ABSTRACT

Mankind used traditional medicine for the treatments of various disease for centuries. Large portion of the world population especially in developing countries depends on the traditional system of medicine for primary health care and a variety of ailments. Many experts believed that the most viable and effective approach is to redesign strategies for discovering novel molecules from the plants. In search of broad spectrum antibacterial activity from traditionally used Indian plants against urinary tract infection. The zone of inhibition noted among that, maximum zone of inhibition at *Hibiscus rosa-sinensis* (18mm) followed by *Mentha plicata* (12mm), *Azadirachta indica* (5mm), *Mangifera indica* (10.2mm), *Solanum nigrum* (5.6mm), *Solanum trilobatum* (5.4mm), *Eclipta alba* (5.2mm), *Ocimum sanctum* (10.3mm), *Andrographis paniculata* (5.3mm), *Murraya koenigii* (10mm). Ten traditional aqueous plant extract were screened against *E.coli* This study explores the antibacterial properties of traditionally used plants. Tested the hypothesis, aqueous extract from traditionally used Indian plants used to treat symptoms often caused by *E.coli* bacteria.
KEYWORDS: Spectrum, aqueous extract, antimicrobial activity, *E.coli*.

INTRODUCTION
Historically, plants have provided a source of inspiration for novel drug compounds, as plant derived medicines which have made large contributions to human health and well-being. Although many drugs that come from trees generally have been replaced by more potent synthetic ones, trees remain a source for some drug ingredients (Thomas WAR(ed). 1978).

Medicinal plants have become important for the treatment of different disease conditions, such as diabetes, malaria, anemia for a long time now (Fola A. 1993), but the potential of higher plants as source for new drugs is still largely unexplored (Gerhartz & Ullmann’s 1985). Systematic screening of them may result in the discovery of novel effective compounds (Tomoko N & Takashi A *et al.*, 2002).

*Ocimum sanctum* Linn (known as Tulsi), a small herb seen throughout India, have been used for various medicinal purposes. Tulsi has long been recognized as possessing antioxidant properties (Sethi J & Sood S *et al.*, 2004).

Historically medicinal plants have provided a good source of antiinfective agents; emetine, quinine and berberine remain highly effective instruments in the fight against microbial infections (Zia-Ul-Haq M & Ahmad M *et al.*, 2011).

MATERIALS AND METHODS
Collection of plant materials
Fresh plant parts were collected from Karuppur, Kumbakonam, Thanjavur Dt, Tamilnadu, India, in January, 2019. Fresh plant materials were washed under running tap water, air dried and homogenized to fine powder and stored in airtight bottles.

EXTRACT PREPARATION
Preparation of aqueous extracts from dried plant materials
The collected leaves were weighed 200 grams of fresh leaves were washed with distilled water and allowed to dry at 55°C. The dried plant materials were ground into fine powder. The powder from dry leaves 70g were stored in bottle until needed for use. For preparation of extracts, 10 g of powdered leaves were soaked in 100ml of distilled water. The mixtures in containers were kept for 24 hours in shaking water bath fewer than 40°C. After the mixtures were filtered using a muslin broth. The filtrate was evaporated to get the final extract using a
rotary evaporator attached to a vacuum pump. 1.7 g of extracts were obtained from leaves respectively and stored at 5°C after being weighed.

**Bacterial isolation and inoculation**

_E. coli_ bacteria isolated and identified from UTI patients, in Microbiology Laboratory, and then the strains were transferred in test tube containing Nutrient broth agar; labeled and incubated at 37°C for 48 hrs.

**Bacterial inoculation and disc –diffusion method**

Media for strain was prepared to inoculate 40μl of standardized broth culture of the bacteria. The spreader was used to ensure uniform distribution of the microorganisms on surface of plates.

By disc diffusion method described by Kirby-Bauer. Normally, this method is used for testing the effect of hemical drugs on bacteria; therefore the same method was used in order to compare the effectiveness of different leaf extracts.

Chemical disc like Erythromycin, Ampicillin, Tetracycline, Norfloxacin etc., was aseptically placed over the media with specific bacteria. The plates were incubated at 37°C for 48hrs.

**RESULT**

In the present study _Hibiscus rosasinensis_ shown maximum zone of inhibition (18mm) observed in Muller Hinton Agar and minimum zone of inhibition (5mm) observed in _Azaddirachtaindica_ followed by _Solanumnigrum_ (5.6mm), _Eclipta alba_ (5.2mm), _Andrographispaniculata_ (5.3mm), _Solanumtrilobatum_ (5.4mm), _Mangiferaindica_ (10.2mm), _Ocimum sanctum_ (10.3mm), _Murrayakoenigii_ (10mm), _Mentha_(12mm).

Testing _E. coli_ with chemical antibiotics by using Muller hinton agar media. shows the maximum zone of inhibition Erythromycin (10.2mm), and minimum Tetracycline (3mm) followed by Norfloxacin (9.5mm), Ciprofloxacin (8.2mm) Ampicillin (8mm).
Table 1: Antimicrobial activity of traditionally used medicinal plants.

