A study of the antimicrobial activity of *Alangium salviifolium*

A certain interest in medicinal plants has been reborn, even though the emphasis persists in research of synthetic compounds. These substances are potentially toxic, and are not free of side effects on the host. This has urged microbiologists all over the world for formulation of new antimicrobial agents, and evaluation of the efficacy of natural plant products as the substitute for chemical antimicrobial agents.

*Alangium salviifolium* Linn (Alangiaceae) is a small deciduous tree or shrub, which grows in the wild throughout the hotter parts of India. The major phytochemical constitutes of the plant are alangine A and B, alangicine, markindine, lamarrkkinine, and emetine. The root of *Alangium salviifolium* has been used in the Indian system of medicine as an acrid, diuretic, astringent and antidote for several poisons. The fruits (mucosa) of the plant are useful in treating burning sensation and haemorrhages. However, no scientific evidence is available regarding its antimicrobial activity. An investigation of *Alangium salviifolium* as an antiinfective agent is the objective of our present study.

The root of the plant was collected during May 1993 from Namakkal Dt. A specimen was deposited in the Rapinat Herbarium, St. Joseph’s College; Tiruchirapalli. The shadow-dried root was macerated overnight with solvents butanol and ethanol in a 1:5 drug:solvent ratio \(\times\) 3. Exhaustive extraction with the solvent was carried out by the cold extraction procedure. The respective extracts thus obtained were evaporated to dryness, and stored in amber-colored storage vials at 4-5°C until they were used for the experiment.

Ten Gram positive and Gram negative ATCC (American Type Culture Collection) bacterial isolates, were used in the present study. The isolates are: *Bacillus cereus* (11778), *Bacillus pumilus* (14884), *Bacillus subtilis* (6633), *Bordetella bronchiseptica* (4617), *Micrococcus luteus* (9341), *Staphylococcus epidermidis* (6538), *Escherichia coli* (10536), *Klebsiella pneumonia* (10031), *Pseudomonas aeruginosa* (9027), and *Enterococcus faecalis* (8043). Agar dilution method with working concentration of 1, 2 and 4 mg/ml of butanol and ethanol extracts, were used for the study. Standard antibiotic ciprofloxacin (Cadila Pharmaceuticals, India) at 4 mg/ml concentration, was used as positive control.

Butanol extract of the plant showed growth inhibitory effect at 4 mg/ml concentrations in all the bacterial isolates tested, except *Klebsiella pneumonia*, where it showed 75% inhibition. Lower concentration of the extract showed concentration-dependent inhibition effect. At 2 mg/ml, 50% inhibition in all the cultures was seen, while at 1 mg/ml, it was completely ineffective, when compared with the positive control (ciprofloxacin) and control (nutrient medium without antibiotic or plant extract). [Table 1] Inhibitory effect of the ethanol extract with all the three concentrations, was not found on any of the cultures used for the experiment, except *Micrococcus luteus*, where it showed 50% inhibition at 2 mg/ml and complete inhibition at 4 mg/ml of the concentration. [Table 1]

The results of the study confirm the antimicrobial potential of the butanol extract of *Alangium salviifolium*. However, further detailed studies are required.

<table>
<thead>
<tr>
<th>Bacterial species (ATCC NO.)</th>
<th>Control</th>
<th>Ciprofloxacin</th>
<th>Extract (mg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BU</td>
<td>ET</td>
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<tr>
<td><em>Bacillus cereus</em> (11778)</td>
<td>++++</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td><em>Bacillus pumilus</em> (14884)</td>
<td>++++</td>
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<td><em>Bacillus subtilis</em> (6633)</td>
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<td>-</td>
<td>+++</td>
</tr>
<tr>
<td><em>Micrococcus luteus</em> (9341)</td>
<td>++++</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td><em>Staphylococcus epidermidis</em> (6538)</td>
<td>++++</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td><em>Escherichia coli</em> (10536)</td>
<td>++++</td>
<td>-</td>
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</tr>
<tr>
<td><em>Klebsiella pneumonia</em> (10031)</td>
<td>++++</td>
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<tr>
<td><em>Pseudomonas aeruginosa</em> (9027)</td>
<td>++++</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td><em>Enterococcus faecalis</em> (8043)</td>
<td>++++</td>
<td>-</td>
<td>+++</td>
</tr>
</tbody>
</table>

Extent of growth: - Complete inhibition; + 75% inhibition; ++ 50% inhibition; +++ 25% inhibition; ++++ no inhibition; BU- Butanol; ET-ethanol
References


3. Prajapati ND, Purohit SS, Sharma AK, Kumar T. A handbook of medicinal plants. Jodhpur: Dr. Updesh Purohit for Agro bios (India); 2003.


