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## Antibacterial Efficacy of *Acacia modesta* Wall Miswak Against Dental Pathogen

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**Abstract:** *Acacia modesta* Wall (Phulai) belong to family Mimosaceae is being regularly used as miswak (tooth brush) for teeth cleaning in various parts of Pakistan. It is medium size tree, 4-7 meter in height and flowering period is from March-May. The present study was confined to check antibacterial efficacy of twigs extract against dental pathogens. The study was conducted in traditional drug section of National Institute of Health, Pakistan. Lactobacillus (gram positive) strain of bacteria was cultured from dental carriers in control conditions. The effect was determined by disc method. The pharmacognostic study revealed that the extract has significant antibacterial efficacy against lactobacterial triclosan.

**Key words:** *Acacia modesta*, antibacterial, miswak

### INTRODUCTION

Dental diseases and related gum diseases is a growing health problem throughout the world, especially in our country due to changing life, dietary habits, excessive use of sugar and other sugar products. The world greatest physician, our Holy Prophet (Peace Be Upon Him) has advised all the Muslims to brush their teeth with miswak five times a day before every prayer. The use of miswak is a common practice in various parts of Pakistan.

The *Acacia modesta* Wall (Family Mimosaceae) locally called phulai is used as miswak (chewing sticks) in various parts of Pakistan. The leaves, fruits, bark and wood of *Acacia modesta* wall is commonly used for medicinal, fuel and timber purposes in our country.

The miswak of *Acacia modesta* Wall was used for gums washing and stop bleeding (Salim *et al.*, 1998). The miswak of *Acacia modesta* Wall is very effective against dental diseases, gastric trouble and stomach disorders (Ahmad, 2003). *Acacia modesta* has antibacterial efficacy (Akhtar *et al.*, 1997). *A. modesta*, *A. nilotica*, *Pongmia glabra* and *Salvadora persica* twigs could act as an effective tools in removing oral deposits and exhibit antimicrobial activities (Saeed, 1988).

The present study reports the antibacterial efficacy of *Acacia modesta* on lactobacillus (gram-positive strain) bacteria. Lactobacillus is basically non-pathogenic but in certain conditions, it ferments carbohydrates into lactic acid, which is harmful for dental coating (enamel).

### MATERIALS AND METHODS

Miswaks (twigs) of *Acacia modesta* Wall were collected from forest near by National Institute of Health, Islamabad. They were washed, dried and cut into small pieces. They were soaked in water to expel the contaminated air till the pieces sank. Different medias that was blood agar, nutrient agar and mackonaky were used for culturing of bacteria. The swab sample containing dental pathogens were taken. Lactobacillus was cultured in laboratory under controlled conditions.

The pieces of *Acacia modesta* Wall were ground by mortar and pistil by using grinding buffer, then filtered to remove insoluble impurities by using Whatman filter paper. The serial dilutions were made to obtain different concentrations of the extract. These concentrations of the extract and known antibacterial agent triclosan were applied on culture by using disc method of Evers and Smith (1955).

### RESULTS AND DISCUSSION

**Macroscopic features of *Acacia modesta* wall:** *Acacia modesta* Wall locally known as Phulai belong to family Mimosaceae. It is a medium size deciduous tree. The flowers (March-May) are pale white to pale yellow fragrant growing in bunches. Prickles pseudostipular, pod 3-4 cm thin and flat. The height of tree is 8-12 m and girth is 25-36 cm in 6 to 8 years of growth. It is mainly used in making agricultural implements, fodder, timber, fuel and

Table 1: Diameter of zone of clearance in millimeter

Percentage composition of compound (µl/100 µl)	<i>Acacia modesta</i> extract	Triclosan
20	0 mm	0 mm
40	0 mm	0 mm
50	5 mm	7 mm
75	8 mm	10 mm
100	11 mm	13 mm

apicultural purposes. Medicinally it is used for gas trouble and young twigs (miswaks) are used for dental problem.

**Antibacterial efficacy:** Lactobacillus culture was treated with different concentrations of *Acacia modesta* Wall and triclosan. Now antibacterial efficacy was observed at lower concentration (up to 40%). At 75% significant antibacterial efficacy was observed and reached close to triclosan at 100% as clear in Table 1.

**Chemical analysis:** The powdered miswak of *Acacia modesta* Wall was soluble in sulphuric acid only. It did not retain its original dark yellow colour under UV (254 nm) on dry filter paper and in various solvents. Dastagir and Haq (1995) reported similar features for miswaks of *Acacia modesta*, *Azadirachta indica* and *Dodonaea viscosa*. Because *Acacia modesta* showed antibacterial activity closer to triclosan. So it is suggested that *Acacia modesta* miswak is cheap, affordable and have antibacterial activity. Therefore its use will help in the oral hygiene and effective against dental pathogens.

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