INTRODUCTION

Today plants are the almost exclusive source of drugs for the majority of the world population. People in developing countries utilize traditional medicine for their primary health care needs.

Aizoaceae which prefers hard open ground. These plants grow in abundance in Rajasthan, Punjab and Uttar Pradesh. Different parts of the plant have been used in Indian Traditional system of medicine for the treatment of conjunctivitis and problems in female to regularize menstruation.

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ABSTRACT

The in vitro antimicrobial activity of crude ethanolic extracts of the plant parts (leaf, root & stem) of Zaleya goivindia was investigated. For antibacterial activities test, the extracts were subjected to its effectiveness against both Gram (+ve) and Gram (-ve) bacteria in disk diffusion method. The opportunistic bacterial strains are Escherichia coli, Pseudomonas aeruginosa, Streptococcus pyogenes, Shigella dysentriae, Vibrio cholerae, Bacillus subtilis, Salmonella typhi, Staphylococcus aureus, Klebsiella pneumoniae & Agrobacterium rhizogenes. The zones of inhibition produced by the crude ethanol extracts against few sensitive strains were measured and compared with those of standard antibiotics Streptomycin, Ampicillin, Gentamycin & Tetracycline. The extracts produced the almost exclusive source of drugs for the majority of the world population.

MATERIAL AND METHODS

Study Site

The plant material was collected from MD College, Sriganganagar, Rajasthan for the evaluation of its antimicrobial effects. The plant parts (root, stem & leaf) were washed under running tap water and dried in hot air oven at 40-50°C. After that the dried plant material was grinded into a fine powder with the help of a suitable grinder. About 30gm of powdered material was extracted by soxhlet apparatus with 200ml 50% ethanol at 20-25°C temperature. The extract thus obtained was concentrated using a vacuum evaporator. The concentrate extracts of various parts of plant were kept in airtight bottles at 4°C in refrigerator for further use.

Bacterial Culture

Escherichia coli, Pseudomonas aeruginosa, Streptococcus pyogenes, Shigella dysentriae, Vibrio cholerae, Bacillus subtilis, Salmonella typhi, Staphylococcus aureus, Klebsiella pneumoniae & Agrobacterium rhizogenes were obtained from Department of Microbiology, MD College, Sriganganagar and Rajasthan, India. All test strains were maintained on Nutrient agar slopes (Hi-Media Laboratories Pvt. Ltd. Mumbai) at 37°C & were sub-cultured every two weeks.

Testing Antibacterial Activity

Antibacterial tests were carried out using the Disk diffusion method.11 Nutrient agar media was prepared by adding water to the dehydrated product that contains all the ingredients. Practically all media are available commercially in powdered form.12 Bacterial inoculums 0.1ml inoculated on solid Nutrient agar media in petriplates. The bacterial inoculum was spreaded by glass spreader until it absorbed fully in agar layer for the development of uniform bacterial growth. Discs of 5mm diameters were made from Whatman filter paper no. 1 with the help of punching machine. The paper discs were dipped in plant extracts, taken aseptically and kept in center of spreaded microorganism cultured petriplate. Standard Antibiotic discs were also kept in same way. The plates were then incubated at 37°C for overnight.

Subsequently, the plates were examined for zone of inhibition

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and diameter was measured in mm after subtracting disk diameter.¹³