INDIAN PHARMACOLOGICAL SOCIETY
OFFICE BEARERS - 2006

Prof. Y. K. Gupta, MD
President, IPS
Dept of Pharmacology,
All India Institute of Medical Sciences
Ansari Nagar, New Delhi – 110 029
Email: yk.ykgupta@gmail.com; ykg@hotmail.com

Dr. P. A. Patil
Sr.Vice President, IPS
Dept of Pharmacology,
J.N. Medical College, Belgaum
E-mail: appatil@cs.york.ac.uk

Dr. Rajan J. Vedashirmoni
Vice President, IPS
Division of Pharmacology
Indian Inst. Chem. & Bio,
4, RajaS.C. Mullick Road, Calcutta - 700 032
E-mail: j_rajan_49@yahoo.com

Dr. Prakash V.Diwane
General Secretary, IPS
Head, Pharmacology Division
Deputy Director, Indian Institute of Chemical Technology,
Hyderabad – 500 007.

Dr. R. Ravendran
Chief Editor, IPS
Dept of Pharmacology,
JIPMER, Pondicherry- 605 006.
E-mail: ravee@jipmer.edu

Dr. T. Ramesh Kumar Rao
Treasurer, IPS
Dept. of Clinical Pharmacology
Nizam’s Institute of Medical Sciences
Panagagutta, Hyderabad – 500 082.
E-mail: drrameshrao@rediffmail.com, drrameshrao@yahoo.co.in

Dr. S. S. Agrawal
Past President, IPS
Delhi Institute of Pharmaceutical Science & Research (DIPSAR),
Pushp Vihar (M.B.Road),
New Delhi – 110 017
E-mail: agrarwal_shyam@indiatimes.com

Prof. S. S. Agrawal
Past President, IPS
Dept of Pharmacology,
Indian Pharmacological Society
Head, Department of Pharmacology
L.M. College of Pharmacy, Navrangpura,
Ahmedabad – 380 009.
E-mail: rkgoyal@hotmail.com

Prof. Ramesh K. Goyal
Past General Secretary, IPS
Indian Pharmacological Society
Head, Department of Pharmacology
L.M. College of Pharmacy, Navrangpura,
Ahmedabad – 380 009.
E-mail: rkgoyal@hotmail.com

Dr. Deshpande Shrikalp Shrikant
Executive Committee Member, IPS
C/6, Ratna Palace
Nr. Juges Bunglow Char Rasta
Bodakdev, Satellite, Ahmedabad 380 054.
E-mail: shrikalpin@yahoo.com

Dr. S. Ramaswamy
Executive Committee Member, IPS
Dept of Pharmaceutical Sciences
Aarupadai Veedu Medical College & Hospital
Kirumampakkam,
Pondicherry 607 402.
E-mail: prakram@vsnl.com

Dr. Gajendra Singh
Executive Committee Member, IPS
Dept of Pharmaceutical Sciences
Guru Nank Dev University,
Aristaar- 143 005.
E-mail: gajneel@yahoo.com

Dr. Subhas C. Marihal
Executive Committee Member, IPS
Goa College of Pharmacy,
Panaji, Goa –403001.
E-mail: smarihal@yahoo.com

Dr. S. Ramakrishna
Executive Committee Member, IPS
Indian Institute of Chemical technology,
Hyderabad
E-mail: sistla@iict.res.in

Dr. Sushma A. Mengi
Executive Committee Member, IPS
C.U. Shah College of Pharmacy
S.N.D.T. Women’s University, Santacruz (W),
Mumbai – 400 049
E-mail: armg@bom5.vsnl.net.in; sushmamengi@rediffmail.com