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the plants</th>
<th>Zone of inhibition on muller hinton agar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hibiscus rosa-sinensis</td>
<td>18mm</td>
</tr>
<tr>
<td>2.</td>
<td>Menthaspicata</td>
<td>12mm</td>
</tr>
<tr>
<td>3.</td>
<td>Ocimum sanctum</td>
<td>10.3mm</td>
</tr>
<tr>
<td>4.</td>
<td>Mangiferaindicata</td>
<td>10.2mm</td>
</tr>
<tr>
<td>5.</td>
<td>Murrayakoenigii</td>
<td>10mm</td>
</tr>
<tr>
<td>6.</td>
<td>Solanumnigrum</td>
<td>5.6mm</td>
</tr>
<tr>
<td>7.</td>
<td>Solanumtrilobatum</td>
<td>5.4mm</td>
</tr>
<tr>
<td>8.</td>
<td>Andrographhispaniculata</td>
<td>5.3mm</td>
</tr>
<tr>
<td>9.</td>
<td>Eclipta alba</td>
<td>5.2mm</td>
</tr>
<tr>
<td>10.</td>
<td>Azadirachtaindicaria</td>
<td>5mm</td>
</tr>
</tbody>
</table>

- Maximum
- Minimum

Table 2: Antibiotic sensitivity test against *Escherichia coli*.

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the antibiotics disc</th>
<th>Zone of inhibition on muller hinton agar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Erythromycin</td>
<td>10.2mm</td>
</tr>
<tr>
<td>2</td>
<td>Norfloxacin</td>
<td>9.5mm</td>
</tr>
<tr>
<td>3</td>
<td>Ciprofloxacin</td>
<td>8.2mm</td>
</tr>
<tr>
<td>4</td>
<td>Ampicillin</td>
<td>8mm</td>
</tr>
<tr>
<td>5</td>
<td>Tetracycline</td>
<td>3mm</td>
</tr>
</tbody>
</table>

*a) Hibiscus rosasinensis.*
b) *Mentha spicata.*

c) *Ocimum Sanctum.*

d) *Mangifera indica*
e) Murraya koenigii.

f) Solanum nigrum.

g) Solanum trilobatum
(Fig: 1) Antimicrobial Activity of Traditionally Used Herbal Plant Against Uti Pathogen *E.Coli Sp.*

**h) Andrographis paniculata**

**i ) Eclipta alba**

**j) Azadirachta indica**
DISCUSSION
In the present work carried out on antimicrobial activity of traditionally used Indian plants against urinary tract infective pathogen *E.colisp.* Assessment of antimicrobial activity of traditional used plant like *Azadiractaindica, Hibiscus rosa-sinensis, Ocimum sanctum, Mangiferaindica, Solanumtrilobatum, Solanumnigrum, Murrayakoenigii, Eclipta alba, Mentha, Andrographhispaniculata* against *E.coli sp.*, The maximum zone of inhibition *Hibiscus rosa-sinensis* (18mm), minimum *Azadirachtaindica* (5mm). Followed by *Mentha(M.spicata) (12mm), Ocimum sanctum (10.3mm), Mangiferaindica(10.2mm), Murrayakoenigii (10mm), Solanumnigrum (5.6mm), Solanumtrilobatum(5.4mm), Andrographispaniculata(5.3mm), Eclipta alba (5.2mm).

Maximum zone of inhibition, observed in *Hibiscus rosa-sinensis*(18mm) against *E.coli*in well diffusion method.an antimicrobial is a substance that kills or inhibits the growth of microbes such as bacteria, fungi or viruses. Antimicrobial drugs either kill microbes or prevent the growth of microbes.

Many of the herbs and spices used by humans to season food yield are useful medicinal compounds. *Hibiscus rosa-sinensis* is widely grown as an ornamental plant through out the tropical as well as subtropical regions of the world. Its flowers are large, generally red in the original varieties,& firm, but generally lack any scent (Ibtisamhammad, 2009). Hibiscus petal is used to stimulate hair growth and to prevent premature graying and loss of hairs and scalp disorders the buds have cooling and astringent effect and remove burning sensation of the body (Kirtikae& Mayor, 1987). (Table-1) (Fig : 1)

In the present study*M.spicata*testing it’s antimicrobial activity against *E.coli* it shows zone of inhibition (12mm). The antibacterial (against *E.coli&s.aureus*) and antioxidant activities (DPPH) of peppermint oil were reported, where as the antibacterial activity of different extracts against the same bacterial strains was reported. (Table-1) (Fig : 1)

