Antimicrobial Activity of Mentha Arvensis L (Pudina) Against on Gram Negative Bacteria

Strain of E.coli, Pseudomonas aeruginasa, Klebsiella pneumoniae, Agar well diffusion method, Mentha Arvensis L, solvents extract

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ABSTRACT The present study has been designed with the objective to examine the Antimicrobial activity of Mentha Arvensis L (family lamiaceae) against the medically important gram negative bacterial strain like E.coli, Pseudomonas aeruginosa, Klebsiella pneumoniae by agar well diffusion method on Nutrient agar media using some solvent extract like Butanol, Chloroform, DMSO.

Introduction:
Due to chaotic use of antimicrobial drugs rate of resistance in human pathogenic microorganisms has increased dramatically (Monroe and Polk, 2000; Parekh and Chanda, 2007). Indian medicinal plants are regularly used in various system of medicine because of minimal side effect and cost effectiveness which provide scientific support to the therapeutic use of the plants in tribal medicine (Rajlakshmi et al., 2003).

Mentha Arvensis L belongs to the family Lamiaceae, which is major source of antimicrobial compound. It is also called Menthol mint, japanese mint, corn mint an essential oil is bearing crop is cultivated for the natural menthol, which is widely use in pharmaceutical, cosmetics and flavoring industries.( B Rachel, sugandhi, meera bai, 2011).It is a erect branched perennial herb with running rootstock rigid branch- ing stem up to 75cm tall. The leaves of the plant are common edible aromatic herb and used in indigestion and rheumatic pain. The plant used to treat liver and spleen diseases, Asthma and Jaundice. The oil is 5% by distillation of leaves, which contain 40-50% menthol. The oil is Antiseptic, Carminative, Refrigerant, stimulant diuretic. Menthol is used for stomach disorders and ointment for headache (Ritish NAIR, Sumitra CHANDA 2007).

The use of plant and their extract in the treatment of diseases back to 460– 370BC when Hippocrates practiced the art of healing by use of plant drugs (Sofowora, E.A. 1982.; B.Rachel 2007 . In addition, the plant is rich in wide variety of secondary metabolites. Such as tannins, phenols, steroids, flavono- ids and volatile oils, were found in-vitro to have antimicro- bial properties.(Blanc et al. 1998:77:140-6)

In India, an use of medicinal plant from ancient time. Today there is renewed interest in traditional medicine and increasing a demand for more drugs from plant sources this is mainly due to a current widespread belief that, Green medicine is safe and more dependable than the costly synthetic drug.

Botanical information of M. Arvensis:
Plant species :- Mentha Arvensis L.
Family :- Lamiaceae
Common name :- Pudina
Part use :- Leaves

Phytochemical analysis: Tannins, phenols, Steroids, Flavono ids and volatile oil.

Extract preparation:
A loop full of bacterial culture which has been taken from pure slant cultures with the help of an inoculating needle and mixes it with sterile distilled water in test tube under sterilized condition .The content is mixed thoroughly until a suspension is formed.

Agar well diffusion assay:
Take loops full of culture was inoculated in nutrient broth test tube and incubate for 24hrs at 37°C. Also prepared the 500 ml nutrient agar medium and autoclave, then pour up to 25-35 ml in each Petri plates.

Then 1 ml of inoculums (N. broth) was inoculated into the each N. agar plates and spread by using glass rod After15-20 min. excess inoculums was soaking by cotton swab. For agar well diffusion method, a well was made in the seeded plates with the help of a cup-borer. The two well was made in each plate, one for the aqueous or solvent extract and other was only pure solvent. Labeling the plate, the extract was intro- duced into the well using micropipettes in proper manner. Incubates the plate at 37°C for 48hrThe microbial growth was determined by measuring the diameter of zone of inhibi-
tion. The control zones were subtracted from the test zones and the resulting zone diameter is shown in the graph. The experiment was done three times and the mean values are presented.

Result: Table 1.

Zone of Inhibition for mentha arvensis L plant against gram negative bacteria by various extract

<table>
<thead>
<tr>
<th>Plant</th>
<th>Extracts</th>
<th>Microorganisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Arvensis</td>
<td>Aqueous</td>
<td>E.coli 6mm, K.Pneumoniae 7mm, Pseudomonas 5mm</td>
</tr>
<tr>
<td>Leaves</td>
<td>Butonal</td>
<td>E.coli 12mm, K.Pneumoniae 13mm, Pseudomonas 7mm</td>
</tr>
<tr>
<td></td>
<td>Chloroform</td>
<td>E.coli 8mm, K.Pneumoniae 8mm, Pseudomonas 7mm</td>
</tr>
<tr>
<td></td>
<td>DMSO</td>
<td>E.coli 11mm, K.Pneumoniae 12mm, Pseudomonas 8mm</td>
</tr>
</tbody>
</table>

According to the parameters, M. Arvensis L extract was classified as active against E.coli, K.pneumoniae, and partial active against Pseudomonas aeruginosa. The Antimicrobial activity of Pseudomonas aeruginosa are the lowest and the inhibition zone ranging from 5mm to 10mm. The inhibition zone of E.coli and K.pneumoniae was ranging from 6mm to 15mm.

It can be seen from the observation, the aqueous extract of plant show lowest antimicrobial activity against the all bacterial strains. The zone of inhibition is 4mm to 7mm which is very lowest than the solvent extract.

Graph:

Antimicrobial activity of Mentha Arvensis extract (Aqueous & Solvent) against gram negative bacteria (E.coli, K.pneumoniae, Pseudomonas aeruginosa)

Discussion:
The present study had been designed with objective to examine the aqueous and solvent extract of Mentha Arvensis L (Pudina) to show the antimicrobial potential against bacterial strain of Escherichia coli, Pseudomonas aeruginasa and Klebsiella pneumoniae.

In order to investigate it’s in-vitro, the plant extract of Butanol and DMSO show highest antimicrobial activity against the E. Coli and K. Pneumoniae species and show lowest in the Chloroform. The extract of Butanol and Chloroform show the lowest antimicrobial activity and DMSO shows the highest antimicrobial activity against the Pseudomonas.

Also, it can be seen from the graph the Aqueous extract of plant show the lowest antimicrobial potential against all the bacterial species E.coli, K. pneumoniae and Pseudomonas aeruginasa as compare to remaining solvent extract Butonol, DMSO and Chloroform.

Conclusion:

This study preliminary evaluation of antibacterial activity of M. Arvensis L. It was indicates that M.arvensis L have the potential to generate novel metabolites. The plant extract demonstrated anti bacterial activity could result in the discovery of novel antibacterial agent, and also be used for self medication in domestic settings.

The present findings corroborate that M.arvensis L possess compounds with antimicrobial properties which supports its medicinal use. The results indicate significant capacity and future scope for the use of these plant species against a wide range of microbial populations. The work can be extended to reveal specific secondary metabolites that attributes to their antimicrobial activity. Also further study can be done for determination of toxicity, side effects and pharmaco-kinetic properties of isolated antimicrobial compounds.

REFERENCE