



## Original Research Article

# Antimicrobial Activity of Ethanolic Bark Extract of *Tamarindus indica* against some Pathogenic Microorganisms

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## ABSTRACT

### Keywords

Antimicrobial activity;  
*Tamarindus indica*;  
*Staphylococcus aureus*;  
*Escherichia coli*.

The present investigation focuses on the Phytochemical analysis and antimicrobial activity of ethanolic bark extract of *Tamarindus indica*. The ethanolic bark extract of this plant was obtained using hot extraction method. The antimicrobial activity of this plant extract was carried out against gram positive bacteria (*Staphylococcus aureus*, *Bacillus cereus*) and gram negative bacteria (*Klebsiella pneumonia*, *Escherichia coli*) by well diffusion method. Phytochemical constituents present in the extract were found to include Saponins, Quinine, Alkaloids, Lignin, Glycosides. Large zone of inhibition was observed (16 mm and 15.25 mm) *Staphylococcus aureus* and *Bacillus cereus* respectively. The result support that can form the basis for the development of novel broad spectrum antimicrobial formulation.

## Introduction

Microorganisms exist everywhere in the earth, which cause various infectious diseases to human being. Man used the antimicrobial drugs against microbes, cause various side effects. The employment and development of these drugs against microbes continued throughout civilization until the modern era, Sometimes microbes constantly developing resistant to these drugs (Abdallah, 2011). Plants are prospective source of antimicrobial agents in different

countries. Traditionally crude plant extracts are used as herbal medicine for the treatment of infectious diseases because of the presence of phytochemical. The phytochemicals work in the human system and due to their therapeutic properties cure many ailments which cannot be cured by the modern drugs (Rahman et al., 2001). In recent years attempts have been made to investigate the new drug against infectious diseases. This may help to develop safer antimicrobial

drugs (Khanzada et al., 2008). The plant *Tamarindus indica* belongs to the family fabaceae. It is a tropical evergreen tree of India. It's pulp, seed, leaves and bark have been consumed as herbal medicine and as traditional food. The plant parts have been extensively studied in terms of pharmacological activity of its major compounds and result indicate potent antidiarrheal, antioxidant, anti-inflammatory, wound healing and antimicrobial activities (Nikkon et al., 2003). The presents study is aimed to evaluate the antimicrobial activity of bark extract of *Tamarindus indica* against some pathogenic microorganisms.

## Materials and Methods

### Collection of Plant Materials

Plant materials were collected from the wild in Trichy and it's surrounding area during the year 2013. Plants were identified and authenticated at the Botany department, Jamal Mohamed College, Trichy, Tamilnadu, India.

### Preparation of Extracts

The freshly collected stem bark of *Tamarindus indica* was chopped into pieces and shade dried at room temperature (32°C-35°C) to constant weight for 5 days. 200gm of bark was coarsely powdered using a mortar and pestle and was further reduced to powder using an electrical blender. (Predrag et al., 2005). The powder was transferred into closed container. The powdered bark 100gm was extracted with 70% ethanol in a soxhlet apparatus (boiling point 60-80°C) for 24 hours. The extract was filtered through a Buchner funnel with whatman NO 1 filter paper. The extract

was concentrated under reduced pressure and preferred at 5°C in air tight bottle until further use (Aida et al., 2001).

### Phytochemical Analysis

The freshly prepared extract was subjected to standard phytochemical analysis to test for the presence of the phytoconstituents, tannins, saponins, alkaloids etc, (Fransworth, 1994).

### Test Microorganisms

The bacterial strains used for the test were *Staphylococcus aureus*, *Bacillus cereus*, *Klebsiella pneumoniae* and *Escherichia coli*. All stock cultures were obtained from Microbiology laboratory at Jamal Mohamed College, Trichy-20. Nutrient agar (Himedia) was used as the media for the culturering of bacterial strains.

### Determination of Antimicrobial Activity

The antimicrobial activity was performed by the direct plate method. From the bacterial culture about 50 micro liter of each of the test organisms were transformed into nutrient agar plates containing (20ml NA) the organism was spread uniformly over the agar plate using spreader for uniform distribution of bacteria. Using a sterile borer, well of 0.5cm diameter was made in the inoculated media in addition 0.5ml of bark extract was aseptically filled into the each well. Ampicillin 30mg was used as positive control. Later the plates were placed at room temperature for an hour to allow diffusion of extract into the agar. Then the plates were incubated at 37°C for 24 hours.

