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## The evaluation of the in-vitro antimicrobial activity of *Alangium salvifolium* (Linn)

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### ABSTRACT

Finding healing power in plants is an ancient idea, and people of all continents and civilization have been using plants in one form or the other for poultices or as decoctions. *Alangium salvifolium* (Linn), family Alangeaceae, is a tree that grows in the wild throughout India. The plant has been used in the Indian traditional system of medicine for skin diseases (e.g. leucoderma), articular diseases, and anti-inflammation, anti-poisonous, anti-pyretic, and anti-emetic requirements. However, no scientific evidence is available regarding its antimicrobial activity. An investigation of *Alangium salvifolium* as an antimicrobial activity agent is the objective of our present study. The ATCC culture used in this study was collected from department of Microbiology, G.M.C., Bhopal (M.P.). Shade dried crude powder (200 grams) of seed of *Alangium salvifolium* was separately extracted with methanol in a soxhelt apparatus. The Antimicrobial activities were then studied by applying the Disc-Diffusion method. Our results indicate that the observed antimicrobial activity of the fraction appears to be due to unknown secondary metabolites in it. H.P.L.C. (high performance liquid chromatography) and chemical studies may, thus be useful in analyzing the presence of unknown secondary metabolites in the fractions.

**Keywords:** Antimicrobial activity, disc diffusion, soxhelt apparatus, secondary metabolites, *Alangium salvifolium*

### 1. INTRODUCTION

Finding healing power in plants is an ancient idea. People of all continents and civilization used plants in one form or the other like poultice or decoction. Due to problem like adverse effects, limited life span and misuse of traditional antibiotics, effects are currently

underway to look for products of natural origins and studies on traditional knowledge. Presently there is an increasing interest in the use of plants Microbicides because of the necessity of finding safer microbicides and the need for preventing environment degradation. *Alangium salvifolium* (Linn) family Alangeaceae is a tree/herb which grows in the wild throughout the india<sup>1</sup>. The plant has been used in the Indian traditional system of medicine in skin diseases (eg: leucoderma), articular diseases, anti-inflammation, anti-poisonous, anti-pyretic, and anti-emetic<sup>2</sup>. However no scientific evidence is available regarding its antimicrobial activity. Investigations of *Alangium salvifolium* as an antimicrobial agent are the objectives of our present study.

## **2. MATERIALS & METHODS**

### *Preparation of plants (Seed) extract*

Shade dried crude powder (200 grams) of seed of *Alangium salvifolium* was extracted with methanol in a soxhelt apparatus separately<sup>3</sup>. The extract was concentrated and the resin was precipitated by adding acidulated water and filtered. It filtrate was evaporated up to dryness, the dry filtrate weighted and re-dissolved in milliliter water yield a solution containing 50 mg/ml of the extract. Finally 500 ug concentration were prepared as per standard procedure and stored in amber-colored storage vials at 4-5 °C until used for the experiment

### *Micro-organisms*

The ATCC culture used in this study were collected from department of Microbiology, G.M.C., Bhopal (M.P.). The ATCC strain used in this study were *Bcillus cereus* (1178), *Bacillus subtillis* (6633), *Staphylococcus aureus* (29737), *Staphylococcus epidermis* (6538), *E. coli* (10536), *Klebsiella pneumonia* (10031), *Pseudomonas aeru* (9027), *Streptococcus faecalis* (8083), *Micrococcus luteus* (9341), *Bordetella bronchiseptica* (4617)

### *Antimicrobial activity*

The Antimicrobial activities were studied by Disc Diffusion Method. The antimicrobial activity was examined in the terms of zone of inhibition produced after overnight incubation at 37 °C and compared with standard drugs.

## **3. OBSERVATION**

The antimicrobial activity of the water soluble fraction of *Alangium salvifolium* extract against different ATCC bacterial strain is shown in Table 1. It can be seen from the table no-1 that all the isolated strain of *Bacillus cereus* (1178), *Bordetella bronchiseptica* (4617), *Klebsiella pneumonia* (10031), and *Pseudomonas aeru* (9027) and *Bacillus subtillis* (6633) were sensitive to ASE. A rough estimate of relative potencies were made from the zone of inhibition and the following conclusions emerge which apply only to 'Doses' of ASE and reference drugs in the discs. The fraction of ASE was as active as Streptomycin against *Staphylococcus aureus* but was less effective then Erythromycin and Gentamycin against

Klebsiella Pneumonia 70% of B. subtilis 50% Pseudomonas aeru. Cultured were sensitive to ASE. The activity being comparable to that of contrimaxozole amongst the other ATCC cultured, *Staphylococcus aureus* and *Staphylococcus epidermis* were uniformly sensitive to ASE, While 80% *Bacillus cereus* 40% of micrococcus luteus and 70% *E. coli* were inhibited by the ASE fraction.

