ANTIMICROBIAL ACTIVITY OF EXTRACTS OF MOMORDICA CHARANTIA AND ALSTONIA BOONEI ON SOME BACTERIA

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ABSTRACT

The medicinal plants, *Momordica charantia* and *Alstonia boonei* were examined for antimicrobial activity against a Gram positive bacterium; *Staphylococcus aureus* and some Gram negative bacteria; *Salmonella typhi, Proteus vulgaris, Pseudomonas aeruginosa* and *Klebsiella pneumoniae*. The active constituents of the leaves of the medicinal plants were extracted with 95% ethanol using the clad maceration method of extraction. Sterilized filter paper disks, 6mm in diameter, were used in evaluating the activity of the plants extracts against viable and pure cultures of the test organisms. Results showed that both medicinal plants exhibited antimicrobial activity against *Staph aureus, S. typhi* and *K. pneumoniae. A. boonei* also showed antibacterial activity against *P. vulgaris,* but this organism was however resistant to *M. charantia. P. aeeruginosa* was resistant to both medicinal plants. Although this is a preliminary study, the possible chemotherapeutic usefulness of these two medicinal plants can not be overemphasized.

INTRODUCTION

Medicinal plants contain physiologically active principles which over the years have been exploited in trado-medical practice for the treatment of various ailments (Adebanjo *et al* 1983). Traditionally, stems and roots of some plants have been used in cleaning teeth by chewing them into brush-like ends. Investigations carried out on the antimicrobial activity of these chewing sticks showed that they all posses antimicrobial activity against oral microbial flora (Sofowora, 1982). Villegas *et al.* (1988) studied the constituents of African medicinal plants and found that a petroleum ether extract of *Heteromopha trifoliate* leaves had antifungal properties against *Cladosporium cuicumerinum.* The ethanol extracts of *Momordica charantia, Alstonia boonei* and *Ocimum bacilicum* have been found to posses antimicrobial activity against *Escherichia coli, Salmonella paratyphi* and *Shigella dysenterae* (Omoregbe *et al.,* 1995). Abul - Hajj and Staba (1973) reported extracts of *Nymphae tuberosa* and *Muphar variegatum* to be moderately active against *Staphylococcus aureus* and *Mycobacterium smegmatis.* A decoction of the root of East African plant *Ozoroa mucronata* is used for various folk medicinal treatment, such as intestinal parasites, dysentery, diarrhoea, gonorrhea, Bilharzia

and abortion. The hexane extract of the root bark exhibited antimicrobial properties against *Staphylococcus aureus* and *Bacillus subtilis* (Hostettman - Kaldas and Nakanishi, 1979).

The ultimate aim of scientific investigations about traditional medicinal plants is to make more provision for the health need of the generality of the people. However, a common practice with most traditional practitioners is the use of one medicinal plant for the treatment of multiple diseases.

The aim of this study therefore, is to investigate the antimicrobial activity of the ethanol extract of *M. charantia* and *A. boonei* against a Gram positive bacterium; *Staph aureus* and some Gram negative bacteria; *P. vulgaris, K. pneumoniae, P. aeruginosa* and *S.typhi* with the hope that interpretation of results that will be obtained will contribute to the health need of the people.

MATERIALS AND METHOD

Medicinal Plants

The medicinal plants used in this study were *A. boonei* and *M. chrantia.* The leaves of these plants were collected at Juoelen village in Ekpoma, Esan West Local Government Area of Edo State.

Extraction Procedure

The leaves of the plants were sun dried and fifty grammes (50g) each of the dried leaves were separately crushed and ground into coarse powder using clean mortar and pestle. The cold maceration method of extraction was followed. For each plant, the powder was mixed with 250ml of 95% ethanol in a conical flask and left to stand with occasional stirring for 24hrs. at room temperature. The content of the flask was transferred to a separating funnel from where a green percolate was collected and its volume measured.

Classification and Concentration of Extracts

For clarification of extract, the extract from a particular medicinal plant was mixed with activated charcoal (66g of charcoal per 100ml i.e, 66% 2?w/w), vigorously shaken and left to stand for one hour. The extract was collected by vacuum filtration using whatman filter paper No.1, a Buchner funnel and vacuum pump. The clarified extract was concentrated in vacuo using a rotary evaporator Model Heidolph VI Gallencamp which ensures evaporation of bulky solution to small volume concentrates without bumping at temperature between 70 - 100°C. The resultant concentrate was measured.