In our observation in agar well diffusion method the antimicrobial activity of Tulsi leaves extract was used . It shows zone of Inhibition (10.3mm).With due consideration to available evidence pertaining to side effects & emergence of uncommon infections with the usage of synthetic antimicrobial agents, This work was agreed with [ Westphal JF & Vetter D et al., 1994., Dancer SJ.2004] including tetracyclines, [Greenstein G. 1995] particularly doxycycline which is used most commonly for management of aggressive periodontitis; this
study was conducted in the quest of identifying Tulsi as a possible alternative or an “adjunct” in the treatment of aggressive periodontitis. Several plant products such as Tulsi, Neem, Lemon & others have been tested for their antimicrobial properties in the past. With considerable success. Resistance to currently used chemotherapeutics is the major factor that necessitates the search for alternative safe, efficacious, and cost-effective treatment options, particularly in developing countries (Table-1) (Fig :1)

In agar well diffusion method the antimicrobial activity of *Mangifera indica* extract was noted. It shows zone of Inhibition 10.2mm. Preliminary phytochemical analysis revealed that the plant possessed the phytoconstituents tannins, glycolsides, Saponins & phenols.

In agar well diffusion method the antimicrobial activity of *Murraya koenigii* leaves extracts was used it shows zone of inhibition (10mm). Curry leaf oil extract have demonstrated the strongest inhibition of zone against *Proteus mirabilis*(18mm), *staphylococcus aureus, Corynebacterium pseudotuberculosis*(15mm), *Klebsiella pneumonia* (15mm) *Pseudomonas aeruginosa* (10mm), *Enterobacter aerogenes* (13mm), and a moderate level zone of inhibition was observed with *salmonella enteric* (11mm) and *Streptococcus pyrogen* (10mm) respectively. Also, in this study *Murraya koenigii* displayed antibacterial activity against the gram positive and gram negative bacteria. while *E.coli* showing maximum susceptibility to acetone extract with zone of inhibition of (16mm). current study has comparable results with the inhibition zone for *E.coli* ranging from (12mm to 24mm) by the various method employed in the experiment. (Table-1) (Fig :1)

In our findings in agar well diffusion *Solanum nigrum* leaves extract shown the zone of inhibition (5.6mm). The result of antimicrobial activity of *S.nigrum* were shown in table 1 the extract shows varying degree of inhibitory effect . The zone of inhibition obtain (5.6mm). same finding co.related with result of the small zone of inhibition was observed in 10 μg concentration of whole plant ethanolic extracts against *bacillus subtilis* no zone of inhibition was observed against to *E.coli, Klebsiella pneumonia* and *pseudomonas aeruginosa*. but zone of inhibition was observed in 10μg concentration of methanolic extract of stem and berries to all bacteria. stem and berries showed minimum zone of inhibition (3.0mm-9.0mm) our findings correlated with with 10μg concentration of ethaolic extract against to tested microorganism. Methanolic extract of stem, berries and whole plant were showed highest antibacterial activity than ethanolic extracts. (Table-1) (Fig:1)
In the present study agar well diffusion *Solanumtrilobatum* shown zone of inhibition (5.4mm). This may be attributed to the fact that these two groups differ by its cellwall component and its thickness. The ability of tannin compounds cause the bacterial colonies to disintegrate results from their interference with the bacterial cellwall.

*Andrographispaniculata* leaves extract was used it shows zone of inhibition (5.3mm). Medicinal plants are the prime sources of new medicines and may constitute an alternative to the usual drugs. Medicinal and aromatic plants are used on a wide scale in medicine against drug resistant bacteria. The methanol extract of croton macrostachyus stem bark induced antibacterial activity against *K.pneumonia, E.coli, C.albicans* and *E.aerogenes* with the zone of inhibition between 9.0+_1.1mm and 14.9+_1.3mm. The methanol extract and the ethyl acetate fraction of Bellisperennis 1. Flowers exhibited broad spectrum of antibacterial activity against *Streptococcus pyogens, Staphylococcus aureus, Enterobacter cloacae* and *Staphylococcus epidermis*. Our findings correlate with the inhibition of 35% (Table-1) (Fig:1)

*Eclipta alba* leaves extract was used it shows zone of inhibition (5.2mm). In the present study *Eclipta alba* has shown significant antibacterial activity against *Bacillus subtilis, E.coli, Klebsiella pneumonia*. Hence the antibacterial activity might be due to the presence of active compounds in *Eclipta alba* against the growth of bacteria. (Table-1)

In agar well diffusion method the antimicrobial activity of *Azadirachta indica* leaves extract was used it shows zone of inhibition (5mm). This research was carried out in order to determine the effect of *Azadirachta indica* crude extracts on the two bacteria strains (*S.aureus* and *E.coli*), as it was shown by the results, *E.coli* showed resistance on all extracts used ethanol extracts were more efficient in all cases whether for dry and fresh neem barks and leaves.

*Azadirachtaindica* extracts did not show any effect on it. Our results are different to those obtained during a study carried out by Gajendra sinh *et al.*, (2012) whereby *E.coli* was the most susceptible bacterium to aqueous and ethanol extracts of *Azadirachta indica*.

Instead of using chemical antibiotics for treating urinary tract infection the traditionally used Indian plants provide better improvement. So in future we prefere traditionally used Indian plants for treating urinary tract infections.
REFERENCES


