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SHORT COMMUNICATION

# *IN VITRO* ANTIBACTERIAL ACTIVITY OF *Bauhinia tomentosa Linn*., LEAF EXTRACTS

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Received 20 Aug 2012; Review Completed 24 Sep 2012; Accepted 06 Oct 2012, Available online 15 Nov 2012

**ABSTRACT**

The aim of this study was to evaluate antibacterial activity of the leaves of *Bauhinia tomentosa* Linn. In the current study, aqueous and ethanolic extracts of leaves of *Bauhinia tomentosa* were tested against some human pathogenic bacteria. *In vitro* antibacterial test was performed by disc diffusion method on Mueller Hinton agar medium. Ethanolic extract showed significantly higher inhibitory effect compared to aqueous extract on tested organisms.

**Key words**: *Bauhinia tomentosa* leaves, aqueous and ethanol extracts, antibacterial activity.

## INTRODUCTION

In India, the use of different parts of several medicinal plants to cure specific ailments has been in vogue since ancient times [1]. There has been a growing interest to evaluate plants possessing antimicrobial activity. Synthetic antibiotics have been effectively used for the control of diseases. However, due to indiscriminate use of these drugs, various pathogenic organisms have developed resistance to many of the currently available antibiotics [2]. Contrary to the synthetic drugs, antimicrobials of plant origin are not associated with many side effects and have an enormous therapeutic potential to heal many infectious diseases [3]. *Bauhinia tomentosa* Linn., is a small shrub of 2-4 m height. The whole plant has been valued in traditional system of medicinies for possessing a variety of therapeutic properties. The root bark is administered for the inflammation of liver; leaves, buds and flowers are prescribed for dysentery and diarrhea; fruit is diuretic [4]. Seeds are eaten for their aphrodisiac action and made into a paste with vinegar as an efficacious application to wounds inflicted by poisonous animals, snakes and scorpions. Bruised bark ground with rice-water into a paste is externally applied to tumours and wounds such as scrofulous [5]. The aim of this present study is to investigate the antibacterial activity of the aqueous and ethanolic extracts of *Bauhinia tomentosa* Linn.

## MATERIALS AND METHODS

### Plant material

The fresh matured leaves of *Bauhinia tomentosa* were collected from a garden in Tiruvarur District, Tamilnadu, India and used for extraction purposes.

### Preparation of plant extract

The leaves were washed shade dried and then milled into coarse powder using a mechanical grinder. Ten grams of pulverized leaf material was extracted with 100 ml of ethanol and 100 ml of distilled water separately at room temperature for 48 hours. Extracts were filtered by using Whatman filter paper No .1 and allowed to condense at 4°C for future use. The extract was dissolved in 10% dimethyl sulfoxide (DMSO) (10%w/v) as 100 mg/ml stock solution.

### Test microorganisms:

The following bacteria were tested against the leaf extracts *viz., Escherichia coli, Salmonella typhi, Streptococcus pyogens, Enterobacter aerogenes, Citrobacter sp., Pseudomonas aeruginosa, Klebsiella pneumonia, Streptococcus faecalis, Staphylococcus aureus, Streptococcus mutans, Streptococcus epidermidis, Enterococcus faecalis, Bacillus cereus, Bacillus subtilis, Alcaligens faecalis, Micrococcus luteus, Proteus vulgaris, Shigella sp. Salmonella typhimurium, Proteus mirabilis and Serratia marcescens.*

### Antibacterial sensitivity assay of extracts

### Preparation of disc

Known quantity of the extract was dissolved in DMSO: PBS in the ratio of 1:1. It was then filtered by making use of syringe filter of pore size 0.42µm. Sterile discs of 6mm diameter were loaded with various concentrations of extracts and were dried. Dried discs were stored in sterile containers till use. Solvent loaded discs were also prepared and were used as negative control & tetracycline loaded discs were used as positive control.

### Antibacterial assay

Antibacterial assay was performed by disc diffusion technique [6]. Petriplates containing 20 ml of nutrient agar were seeded with a 24 hours old culture of the bacterial strain. Different concentrations (100µg, 200µg, 400µg and 800µg) of plant extracts were impregnated into the sterile

 

6 mm diameter discs. Discs were dried and dispensed on the solidified nutrient agar medium previously inoculated with test microorganisms. Tetracycline and vehicle loaded (DMSO: PBS) loaded discs were used as positive and negative control respectively. Then it was incubated at $37^0$C for 24 hours. The assessment of antibacterial activity was based on the measurement of zone of Inhibition formed around the discs. Antibiotic zone scale was used to measure zone of inhibition (Hi-Media, Mumbai).