**Table 1.** Comparative antimicrobial activity of water soluble fraction of ASE extract against microorganisms.

S.no.	Bacterial species (ATCC no.)	Num. of plate			Zone of inhibition in mm.				
			R	S	ASE5 00ug	Contrimaxozole 2ug	Gentamycin 200ug	Stuptomycin 100ug	Erythromycin 10ug
1	<i>Bcillus cereus</i> (1178)	10	10	-	8-20	0-15	-----	0-25	8-20
2	<i>Bacillus subtilis</i> (6633)	08	6	-	7-15	0-14	-----	----	0-9
3	<i>S. aureus</i> (29737)	5	3	2	8-12	0-20	0-12	0-25	----
4	<i>S. epidermis</i> (6538)	6	5	1	8-10	0-15	-----	0-12	8-12
5	<i>E. coli</i> (10536)	25	20	5	8-12	-----	-----	----	-----
6	<i>Klebsiella pneumonia</i> (10031)	14	9	5	6-8	0-10	0-20	-----	7-10
7	<i>Pseudomonas aeru</i> (9027)	11	11	-	7-13	0-8	-----	0-11	0-24
8	<i>S. faecalis</i> (8083)	18	12	6	4-9	0-12	-----	----	8-12
9	<i>Micrococcus luteus</i> (9341)	15	13	2	7-24	----	0-10	0-12	6-12
10	<i>Bondretella bronchiseptica</i> (4617)	16	16	-	6-10	0-17	-----	0-25	-----

S = Sensitive, R = Resistance  
(Figure in parenthesis indicate total number of culture studied)

Antimicrobial activity of ASE was compare to that of Contrimaxozole, Gentamycin for *Klebsiella pneumonia*, *Pseudomonas aeru* and Erythromycin, streptomycin in remaining

micro-organisms. *Strepto faecalis* resistant to ASE was sensitive to contrimaxozole and erythromycin but *E. coli* sensitive to ASE was found to be resistant to all other antibiotics tested. *Staphylococcus aureus* resistant to ASE was sensitive to contrimaxozole Gentamycin and streptomycin, while the growth of resistant *Bacillus subtilis* was inhibited by erythromycin.

In summary, the effect of ASE was comparable to that of contrimaxozole against *S. aureus*, *S. faecalis* *S. epidermis*, *Klebsiella pneumonia*, *Pseudomonas aeru.* to streptomycin against micrococcus luteus and kanamycin against *E. coli*, *Bacillus cereus*, *Bacillus subtilis*. Its activity against *Bordetella bronchiseptica* was less than that of erythromycin and tetracycline.



Fig. 1. *Alangium salviifolium* (L.f.) Wangerin

#### 4. DISCUSSION & CONCLUSION

Secondary metabolites from medicinal plants exhibit a range of biological activities including antimicrobial, antioxidant, insecticide, herbicidal, immunosuppressive or stimulator, nerve tonic<sup>3-8</sup>. They have been extracted from plants for centuries, however, their exploitations yet to be fully realized<sup>3</sup>. The biosynthesis of these metabolites is controlled genetically and affected strongly by the environmental influences that may be biotic or abiotic<sup>9,10</sup> as a result there are fluctuations of these secondary metabolites such as Alkaloids, glycosides, volatile oil and steroids<sup>8</sup>. Developing countries like India, in particular have an urgent need for such extraction since they depend for greater extent upon plant derived compounds. Medicinal plants in Western region of Madhya Pradesh are highly useful as drug. Many species are being lost which might have yielded useful products to mankind and profit to the industry especially Pharmaceutical industry. Antimicrobial effects of hydrophobic and hydrophilic extracts of roots and shoot, seed leaves and whole plants (panchang) of the medicinal plants were tested against gram positive /gram negative bacterial species. In view

of these hydrophilic characteristics of this active principle present in the plants .the observed antimicrobial activity of the fraction appears to be due to unknown secondary metabolites in it. H.P.L.C. (high performance liquid chromatography) and chemical studies analyzing the presence of unknown secondary metabolites in the fractions <sup>11-17</sup>.

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