**Material and Methods**

Good inhibitory activity of *Artemisia vulgaris* and the plant were studied using antibiotics, Gentamicin as test organism. The antibacterial activity of aqueous, alcoholic, petroleum ether and Benzene extract of leaves of the plant were studied using *Escherichia coli* and *Staphylococcus aureus*, as test organisms. All the extracts were effective against all the two microorganisms. The result revealed that the plant extracts have maximum inhibitory activity against Gram negative and Gram positive organism when compared to standard antibiotics. The petroleum ether and benzene extracts of plant have shown significant activity against *Escherichia coli* and *Staphylococcus aureus*. Similarly the aqueous and alcohol extract of plant has shown good inhibitory activity of *Artemisia vulgaris* indicating that the plant can fight these organisms effectively.

**INTRODUCTION**

As the Damanaka (*Artemisia vulgaris* Linn.) (Family, Asteraceae) leaves have been used to treat a wide variety of skin ailments, foul ulcers, wounds, stomachic, antispasmodic. The expressed juice is responsible for the worm infestations, t essay of skin ailments, foul ulcers, wounds, stomachic, antispasmodic.

**MATERIALS AND METHODS**

Collection of plant material and extraction

The leaves of *Artemisia vulgaris* were collected from K.L.E.U Shree B.M.K. Ayurved Mahavidyalaya, Belgaum. The present work was carried out with the objectives of comparing antimicrobial activity of various extracts and standard antibiotic drugs, plant against some pathogenic bacterial. The in vitro antibacterial studies of the aqueous, alcohol, Petroleum ether, and Benzene extracts of the leaves were carried out by disc agar diffusion method. The extracts were found to be effective against Gram negative (*Escherichia coli*) pathogens when compared to Gram Positive (*Staphylococcus aureus*) pathogen. The phytoconstituents, present in the extracts may be responsible for the antimicrobial activity. The mechanism is yet to be identified.

Collection of plant material and extraction

The leaves of *Artemisia vulgaris* were collected from KLEU Shri. B.M.K.Ayurved Mahavidyalaya, Shahapur, Belgaum. The following studies were carried out. The leaves were collected, dried and coarsely powdered. The powder was subjected to extraction using Soxhlet apparatus with alcohol 95%, petroleum ether, benzene and water separately. Four extracts were concentrated into paste consistency. From each extract, test compound of 50 mg was taken, dissolved in 2 ml of Dimethyl sulphoxide (DMSO) and stored in airtight containers.

Microorganisms

The following strains of bacteria were used in the study.

1. *Escherichia coli* (Gram negative)
2. *Staphylococcus aureus* (Gram positive)

**Antibacterial activity**

The above mentioned bacterial isolates were grown in nutrient agar at 37°C and reactivated for further use in nutrient broth. The different extracts of *Artemisia vulgaris* and standard drugs were tested for antibacterial activity against the test organisms using the agar diffusion method (Van. C.J. Kurata H. et al. 1994). Mueller Hinton agar media was prepared and the plates were swabbed for 24 hrs cultures of respective bacteria grown in nutrient broth overnight. Sterile discs of 8 mm diameter were impregnated with 0.5 ml of each extract and Dimethyl sulphoxide separately. Dimethyl sulphoxide was used as negative control and discs of standard drugs as positive control. The plates were then incubated at 37°C for 24hrs.

After the incubation period, each plate was observed for zone of inhibition and measured using transparent scale or slide calipers.

**RESULT AND DISCUSSION**

**Anti Bacterial Screening**

Antibacterial Activity of different extracts of *Artemisia vulgaris* against microorganisms

<table>
<thead>
<tr>
<th>Bacterial Strains</th>
<th>DMSO</th>
<th>Aq.E</th>
<th>A.E</th>
<th>P.E</th>
<th>B.E</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Escherichia coli</em></td>
<td>Nil</td>
<td>15mm</td>
<td>20mm</td>
<td>08mm</td>
<td>08mm</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>Nil</td>
<td>04mm</td>
<td>20mm</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Aq.E = Aqueous extract   P.E = Petroleum ether extract  
A.E = Alcohol extract  B.E = Benzene extract.
The results of antimicrobial activities are given in Tables 1 and 2. From Table 1 and Fig. 1, it is very clear that all the extracts have shown antimicrobial activity against all tested organisms. The aqueous and alcohol extracts of plant has shown significant activity, against Escherichia coli (18 mm, 20mm) and Staphylococcus aureus (10mm, 20mm). The antimicrobial activities of different extracts against test organisms are given below.

**Escherichia coli**

Aqueous and alcohol extracts showed maximum zone of inhibition (20 mm) followed by aqueous extract 18 mm, while petroleum ether and benzene extracts showed less zone of inhibition (8 mm, 8 mm).

**Staphylococcus aureus**

Alcohol extracts showed maximum zone of inhibition (20 mm). While aqueous extract showed (04 mm) same as standard antibiotic (Tetracycline 20 mm). Petroleum ether and benzene extracts zone of inhibition is not seen.

**Susceptibility**

Susceptibility test of organisms in traditional antibiotics was done using standard antibiotics such as Gentamycin, Tetracycline, Ampicillin, ciprofloxin and ofloxacin. The zone of inhibition of the standard antibiotics against the test organisms was measured and the results are given in table 2 (Fig. 2.).

**Escherichia coli**

Standard antibiotic ofloxacin showed maximum zone of inhibition (42 mm) followed by ciprofloxin (40 mm), Tetracycline (35 mm), Ampicillin (35 mm) and Gentamycin (32 mm).

**Staphylococcus aureus**

Standard antibiotic ciprofloxin showed maximum zone of inhibition (40 mm) followed by gentamycin (32 mm) ofloxacin (24 mm) Tetracycline (20 mm) and Ampicillin (18 mm).

**CONCLUSION**

It can be concluded from the results that Artemisia vulgaris plant leaf extracts possess antimicrobial activity against various test organisms used. Some of the extracts (aqueous and alcohol) were more effective than traditional antibiotics to combat the pathogenic microorganisms studied. This possibly means that the compound responsible for the antimicrobial activity is present in each extract at different concentrations. The chance to find antimicrobial activity was more apparent in alcohol and aqueous extracts than in petroleum ether and benzene extracts. The extracts were found to be effective against Gram negative (Escherichia coli) pathogens when compared to Gram positive (Staphylococcus aureus) Pathogen. The phytoconstituents present in the extracts may be responsible for the antimicrobial activity. The mechanism is yet to be studied. The **in vitro** study of antimicrobial activity of Artemisia vulgaris on various test organisms may help to discover new class of antibiotic substances that could serve as selective agents for infections, chemotherapy and control. This approach has opened up the possibility of the use of this plant in drug development for human consumption for future use.

**ACKNOWLEDGMENT**

The authors are thankful to Dr. B. Srinivas Prasad, Principal. K.L.E.U’ Shri. B.M.K. Ayurved Mahavidyala Belgaum, and Dr. S. Palli, Principal. And Dr. S.C. Mali, H.O.D. of K.L.E’s College of Engineering and Technology Belgaum, for providing the necessary facilities.

**REFERENCES**

4. Agnivesh Revised by Charaka & Dridhbala with Ayurveda-dipika Commentary of Chakrapanidatta, Edited by Yadavji Trikamji, Charaka Samhita, Sutrasthana- 26 Chapter Shloka no. , Varanasi, Chaukhamba Sanskrit Sansthana, Reprint 1984; Page No.-
8. www.wikipedia.com

Source of support: Nil, Conflict of interest: None Declared.