

# Antibacterial activity of aqueous methanolic extract of leaf and fruit extract of *Santalum album*

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**Abstract-** *Santalum album* commonly known as Sandalwood is used traditionally for health and wellness. It is an evergreen and hemi-parasitic tree and has a long history in Indian religious rituals and traditional Chinese medicine. In the present study we were investigated the antibacterial activity of leaf and fruit extract of *Santalum album*. The antimicrobial activity of aqueous extract leaf and fruit of *Santalum album* was performed against gram negative and gram positive bacteria.

**Index Terms-** Antibacterial activity, *Santalum album*, leaves and fruits.

## I. INTRODUCTION

*Santalum album* is a native of the highlands of southern India mainly Coorg, Chennai and Mysore. It generally occurs at altitudes of 2000-3000 feet. The tree attains the height of 60-65 feet. *Santalum* thrives well-drained loamy soil preferably on slopes of hills exposed to the sun. It requires a minimum of 20-25 inches rainfall per year. The finest wood grows in driest region particularly on red or stony ground while on rocky ground the tree often remains small but gives the highest yield of oil. Trees more than 30 years old may have circumference from 18 to 38 inches. The bark and sapwood are odourless and the roots and heartwood contains the essential oil. [1]

Antimicrobials of plant origin have enormous therapeutic potential. They are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials. All medicinal, plant contains certain active constituent, it responsible to some pharmacological activity. The medicinal actions of plants are unique to a particular plant species or group, consistent with the concept that the combination of secondary products in a particular plant is taxonomically distinct [2]. The present study aims to assess the antibacterial activity of leaf and fruit extract of *Santalum album*.

## II. MATERIAL AND METHODS

### Selection of plant material

In present work *Santalum album* Linn. (Sweta chandan) have been selected for the study. It has been collected from civil line Rewa of Rewa district (M.P.). Mostly extract of leaf and fruit has been used in the study.

### Preparation of the plant extract

The Fresh and disease free leaves and fruit of plant were washed and dried under shade. Then the samples were ground

separately using mortar and pestle. 100% aqueous extract of plant leaves and fruit were prepared by using distilled water.

### Antibacterial assay

The following bacterial strains were used in this study viz., Gram negative (*E. coli*, *P. aeruginosa*, *P. putida*, *Proteus vulgaris*) and gram positive (*S. mutanc*, *S.aureus*, *E. ficalis*, *M. luteus*). Disc diffusion assay method was carried out by using standard protocol.

## III. RESULTS AND DISCUSSION

The antimicrobial activity of the leaf and fruit extract was estimated using disc methods against Gram negative (*E. coli*, *P. aeruginosa*, *P. putida*, *Proteus vulgaris*) and gram positive (*S. mutanc*, *S.aureus*, *E. ficalis*, *M. luteus*). The methanol crude extracts of *Santalum album* and its fractions revealed comparatively small antibacterial potential against gram-positive and gram negative bacteria at the concentrations of 25%, 50%, 75% and 100% with their respective zone of inhibition of 10 -18 mm (Table 1 and 2).

Maximum zone of inhibition was observed in 25% and 50% methanol extract of *Santalum album* leaf extract against in *S. aureus*.

Many plants produce chemicals which inactivate bacterial infections. The results showed that leaf have more antibacterial activity than fruit so that we can use *S. album* leaf extract against those microbes. [3-6]

**Table 1- Antibacterial activity of leaf extract of *Santalum album***

Gram negative bacterial strains	Zone of inhibition (mm)			
	25%	50%	75%	100%
<i>E. coli</i>	10	11	11	12
<i>P. aeruginosa</i>	11	11	13	15
<i>P. putida</i>	11	12	13	14
<i>Proteus vulgaris</i>	11	12	13	14
<b>Gram positive bacterial strains</b>				

<i>S. mutanc</i>	10	11	12	12
<i>S. aureus</i>	18	18	10	10
<i>E. ficalis</i>	11	12	14	12
<i>M. luteus</i>	11	12	13	16

**Table 2 - Antibacterial activity of fruit extract of *Santalum album***

Gram negative bacterial strains	Zone of inhibition (mm)			
	25%	50%	75%	100%
<i>E. coli</i>	10	10	11	11
<i>P. aeruginosa</i>	11	12	10	10
<i>P. putida</i>	0	11	12	12
<i>Proteus vulgaris</i>	0	12	12	13
Gram positive bacterial strains				
<i>S. mutanc</i>	11	12	12	13
<i>S. aureus</i>	12	14	12	12
<i>E. ficalis</i>	11	10	14	10
<i>M. luteus</i>	12	14	15	16

#### IV. CONCLUSION

The present antimicrobial study of extract of *Santalum album* that the aqueous methanolic extract of leaf shows highest activity against the employed bacteria. Possibilities for future

studies may include testing different parts of *S. album* for antimicrobial activity. Comparing data from studies of other *Santalum spp.* may be helpful in determining similar medicinal properties of plant extracts. These properties may have economic benefits involving *S. album* in cultivation.

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