



ANTIMICROBIAL ACTIVITY OF THE ROOT EXTRACTS OF *DALBERGIA LATIFOLIA* (ROXB.)

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ABSTRACT

The search for biologically active compound from natural source has always been a great interest to researchers looking for new drugs useful in infectious disease. In the present study, the various extracts of *Dalbergia latifolia* Roxb belongs to family Fabaceae .The roots were tested for the anti bacterial and anti fungal activities against gram positive bacteria such as *Staphylococcus aureus*, *Klebsiella pneumonia*, *Bacillus subtilis*, gram negative such as organism *Escherichia coli* and fungi *Candida albicans* respectively by agar cup plate method. All the extracts were effectively against tested micro organism which was well comparable with standard antibiotics. The ethanolic extract showed higher zone of inhibition than other extracts tested. The zone of inhibition of the extracts of *Dalbargia latifolia* indicating that plant can fight these organisms effectively due to presence of tannins and it could be better alternative to the modern medicine.

KEY WORDS: *Dalbergia latifolia* R., Pharmacognostic profile, Antimicrobial activity.

INTRODUCTION

Alternative Systems of Medicine viz, Ayurveda, Siddha, and Traditional Chinese Medicine have become more popular in recent years. Accordingly to one estimate, more than 700 mono and poly-herbal preparations in the form of decoction, tincture, tablets and capsules from more than 100 plants are in clinical use. *Dalbergia latifolia* Roxb (Fabaceae), commonly known as Amerimnon latifolium important medicinal plant used in our Traditional System of Medicine to treat various diseases. *Dalbergia latifolia* in ayurveda for treatment of ulcers, leprosy, oedma and brain tonic (memory enchancers) (1). The plant is rich in many pharmaceutical active ingredients like carbohydrates, glycosides, flavonoids, alkaloids, phenolic compounds and tannins (2). In present study anti microbial activity of different extracts of roots of *Dalbergia latifolia* was studied.

MATERIAL AND METHODS

Plant Material

The root of *Dalbergia Latifolia* Roxb was collected from local areas of Tirupati, chittor District, Andhra Pradesh, India. It was authenticated by Dr. T.Vijaya, Taxonomist in S.V.U College of Sciences, S.V. University, Tirupati. A voucher specimen no 18, SVUCS/2011 was deposited in the departmental herbarium.

Preparation of Extract

The collected roots were cleaned and shade-dried at room temperature. The dried roots were size reduced to coarse powder and passed through a 20-mesh sieve. A powdered root (500 g) was successively extracted with ethanol, methanol, and chloroform using a soxhlet apparatus.

The extraction was carried out for 24 hrs at room temperature with mild shaking. The extracts were filtered and concentrated at 35^o C. The colour, consistency and the % yield of the extract of *Dalbergia latifolia* was noted in table 1. All the extracts were kept in desiccators until further use (3).

Preliminary Phytochemical Screening

The Preliminary phytochemical studies were conducted for above extracts of *Dalbergia latifolia* root to find out the the presence of various phytoconstituents such as carbohydrates, glycosides, flavonoids, alkaloids, phenolic compounds and tannins (4). The results of Preliminary phytochemical investigation are shown in Table 2.

ANTIMICROBIAL ACTIVITY AND ANTIBACTERIAL ACTIVITY

The antibacterial activity was performed by cup plate method described by Lingadahalli et al. All the extracts were dissolved separately in 2 % v/ v Tween 80 at a concentration of 10 mg/ml. The respective bacterial culture was spread (swabbed) into the nutrient agar plates for uniform distribution of colonies. Using a sterile cork borer, 8mm wide well was made of each agar plates. All the extracts (10 mg/ml) were poured separately into each well used a sterile micropipette and Ofloxacin (10µg/ml) was used as standard. The plates were incubated for 24 hrs at 37^o C. After incubation, the zone of inhibition was measured and the values were tabulated in Table 3. All the experiments were done in triplicate.

ANTIFUNGAL ACTIVITY

The antifungal activity was tested against *Dalbergia latifolia* by cup plate method Lingadahalli et al. All the extracts

were dissolved separately in 2% v/v Tween 80 at a concentration of 10mg/ml. The fungal culture was spread (swabbed) into the sabouraud dextrose agar plates for uniform distribution of colonies. Using a sterile cork borer, 8mm wide well was made on each agar plates. All the extracts (10 mg/ml) were poured separately into each well using a sterile micropipette and Fluconazole (10µg/ml) was used as standard. The plates were incubated for 48h at 27°C. After

incubation, the zone of inhibition was measured and the values were tabulated in Table 3. All the experiments were done in triplicate. Data are expressed as mean ± standard deviation (SD) of triplicates. Student's t-test was used to compare the antimicrobial activity of all the extracts against the standard antimicrobial agents. The statistical analysis was conducted with ANOVA software at significant levels of 0.05, 0.01 and 0.0001.

