added; A brick red precipitate was a positive test for the presence of glycosides.

8) Test for Resins

To a 2ml of the extract, was added equal volume of acetic anhydride solution and drops of conc. H_2SO_4. A violet coloration was taken as an indication for the presence of resins.

d) Test Microorganisms

The microorganisms used in this research were clinical isolates obtained from Federal Medical Centre, Yola. The microorganisms were *Pseudomonas aeruginosa, Escherichia coli,* and *Salmonellatyphi.*

e) Determination of Antimicrobial Activity

The disk diffusion method was used. The culture medium was prepared by weighing 1.3g of nutrient broth and dissolved in 100mls of distil water. The solution was then pipetted (15ml) into universal bottles, and sterilised by autoclaving at 121°C for 15 minutes. The microbes under the test were grown into this nutrient broth at 37°C for 24 hours in an incubator. The sterilised petri dishes containing the nutrient agar were inoculated with microbes using swab stick. The plates were labeled at various points with various parts of plants. The dishes were then dipped in each of the various extracts and placed on labeled parts accordingly using a forceps.

The innoculated plate, containing the extracts was incubated for 24 hours. Thereafter, observation comprising the diameter of disk and zone of inhibition were determined as described by Banso *et al.*, (2001) and Boakye-Yiadam (1979).

Results and Discussion

Phytochemical screening of ethanol and water extracts (Table 1)

Table 1: Photochemical Screening of Ethanol Extracts

Chemical Constituents	Parts of Plant							
	Root		Stem		Fruits		Leaves	
	E	A	E	A	E	A	E	A
	+	+	+	+	+	+	+	+
Saponins	-	+	-	+	+	+	+	+
Tannins	-	-	-	-	-	-	-	+
Volatile Oils	-	-	-	-	-	+	-	-
Alkaloids	-	-	-	-	+	+	+	+
Phenols	-	-	-	-	-	-	-	-
Resin	-	-	-	-	-	-	-	-
Glycosides	-	-	-	-	-	-	-	-
Flavonoids								

Key: + = Present E = Ethanolic

- = Absent A = Aqueous

indicated the presence of saponins, tannins, volatile oils, alkaloids and phenols. These classes of compounds have earlier been reported with antimicrobial activity (Fasola, 2000). Therefore those compounds might be responsible for the antimicrobial activity of the plant.

From the results of the antimicrobial screening of ethanol extract (Table 2),

Table 2: Antimicrobial Activity of Ethanol and aqueous Extracts

Micro-organisms	Diameter of Zone of Inhibition (mm) of the various plant parts							
	Root		Stem		Leaves		Fruits	
	E	A	E	A	E	A	E	A
Salmonella Typhii	6.5	-	-	-	6.5	-	7.0	-
Pseudomonas aruginosa	-	-	-	-	-	-	-	-
Escherichia Coli	-	-	-	-	8.0	-	6.5	7.0

Key: - = No activity

A = Aqueous

E = Ethanolic

it showed that leaves extract possess the highest activity against *Escherichia coli* (8.00mm) followed by seed extract against *Salmonella typhi* (7.00m).

However, seed extract is found to posses' activity against *S. typhii* and *E. coli* except *Pseudominas aeruginosa*. The root extract showed activity against *Salmonella typhii* (6.5mm) only, while the stem extract did not inhibit the growth of any microorganism. Similarly, in the aqueous ectract, only seed extract inhibit the growth of *Escherichia coli* (7.00mm).

The antimicrobial properties of this plant probably explain its traditional use for treating diarrhea, dysentery and stomach constipation.

References

Banso, A. and Olutimayin, T. (2001). Phytochemical and Antimicrobial Evaluation of Aqueous Extracts of *Daniella oliveri* and *Nauclea latifolia*. Nig. *J. Biotech.* **12** (1), 114 – 118

Boakye-Yiadam, K. (1979). Antimicrobial Properties of some West African Medicinal Plants II. Antimicrobial Activity of Aqueous Extracts of *Cryptolepsis sanguinolenta* Lind Schlecter. *Quart. J. Crude research* **170**, 78 – 80

Fasola, T.R. (2000). Screening Nigerian Plants for their

Medicinal Importance. *Journal of Science Research* **6**(1); 51-57.

Gill, L. (1992). Ethanomedicinal uses of plants in Nigeria. Uniben Press. Benin City, Nigeria. 276pp.

Irvine; I.R. (1961). Wood Plants of Ghana. Oxford University Press London. Pp. 508-511.

Keay, R.W.J. (1989). Trees of Nigeria, Oxford University Press. New York. Pp 333-334.

Odebiyi, A. and Sofowora, A.E. (1978). Phytochemical Screening of Nigerian Medicinal Plants. Part III *Lyodia* **41** (3), 234-246.