ANTIMICROBIAL ACTIVITY OF EUGENIA CARYOPHYLLUS

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ABSTRACT

The present study was aimed at detecting and evaluating antimicrobial activities of Eugenia caryophyllus known for their medicinal properties in folk medicine. The Acetone and Ethanol extract of cloves shows good activity against some bacterial strains such as M.luteus, Pseudomonas aerugisa, Klebsiella species, B.cereus, and Escherichia coli. The Acetone and Ethanol extract also shows good antifungal activity against R.aerugious, Rhizopus stolonifer, A.niger, and P.carysogenum.

Keywords: Eugenia caryophyllus, Antimicrobial activity, Myrtaceae.

INTRODUCTION

Eugenia caryophyllus, a plant belonging to family Myrtaceae¹. The clove tree is an evergreen which grows to a height ranging from 10-20m, having large oval clove and crimson flower in numerous groups of terminal clusters. The flower buds are at first of a pale color and gradually become green, after which they develop into a bright red, when they are ready for collecting. cloves are harvested when 1.5-2 cm long and consist of a long calyx, terminating in four spreading sepals and four unopened petals which form a small ball in the centre²³. Cloves are the aromatic gried flower buds of a tree in the family of myrtaceae. Cloves are native to Indonesia and India and used as a spice in cuisine all over the world. The English name derive from latin clavus ‘nail’ as the buds vaguely reassembly small irregulars nails in shape. cloves are invested primarily in Indonesia, Madagascar, Zanzibar, Pakistan and srilanka; it is also grown in India under the name lavang, called “lavanga” in telugu⁴.
MATERIALS AND METHODS

1. Collection of clove of *Eugenia caryophyllus*.
Clove of *Eugenia caryophyllus* were collected from area around Tilak nagar, Delhi during the month of Oct to Dec. The collected plant material was washed with water to remove mud and other undesirable material and dried under shade.

2. Extraction of clove of *Eugenia caryophyllus*
The collected plant material was washed with water to removed other undesirable material and dried under shade. The air-dried clove (300 gm) of *Eugenia caryophyllus* were crushed. The crushed clove extracted with methanol at room temperature. The extract was evaporated till dryness to obtain residue. These extracts were concentrated under reduced pressure. The extract was used for used for antimicrobial activity.

4. Anti-microbial activity
The anti-microbial activity of the clove and bark of *Eugenia caryophyllus* was carried out. The clove and bark extract were screened for anti bacterial and anti fungal activities.

Anti bacterial activity of clove extract
In this study, the anti bacterial activity was studied against the micro organism and the bacterial cultures used in the study were:
1. Escherichia coli
2. Pseudomonas aerugisa,
3. Klebsiella species
4. Bacillus cereus
These bacterial cultures were maintained on nutrient agar slants at first being incubated at 37°C for about 18-24 hours and then stored at 4°C as stock for anti bacterial activity. Fresh cultures were obtained by transferring a loop full of cultures into nutrient broth and then incubated at 37°C overnight. To test anti bacterial activity, the well diffusion method used.

Culture media preparation
The microbiological media prepared as standard instruction provided by the HI-Media Laboratories, Mumbai. The media used for anti-bacterial activity Muller- Hinton Agar (MHA) and Nutrient broth (NB). They were prepared and sterilized at 121°C at 15 psi for 15-30 minutes autoclave.
Plate preparations
25 ml of pre autoclaved Muller-Hinton agar (MHA) was poured into 90 mm diameter pre sterilized petri-plates. These petri-plates were allowed to solidify at room temperature.

Well diffusion method
After the plated solidified the freshly prepared microbial growth culture suspension (about 20µl) was spread over the Muller – Hinton agar (MHA) media using L shaped sterilized glass spreader separately under the aseptic condition using laminar air flow. Then well were made in each plate with the help of borer of 8 mm diameter .In these well, about 100µl of each clove extracts individually was loaded. This method depend upon the diffusion of clove extracts from hole through the solidified agar layer of petri-dish to such an extent that the growth of added micro organism is prevented entirely in a circular area or Zone around the hole containing leaf extract.

Incubation: Petri plates were incubated for overnight at 37°C ± 0.5°C in the incubator.

Inhibition Measurement of zone of inhibition

After incubation, the diameter of clear zone of incubation produced around the well or holes were measured in mm by ESR Tube and compared with standard drug.

RESULTS
Table-1: Antibacterial activity of the extract of *Eugenia caryophyllus* clove

<table>
<thead>
<tr>
<th>Test organism</th>
<th>Acetone (mm)</th>
<th>Ethanol (mm)</th>
<th>n-hexane (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Escherichia coli</em></td>
<td>20 (70mm)</td>
<td>20 (70mm)</td>
<td>12 (70mm)</td>
</tr>
<tr>
<td><em>M. luteus</em></td>
<td>25 (-)</td>
<td>23 (-)</td>
<td>14 (-)</td>
</tr>
<tr>
<td><em>Pseudomonas aerugisa</em></td>
<td>20 (36mm)</td>
<td>16 (36mm)</td>
<td>Nil (36mm)</td>
</tr>
<tr>
<td><em>Klebsiella species</em></td>
<td>21 (35mm)</td>
<td>24 (35mm)</td>
<td>15 (35mm)</td>
</tr>
<tr>
<td><em>B. cereus</em></td>
<td>18 (-)</td>
<td>20 (-)</td>
<td>Nil (-)</td>
</tr>
</tbody>
</table>
Table- 2: Antifungal activity of the extract of *Eugenia caryophyllus* clove

<table>
<thead>
<tr>
<th>Test organism</th>
<th>Inhibition zone (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acetone</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>20 (70mm)</td>
</tr>
<tr>
<td>Penicillium chrysogenum</td>
<td>25 (-)</td>
</tr>
<tr>
<td>Rhizopus stolonifer</td>
<td>20 (36mm)</td>
</tr>
<tr>
<td>Rhizopus aeruginous</td>
<td>21 (35mm)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Acetone and ethanol extract of clove showed similar activity against E.coli. Ethanol extract of clove showed similar activity against E.coli and B.cereus. Acetone extract of clove showed similar activity against P.aeroginosa and E.coli.

Acetone extract of clove showed similar activity against Rhizopus aeruginous and P.chrysogenum. Acetone and ethanol extract of clove showed similar activity against Aspergillus niger. Ethanol and acetone extract of clove showed similar activity against P.chrysogenum and Rhizopus aeruginous.

**REFERENCES**

1. Chatterjee D. and Randhawa G.S. Standardized name of cultivated plant in India-II cereals,pulses,vegetables and spices.Ind. J .Hort 1986 (9) : 64-84