<table>
<thead>
<tr>
<th>Microorganisms</th>
<th>50% ethanol</th>
<th>Leaf (mm)</th>
<th>Stem (mm)</th>
<th>Root (mm)</th>
<th>Streptomycin (10 mcg)</th>
<th>Ampicillin (10 mcg)</th>
<th>Gentamycin (10 mcg)</th>
<th>Tetracycin (30 mcg)</th>
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<tbody>
<tr>
<td>E. coli</td>
<td>0±0</td>
<td>21.3±1.88</td>
<td>26.6±6.90</td>
<td>39±57</td>
<td>18.3±1.95</td>
<td>21±5.2</td>
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<td>P. aeruginosa</td>
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<td>13.1±1.15</td>
<td>11.3±5.7</td>
<td>15.3±6.2</td>
<td>21±6.92</td>
<td>18.3±1.15</td>
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<td>S. pyrogenes</td>
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<td>12.3±1.45</td>
<td>14.6±1.10</td>
<td>17±5.2</td>
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<td>18.3±1.15</td>
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<td>22±5.3</td>
<td>20±1.20</td>
<td>35.6±1.45</td>
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<td>V. cholerae</td>
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<td>16.6±1.20</td>
<td>11.6±5.6</td>
<td>20.6±7.2</td>
<td>17±6.56</td>
<td>13.3±5.7</td>
<td>28±6.10</td>
<td>25±6.20</td>
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<td>25.3±9.5</td>
<td>27.6±6.6</td>
<td>16.6±3.38</td>
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<td>S. typhi</td>
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<td>23.3±6.6</td>
<td>32.6±1.15</td>
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<td>29±9.1</td>
<td>26±8.8</td>
<td>25±5.7</td>
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<td>S. aureus</td>
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<td>35.6±3.3</td>
<td>32.6±6.91</td>
<td>36.6±1.45</td>
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<td>29±7.6</td>
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<td>K. pneumoniae</td>
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<td>A. rhizogenes</td>
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</tbody>
</table>

Results as per shown in Mean±SE; ------ No inhibition

RESULTS AND DISCUSSION

The screening of selected plant extracts were done against 10 bacterial species using disk diffusion method. The zone of inhibition greater than 5 mm diameter is found to be having significant against particular bacteria.¹⁴ All three extracts of the plant test showed varying degree of antibacterial activities against the test bacterial species (Table 1). The antibacterial activities of the ethanol extract of various parts of plant compared favorably with that of four standard antibiotics (Streptomycin, Ampicillin, Gentamycin and Tetracycline) and have appeared to be broad spectrum as its activities were independent on gram reaction. The non-activity of the ethanol extract against most bacterial strains investigated in this study is in agreement with previous works which show that aqueous extracts of plant generally showed little or no antibacterial activities.⁵-¹⁸

The highest zone of inhibition was shown by root extract against S. aureus (36.6 mm), S. dysentiae (35.6 mm), S. typhi (32.6 mm) and E. coli (29 mm). The growth inhibition was moderately active against B. subtilis (27.6 mm), A. rhizogenes (23.6 mm), K. pneumoniae (21 mm) and V. cholerae (20.6 mm). The least active inhibition was reported in P. aeruginosa (15.6 mm). This zone was much less in other extract other to bacteria. This bacterium showed no inhibition against Streptomycin and Ampicillin. S. aureus is the most common species found in purulent wound.¹⁹ (Sue et al 2004). This bacterial species is found to be more effective in all extracts and showed maximum inhibition zone (33.3 mm) in all antibiotics and especially against Ampicillin. K. pneumoniae develops conjugativities in eyes. This plant extract also showed antibacterial activity against this. S. dysentiae common in food borne disease showed least inhibition zone against Ampicillin (2.3 mm); Tetracycline (21.6 mm) and showed highest against Streptomycin (23.6 mm). Out of these antibacterial drugs Ampicillin was very least efficient drug against S. pyrogenes. Lowest inhibition of Streptomycin was performed by A. rhizogenes. This bacterium can cause opportunistic infections humans with weakened immune system.²⁰²¹

The inhibitory effect of extracts of Z. goivinda against pathogenic bacterial strains can introduce the plant as a potential candidate for drug development for the treatment of ailments caused by these pathogens.⁰

CONCLUSION

The present study has shown a successful approach in the direction of new antibacterial drug discovery from plant origin. It has revalidated that Z. goivinda act as a remedy for different microbial diseases traditionally including Conjunctivitis, prevent wound infections and to regularize menstruation in females.

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REFERENCES


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