RESULTS

Table 3: Antibacterial and antifungal activities of *Dalbergia latifolia* root extracts against the selected microorganisms

Test organism	Diameter of zone of inhibition (mm)			Reference standard
	Extract concentration (10 mg/ml)			
	Ethanol Extract	Methanol Extract	Chloroform Extract	
S.aureus	13.5 ^{aaa} ± 0.4	9.6 ^a ± 0.8	8.6 ^a ± 1.2	16.4 ^{aaa} ± 2.2 (O)
K.pneumoniae	13.5 ^{aaa} ± 0.8	8.4 ^a ± 1.0	7.2 ^a ± 0.4	16.4 ^{aaa} ± 1.4 (O)
E.coli	14.7 ^{aaa} ± 0.9	9.8 ^{aa} ± 0.8	9.4 ^{aa} ± 1.2	15.6 ^{aaa} ± 1.4 (O)
B.subtilis	10.3 ^{aa} ± 0.8	8.6 ^a ± 1.1	7.3 ^a ± 1.0	13.8 ^{aaa} ± 0.6 (O)
C.albcians	12.3 ^{aaa} ± 0.8	9.2 ^a ± 0.3	8.4 ^a ± 1.0	16.2 ^{aaa} ± 1.6 (F)

* O – Ofloxacin (10µg/ml); F – Fluconazole (10µg/ml);

Values are means of three times ± SEM. ^a P<0.05, ^{aa} P<0.01, ^{aaa} P<0.001, zone of inhibition of extracts against bacteria and fungus vs. the normal diameter of disc. The result revealed that all the extracts had significant antibacterial and antifungal activities among which ethanolic extract (10mg/ml) exhibited maximum (p<0.001) zone of inhibition against all the tested microorganisms whereas chloroform extract (10mg/ml) exhibited lower (p<0.01) zone of inhibition followed by methanolic extract (10 mg/ml) which was well comparable with reference standards ofloxacin and

fluconazole at a concentration of 10 µg/ml respectively. Phytochemical analysis of the plant directs the importance of further development of some potential drugs. Based on results of the study and earlier reports of the presence of phenolic compounds in *Dalbergia latifolia* these extracts showed significant zone inhibition (5) and the presence of tannins also supports its antibacterial and antifungal activities (6). Thus, our study concluded that the extracts possess and proves enough potential to be used as good source of antibiotics against various microbial pathogens.

Table 1: Colour, Consistency and % yield of the extract of *Dalbergia latifolia*

Extracts	Colour	Consistency	% yield
Ethanol	Dark brown	Solid	8.25
Methanol	Light brown	Solid	7.93
Chloroform	Greenish brown	Semi solid	6.15

Table 2: Preliminary phytochemical investigation extract of *Dalbergia latifolia*

S.no.	Test	Ethanolic extract	Methanolic Extract	Chloroform Extract
1.	Carbohydrates	+ve	+ve	-ve
2.	Glycosides	+ve	+ve	+ve
3.	Flavanoids	+ve	+ve	-ve
4.	Alkaloids	+ve	+ve	+ve
5.	Phenolic compounds	+ve	+ve	+ve
6.	Tannins	+ve	+ve	+ve
7.	Proteins	-ve	-ve	-ve
8.	Gums and Mucilage	-ve	-ve	-ve

DISCUSSION

The colour, consistency and percentage yield of ethanol, methanol and chloroform of *Dalbergia latifolia* were recorded in Table 1. Many medicinal plants extracts have been known to possess antimicrobial activity and are used for the treatment of microbial infections due to the presence of certain chemical constituents. In the present study, the preliminary phytochemical investigation on *Dalbergia latifolia* extract revealed the presence of various chemical constituents in the extracts was reported in the Table 2. The antibacterial and antifungal activities of *Dalbergia latifolia* root extracts against the selected microorganisms were assessed by the zone of inhibition in diameter (Table 3)

CONCLUSION

All the extracts were showed significant antimicrobial activity with respect to the plant's constituents by zone of inhibition. The findings of this study showed excellent antibacterial and antifungal activities of ethanolic extract of *Dalbergia latifolia* which may be due to the presence of tannins and phenolic compounds. This in vitro study demonstrated that folk medicine can be as effective as modern medicine to kill the pathogenic microorganisms.

Further work is needed to isolate the secondary metabolites from the extracts studied in order to test specific antibacterial and antifungal activities. The results of the present study lead to the conclusion that this plant *Dalbergia latifolia* would serve as sources of novel antibiotic agents.

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