

Extraction of tamarind pulp and its antibacterial activity

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ABSTRACT

Tamarinds indica L. of the family Fabaceae is known to be used in folk medicine. Among efforts to verify this scientifically, the antimicrobial activities of the pulp extract were investigated against gram-negative bacteria using disk diffusion method. The methanol crude extract obtained from it pulps were evaluated in vitro to determine their inhibition activities against human pathogenic microorganisms Bacillus subtilis. Preliminary phytochemical screening of methanol extract indicated the presence of alkaloids and tannins. Natural products present in tamarind pulp have potential of being used as antimicrobial agents for animals and/or plants protector against pathogenic microorganisms.

Keywords: *Tamarind indica* L., Methanol extract, Phytochemicals, Antimicrobial activity.

INTRODUCTION

Tamarind, *Tamarindus indica* L., is a multipurpose tropical fruit tree used primarily for its fruits, which are eaten fresh or processed, used as a seasoning or spice, or the fruits and seeds are processed for non-food uses. The species has a wide geographical distribution in the subtropics and semiarid tropics and is cultivated in numerous regions (Fig.1 & Fig.2) [1].

Tamarind has been used for centuries as a medicinal plant; its fruits are the most valuable part which have often been reported as curative in several pharmacopoeias [2]. Many parts of tamarind plant have long been used in traditional medicines for the treatment of a wide variety of ailments and diseases such as jaundice, gonococci and gastrointestinal disorders (Polysaccharides and their derivatives have been the choice of polymers as rate controlling carriers in sustains drug delivery system [3]. Making antimicrobial drug therapy effective , safe , and affordable has been the focus of interest during recent years. In the recent study attempts have been made to screen mature unripe tamarind fruit pulp extract for possible antimicrobial activity and reason for antimicrobial activities by determining the phytochemicals present there in[4].



Figure 1. Tamarind pulp



Figure 2. Tamarind pulp extract

MATERIALS AND METHODS

Collection of samples

Mature tamarind fruits were brought from Amingaon market, Guwahati. The pulp was hand-scraped from the seeds and shell of tamarind fruits. Non-plant materials, visible dirt and insect-infested parts were removed from the pulp prior to analyses.

Extraction of tamarind pulp

The extraction process was carried out to get the clear solution so that the photochemical test to be carried out and to know the antibacterial activity. 10.0 g of tamarind pulp was taken and extracted was carried out in 1000ml of methanol for 8 h using soxlet apparatus till the clear solution is obtained. As the clear solution was noticed the extraction process was stopped and it was allowed to cool. The extracts were filtered using vacuum filter and concentrated under vacuum to carry out the further process [5].

Preliminary phytochemical analysis

The phytochemical tests were performed using various reagents. The purity of polysaccharide was determined by prescribed phytochemical tests, which indicated the absence of alkaloids, steroids, flavonoids, saponins, sugars, tannins and phenols [6].

Antimicrobial studies

Microorganisms and inoculum preparation

Cultures of one human pathogenic bacteria made up of one gram-positive bacteria (*Bacillus subtilis*) nutrient agar media was used. A volume of 50 mL of nutrient broth taken in a 250-mL Erlenmeyer flask was inoculated with a loop full of cells from a 24-hour-old slant and kept at 37 °C in a rotary shaker. After 18 h of incubation, 1 mL of this nutrient broth culture was used as the inoculums [6].

Antibacterial Screening

Antibacterial screening is generally performed by disc diffusion method (Whatman filter paper), which were qualitative to semi quantitative test. Ampicillin (Beecham) was used as reference drugs in the assay. Briefly 20 ml quantities of nutrient agar were plated in petri dish. After it was solidified, and *Bacillus subtilis* was spreaded on the agar plate. Blank disc was soaked in the tamarind pulp extract. After few mins the disc was transferred on the agar plate. The activity was determined after 18 h of incubation at 37°C. The diameters of zone of inhibition produced by the inoculum were then compared with the standard antibiotic kanamycin 10 µg/disc. Each sample was used in triplicate for the determination of antibacterial activity [4,5,6].

RESULTS AND DISCUSSION

Phytochemical screening

Phytochemical screening of the methanol extracts of the tamarind pulp samples revealed the presence of only flavonoids and tannins. Presence of tannins is most likely to be responsible for the antioxidant and anti-inflammatory properties recorded for this plant pulps and the flavonoids are responsible for other medicinal properties (Table.1).

Table 1. Qualitative phytochemical evaluation of the *Tamarind pulp* extracts

Phytoconstituents	Test performed/reagents used	Results
Alkaloids	Meyers test	-
	Dragendorff's test	-
	Hangers test	-
Steroids	Liebermann-Burchard test	-
Flavonoids	Shinoda test	+
Tannins	Ferric chloride	+
	Lead acetate	+
Saponin	Test for stable foam	-
Glycosides	Borntager test	-
Proteins and amino acids	Ninhydrin test	-
Reducing sugar	Benedict test	-
	Fehling's test	-

+ (Presence) - (Absence)

Antibacterial screening

Tamarind pulp has antibacterial activity and the application was carried out against *Bacillus subtilis*. The results representing antibacterial activity Tamarind pulp extract. The antibacterial activity was found 15.6 mm diameter of zone inhibition against *Bacillus subtilis* (Fig 3).



Figure 3. Antibacterial activity of tamarind pulp against *Bacillus subtilis*

CONCLUSION

The phytochemical tests and the phytochemical screening of the methanol extracts of the tamarind pulp samples revealed the presence of only flavonoids and tannins. The application of tamarind pulp was carried out antibacterial screening which showed significant result against *Bacillus subtilis*.

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