Test Organisms

Stock culture of *Staph aureus, S. typhi, P. vulgraies, P. aerugionsa* and *K. pneumoniae* were obtained from Microbiology laboratory, Edo State University, Ekpoma. These cultures were checked for viability and purity and maintained on nutrient agar slopes.

Test Procedure for Antimicrobial Activity

The disk method was followed and the disks used made from Whatman filter paper No.1 were 6mm in diameter. A total of 100 sterilized filter paper disks were placed in 1ml solution of each plant extract in screw-capped bottles. The disks were allowed to absorb the plants extracts. Plates of Mueller - Hitton sensitivity Agar (oxoid) were aseptically seeded with broth culture of the test organism using sterile swab sticks. For each test organism, plates were prepared in triplicates per plant extract. The plates were allowed to dry. The disks containing the plant extract were transferred using flame but cooled forcepts onto the surface of the inoculated agar plates. They were sufficiently spaced to prevent the resulting zones of clearing from overlapping. The extractive solvent was used as a control. Plates were incubated at 37° for 24hrs. before being examined for zones of inhibition of growth. To obtain zones of inhibition exhibited by only the plants components, zones of inhibition demonstrated by the solvent (control) were subtracted from each total zones of inhibition obtained.

RESULTS

The plants extracts had antimicrobial activity against *Staph. aureus, S. typhi,* and *K. pneumoniae,* although the zones of inhibition demonstrated against each test organism were not uniform. *A. boonei* showed antimicrobial activity against *P. vulgaris* but the organism was resistant to *M. chrantia*. *P. aerugionsa* was resistant to the two plants extracts. However, in most cases, the ethanol (control) showed a minimal level of antimicrobial activity on the test organisms (Table 1).

Result of zones of inhibition obtained from plants extracts were comparable to those of commercial antibiotics (Table 2)

Table 1: Antimicrobial Activity of Medicinal Plants Extracts Against some Bacteria

Test Organisms	Zones of Inhibition (mm)			Antimicrobial Activity	
	Ethanol (Control)	*M. charantia*	*A. boonei*	*M. charantia*	*A.boonei*
Staphylococcus aureus	7	8	5	Positive	Positive
Salmonella typhi	7	12	9	Positive	Positive
Klebsiella pneumoniae	7	11	13	Positive	Positive
Protens vulgaris	7	-	9	Negative	Positive
Pseudomonas aerugionsa	7	-	-	Negative	Negative

Table 2: Antimicrobial Activity of Extracts of Medicinal Plants Against some Bacterial compared with some Commercial Antibiotics

Commercial Antibiotics	*Salmonella typhi* (mm)	*Klebsiella pneumoniae* (mm)	*Proteus vulgaris* (mm)	*Pseudomonas aeruionsa* (mm)	*Staph. aureus* (mm)
Streptomycin	14.5	16.75	9.09	19.50	10.0
COT	-	21.0	-	-	-
Collistin	13.5	12.5	11.35	11.35	-
Ampicillin	-	-	-	-	7.5
Tetracycline	-	15.0	-	-	8.0
Nitro furanton	22.5	14.0	-	-	-
Nalidixic acid	14.5	19.50	-	-	-
Gentamycin	11.0	18.75	-	17.25	7.38
Medicinal Plants					
A. boonei	9	13	9	-	5.0
M. charantia	12	11	-	-	8.0

DISCUSSION

Ethanol extracts of *Alstonia boonei* and *Momordica charantia* have demonstrated antimicrobial activity against some of the test organism. Of the sensitive test organism, *Staph aureus* was the least sensitive to the two plants extracts. *K. pneumoniae* demonstrated the highest sensitivity towards *A. boonei* and to *M. charantia, S. typhi* was most sensitive. However, *P. aeruginosa* which was found resistant to the two test plants has been reported by Jawetz *et al.* (1982) to be resistant to most antibiotics. *P. vulgareis* was also found resistant to *M. charantia*, although sensitive to *A. boonei.* There is however possible usefulness of extracts of the two plants against members of Enterobacteriaceae and to some extent *Staph aureus.* Omoregbe *et al.* (1975) demonstrated the antibacterial effect of ethanol extracts of *Alstonia boonei, Momordica charantia* and *Ocimum bacilicum* on *E. coli, Shi. dysenterae* and *S. paratyphi.*

Results obtained from this study showed considerable zones of inhibition obtained with *A. boonei* and *M. charantia* some of which were comparable to those of commercial antibiotics (Table 2). The possible chemotherapeutic usefulness of these two plants have been demonstrated. However, there is need to identify the active chemical components of these plants, the results of which may help in their development into commercial drugs. A preliminary study has only been done.

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