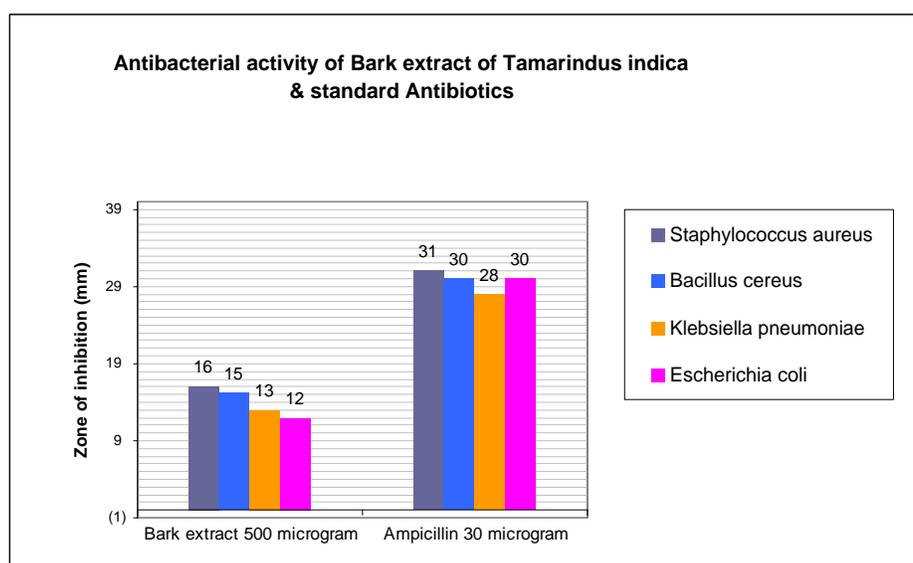
**Table.1** Phytochemical screening of *Tamarindus indica* bark extract

Phytochemical constituents	Ethanollic bark extract of <i>Tamarindus indica</i>
Saponin	+
Tannin	-
Sterol	-
Sugar	+
Flavonoids	-
Quinine	+
Lignin	+
Alkaloids	+
Glycosides	+
Qumarine	-

**Table.2** Antibacterial activity of Bark extract of *Tamarindus indica* with standard Ampicillin

Tested organisms	Zone of inhibition (mm) of <i>Tamarindus indica</i> bark extract	
	Bark extract 500 microgram	Ampicillin 30 microgram
<i>Staphylococcus aureus</i>	16	31
<i>Bacillus cereus</i>	15.25	30
<i>Klebsiella pneumoniae</i>	13	28
<i>Escherichia coli</i>	12	30

**Figure.1** Antibacterial Activity



## Results and Discussion

Phytochemical screening of ethnolic bark extract of *Tamarindus indica* is presented in Table-1. It showed the presence of some bioactive compound in plant. It ethanolic bark extract ten bioactive constituents were tested and shown six positive result (Table 1). *In vitro* antibacterial activity of ethanolic bark extract of *Tamarindas indica* with standard ampicilin against gram positive (*Staphylococcus aureus*, *Bacillus cereus*) and Gram negative (*Klebsiella pneumoniae*, *Escherichia coli*) bacteria is presented in Table 2.

Determination of the inhibition zone by means of well diffusion method (Table 2) shows that bark extract of *Tamarindus indica* exhibited an antimicrobial effects against all tested bacteria. Highest zone of inhibition was found to be 16 mm well against *Staphylococcus aureus* and lowest zone inhibition was found to be 12 mmwell against *Escherichia coli*.

In this present study has been indicated that medicinal plants are backbone of traditional medicine and the antibacterial activity of plant extract is due to different chemical agent in the extract which were classified as active antibacterial compounds (Rojas et al., 1992).

In the present study, ethanolic bark extracts of *Tamarindus indica* tested positive for the presence of alkaloids, glycosides, saponins and etc. Alkaloids is a plant derived compound responsible for the anti bacterial activity (Doughari, 2006). Glycosides serve as defense mechanisms against predation of many microorganisms (De, et al., 1999). This may explain the demonstration of anti bacterial activity by the stem bark of *Tamarindus indica* (Doughari, 2006).

From this study we can conclude this investigation has opened up the possibility of the use of this plant in drug development for human consumption for various infectious diseases.

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