

ANTIMICROBIAL ACTIVITY OF SOME SPECIES OF BIGNONIACEAE

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*The phytochemical study revealed that extracts from some species of Bignoniaceae contained naphthoquinones and iridoids. The crude extracts of all the species studied were found to show antibacterial activities towards the Gram-positive bacteria (**Bacillus subtilis**, **Staphylococcus aureus** and **Pseudomonas aeruginosa**), Gram-negative (**Escherichia coli**) and yeast (**Candida albicans**). The extract of *Tabebuaispectabilis* was found to be the most active against the Gram-positive bacteria.*

INTRODUCTION

The Bignoniaceae is a family of shrubs, trees and woody climbers. It comprises mainly of tropical species and many have been used as traditional medicines for many different purposes. The major types of phytochemicals so far detected are naphthaquinones and iridoids which have been linked to traditional uses such as treatment for tumours and antiseptic effects. The antitumour activity of Bignoniaceae is probably due mainly to its naphthaquinoids which among them, for example lapachol, have been considered as candidates for clinical use (Kingston and Rao, 1982). The reputed antimicrobial activity of *Kigelia pinnata* has been shown to be due in part to the iridoids present (Akunyili *et al.*, 1993).

MATERIAL AND METHODS

Test Organisms

Cultures of the following microorganism were used in the study: *Escherichia coli*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Candida albicans* and *Staphylococcus aureus*.

Antibacterial Screening Test

All petri dishes (diameter 86 mm) and graduated measuring pipettes were dry heat sterilised in a canister at 420 °C for 4 hours. Media were steamsterilised at 121°C (15 psi) for twenty minutes in an autoclave. All plates were prepared with an equal thickness of tryptone soya agar. Test organisms were grown overnight at 37 °C in tryptone soya broth. 10 µg of each extract was impregnated onto a small disc of filter paper (diameter 5 mm) and placed on top of the seeded medium. In order to compare the activity of the test material, 10 µg of streptomycin disc was used. After overnight incubation at 37 °C in the incubator, the zones of inhibition were measured.

The determination of the Minimum Inhibitory Concentration (MIC) of the plant extract was conducted according to published standard procedures (Dhar *et al.*, 1968; Rasadah *et al.*, 1988).

RESULTS AND DISCUSSION

The study showed that the extracts investigated were active against Grampositive, *B. subtilis* and *S. aureus* (Table 1). The dichloromethane extract of *Tabebuai spetabilis* was the most active against both groups of bacteria. The extract of *J filicifolia* showed weak inhibition on the growth of the organisms. It was found that the yeast and the Gram-negative bacteria were less susceptible to killing by the plant extracts compared to Grampositive bacteria. The antimicrobial activity of the extract may be due to the present of iridioids which has been isolated and identified in *Kigelia pinnata* (Akunyili *et al.*, 1993).

Table 1. Antimicrobial Activity of Bignoniaceae Species

Samples	Zone of Inhibition (cm)				
	BS	SA	CA	EC	PA
1. <i>Oroxylum indicum</i>					
a) wood	1.17±0.09	0.80±0.00	0.80±0.00	-ve	-ve
b) rootbark	1.16±0.04	-ve	-ve	-ve	-ve
c) woodbark	0.87±0.09	-ve	-ve	-ve	-ve
d) root	1.93±0.09	1.40±0.00	0.60±0.00	-ve	-ve
2. <i>Tabebuai spectabdis</i>					
a) stem	2.00. ±0.00	1.40±0.00	-ve	-ve	-ve
3. <i>Fernandao adenophylla</i>					
a) root	1.87±0.00	1.40±0.00	-ve	-ve	1.10±0.0
b) wood	1.40±0.00	1.00±0.00	-ve	-ve	-ve
c) woodbark	1.20±0.08	-ve	-ve	-ve	-ve
d) rootbark	1.43±0.05	1.43±0.05	-ve	-ve	-ve
4. <i>Jacaranda filicifolia</i>					
a) wood	-ve	0.70±0.00	-ve	-ve	-ve
b) woodbark	-ve	-ve	-ve	-ve	-ve
5. <i>Steriospermum fibriatum</i>					
a) wood	0.60±0.00	0.70+0.00	-ve	-ve	-ve
b) root	1.17±0.05	-ve	-ve	-ve	-ve
c) rootbark	1.47±0.08	1.40±0.00	-ve	1.10±0.00	-ve
d) woodbark	1.67±0.09	-ve	-ve	-ve	-ve
6. <i>Dolichandrone spathacea</i>					
a) woodbark	-ve	-ve	-ve	1.10±0.00	-ve
b) root	1.50±0.00	0.70±0.00	-ve	-ve	-ve
c) wood	1.70±0.00	0.70±0.00	-ve	-ve	-ve
7. <i>Antibiotic Streptomycin</i>	1.80±0.00	1.70+0.00	-ve	2.00±0.00	1.10±0.0

Abbreviations: BS - *B. subtilis*; SA - *S. aureus*; CA - *C. albican*; EC - *E. coli*; PA - *Ps. aeruginosa*

The MIC of the extracts of the species studied fell in the range of 0.1 to 100 ppm for *B. subtilis* and 1 to 10000 ppm for *S. aureus* (Table 2). Penicillin was very effective against infections with most Gram-positive organism. Streptomycin, a standard antibiotic and tetracycline, a standard antifungal drug, inhibited all the bacteria and yeast tested, respectively.

Table 2. Minimum Inhibitory Concentration (MIC) of Bignoniaceae Species

Samples	<i>Rsubtilis</i> (Ppm)	<i>Stap. aureus</i> (Ppm)
<i>Fernandao adenophylla</i> (root)	1	1
<i>Tabebuai spetabilis</i> (stem)	0.1	10
<i>Oroxylum indicum</i> (root)	1	1000
<i>Stereospermum fibriatum</i> (rootbark)	0.1	100
<i>Dolichandrone spatataceae</i> (wood)	100	10000
Penicillin-G	1	1
Streptomycin	10	1
Tetracycline	10	1

Further studies are being conducted to elucidate the components responsible for the antimicrobial activity as well as any pharmacological or toxicological properties that such extracts might have.

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