ABSTRACT

Green plants synthesize and preserve a variety of biochemical products, many of which are extractable and used as chemical feed stocks or as raw material for various scientific investigations. Many secondary metabolites of plant are commercially important and find use in a number of pharmaceutical compounds. Phytochemicals are secondary metabolites in one or more parts of the medicinal plants. These have the ability to produce a definite physiological action on the human body. Euphorbia hirta belongs to family Euphorbiaceae. Antimicrobial & antifungal activity of the plant extract is taken up in this study since this plant is medicinally important. The organisms for the study are Klebsiella pneumoniae, Saccharomyces cerevisiae, Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus. The activity was studied by agar cup method.

KEYWORDS: Antimicrobial, antifungal, Klebsiella pneumoniae, Saccharomyces cerevisiae, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, agar cup.

INTRODUCTION

Euphorbia hirta L. is commonly called spurge and belongs to family Euphorbiaceae (Hooker, 1883).


The plants share the feature of having a poisonous, milky, white, latex-like sap, and unusual and unique floral structures.
Chemical Constituents

*Euphorbia hirta* contain secondary metabolites such as alkaloids, diterpenoids, stigmasterone, beta-sitosterol, carboaromatic compounds polyols, triterpenoid dicarboxilic acid, barringtonic acid and other triterpenoids, baringenic acid, euphane triterpenoids, phytosterolin gallic acids, and linoleic acids.

Uses

Leaves used in the treatment of snake bite, applying crushed leaves to a wound can also stop bleeding. The decoction of the roots of *E. hirta* is used to heal various female disorders. It increases lactation in nursing mothers who are not producing enough milk, but it should never be administered to pregnant women, as this may induce miscarriage. Roots are cooling, aperient and expectorant. The fruits are bitter, coolant, anthelmintic, useful in biliousness, bronchitis, etc.

Seeds are very warm and dry and are applied to chest to relieve pain and cold; to the abdomen to relieve pain. (Kapoor, 1990).

MATERIAL AND METHODS

Collection: The plant material i.e. leaves and stem of Euphorbia hirta for the present work was collected from Borivali and Waghoba forest (Palghar) & authenticated.

Cultures used were: *Klebsiella pneumoniae* (NCIM 2883), *Saccharomyces cerevisiae* (NCIM 3090), *Escherichia coli* (NCIM 2066), *Pseudomonas aeruginosa* (NCIM 2036), *Staphylococcus aureus* (NCIM 2121).

The agar cup method was used to study the antibacterial activity of the extracts. The culture from culture plates were scooped using a wire loop and separately mixed with normal saline. A loopful was withdrawn and was mixed with the agar broth and then was poured in petriplate until the agar solidified. Wells of approximately 6mm in diameter and 2.5mm deep were made on the surface of the solid medium using a sterile borer. The extracts were inoculated in the well having the concentration 200,400, 600, 800 & 1000 µg/mL. Solvent blank was also inoculated. The plates were incubated at 37°C for 24 hours. After 24 hours, the plates were removed and zones of inhibition measured and the results were tabulated. Extracts with zone of inhibition greater or equal to 7mm diameter were regarded as positive.
Observations

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Organism</th>
<th>200 µg/ml</th>
<th>400 µg/ml</th>
<th>600 µg/ml</th>
<th>800 µg/ml</th>
<th>1000 µg/ml</th>
<th>Control (DMSO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Klebsiella pneumoniae</em></td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>14</td>
<td>--</td>
</tr>
<tr>
<td>2.</td>
<td><em>Saccharomyces cerevisiae</em></td>
<td>9</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td><em>Escherichia coli</em></td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td><em>Pseudomonas aeruginosa</em></td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td><em>Staphylococcus aureus</em></td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>-</td>
</tr>
</tbody>
</table>

- indicates no growth, zone of inhibition in mm.

RESULTS

The leaf extract showed both antimicrobial as well as anti-fungal activity. The activity was visible in 200, 400, 600, 800 & 1000 ppm concentrations. The activity was prominent in *Saccharomyces cerevisiae* whereas in bacteria it was more in *Staphylococcus aureus* followed by *Klebsiella pneumoniae, Escherichia coli, Pseudomonas aeruginosa* in which it was almost the same but definite.

CONCLUSION

The antimicrobial activity shows maximum activity in 800 ppm & 1000 ppm concentration. The activity is seen in 200, 400, 600 ppm also. Thus confirming that the plant has antimicrobial properties.

DISCUSSION

Antifungal and antimicrobial use of *Zizyphus jujuba* lamk. Leaf has been studied by Vaidya & Shingadia 2016. Vaidya (2015), has studied antimicrobial activity of *Holarrhena antidysenterica* along with antimicrobial activity of aqueous & methanolic extract of young and mature leaves of *Psidium guajava* (Guava) has been studied by Vaidya, 2013. Antimicrobial activity of *Eclipta prostrata* has recently been studied by Vaidya and Sambhare, 2016. Thus we can conclude that anti-microbial & anti-fungal properties of *Euphorbia hirta* can be tapped as a source & used as medicine.
<table>
<thead>
<tr>
<th>Klebsiella pneumoniae</th>
<th>Saccharomyces cerevisiae</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>Pseudomonas aeruginosa</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td></td>
</tr>
</tbody>
</table>

**BIBLIOGRAPHY**