## RESULTS AND DISCUSSION

Antibacterial activity of the aqueous and ethanol extracts of the leaves of *Bauhinia tomentosa* are listed in the table. Ethanol extract exhibits higher antibacterial effect than that of the aqueous extract. Both the extracts showed antimicrobial activity against the tested strains whereas *Bacillus subtilis* is susceptible only to the ethanol extract.

The ethanol extract showed the maximum inhibitory effect against *Streptococcus faecalis* and it is minimum for *Enterobacter aerogenes*. All the tested pathogens showed significant inhibitory effects.

Aqueous extract showed the highest inhibitory action against *Streptococcus faecalis*, as that of the ethanol extract. It was minimum for *Bacillus cereus. Bacillus subtilis* showed no inhibitory effects. Overall the leaf extracts of *Bauhinia tomentosa* showed significant antimicrobial activity against the tested pathogens, when comparing with the standards.

The selection of this plant for the present study was based on its medicinal properties and its use in traditional system. The present study clearly implies that the selected plant leaf extracts can cure the sort of illness concerned with the respective organisms and it further confirm the literatures.

Drug resistant in microbes become a big problem along with the emergence of new infectious diseases. Microbes acquire resistance against the pharmaceutical drugs by the production of drug degrading enzymes, resistant plasmids, alteration of metabolic pathway, etc.,[7,8,9,10]. To overcome these problems, pharmacologists are focusing on different sources of new antimicrobial agents.

Antimicrobial properties of a plant depend on its biologically active phytoconstituents. A wide range of anti-infective actions have been assigned to tannins [11]. Some authors have found that more highly oxidized phenols are more inhibitory [12,13]. Flavonoids are synthesized by plants in response microbial infection [14]. Terpenoids are active against bacteria [15], fungi [16], viruses [17] and protozoa [18]. Hence the plant which was subjected to this investigation reveals the presence of active phytochemicals, which exhibits many beneficial properties.

**Table** 1: **Antibacterial activity of *Bauhinia tomentosa* Linn., leaf extracts.**

| S.NO | Organism | Aqueous extract (Mean±SD) | Ethanolic extract (Mean±SD) |
|---|---|---|---|
| 1 | *Escherichia coli* | 14.00±1.87 | 21.66±3.93 |
| 2 | *Salmonella typhi* | 15.66±2.03 | 17.66±2.90 |
| 3 | *Streptococcus pyogens* | 13.66±2.03 | 18.00±2.54 |
| 4 | *Enterobacter aerogenes* | 15.00±1.22 | 13.00±0.70 |
| 5 | *Citrobacter sp.* | 13.33±2.36 | 15.00±0.70 |
| 6 | *Pseudomonas aeruginosa* | 14.00±2.00 | 17.33±2.03 |
| 7 | *Klebsiella pneumonia* | 13.66±2.60 | 17.00±1.22 |
| 8 | *Streptococcus faecalis* | 16.00±2.12 | 22.00±0.70 |
| 9 | *Staphylococcus aureus* | 14.33±2.44 | 20.00±1.22 |
| 10 | *Streptococcus mutans* | 22.00±0.56 | 25.00±1.00 |
| 11 | *Streptococcus epidermidis* | 16.00±0.56 | 14.00±1.03 |
| 12 | *Enterococcus faecalis* | 17.00±0.45 | 17.33±1.16 |
| 13 | *Bacillus cereus* | 18.00±0.53 | 13.34±0.58 |
| 14 | *Bacillus subtilis* | 18.45±1.16 | 18.50±0.57 |
| 15 | *Alcaligens faecalis* | 25.00±0.81 | 21.50±1.29 |
| 16 | *Micrococcus luteus* | 16.00±0.56 | 14.75±1.50 |
| 17 | *Proteus vulgaris* | 28.75±0.95 | 26.50±0.57 |
| 18 | *Shigella sp.* | 21.50±1.29 | 21.00±0.81 |
| 19 | *Salmonella typhimurium* | 17.00±0.56 | 14.75±1.50 |
| 20 | *Proteus mirabilis* | 21.00±0.00 | 17.75±0.95 |
| 21 | *Serratia marcescens* | 10.75±0.95 | 11.75±0.95 |

## CONCLUSION

Based on the results obtained, it is concluded that the leaf extracts of *Bauhinia tomentosa* L., possess significant antibacterial properties against a wide range of bacterial pathogens.

 ISSN: 2250-1177 CODEN (USA): JDDTAO

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 ISSN: 2250-1177 CODEN (USA): JDDTAO