IN VITRO ANTIMICROBIAL ACTIVITY OF JATROPHA CURCAS LINN. LEAVES

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Summary

In the present study in-vitro antimicrobial activity of petroleum ether (40°-60°) and aqueous extracts of the air-dried leaves of Jatropha curcas Linn. was carried out by using cup-plate method on Staphylococcus aureus (Gram +ve) and Escherichia coli (Gram –ve). The antimicrobial activity of the both extracts was compared with standard drug (Benzyl penicillin). Aqueous extract showed most significant antimicrobial activity against Staphylococcus aureus and Escherichia coli when compared with standard drug.

Keywords: Antimicrobial activity, Cup-Plate method, Jatropha curcas.

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Introduction

The leaves of *Jatropha curcas* Linn belonging to the family Euphorbiaceae is a large shrub, 3-4 m high, native of tropical America, occurring throughout India and in Andaman and Islands known as Jangalieran in Hindi [1]. The leaves of *Jatropha curcas* Linn. contain apigenin, vitexin and isovitexin. α amyrin, stigmasterol, stigmastenes along with two new flavonoids found in leaves and twigs [2]. Three Deoxypreuissomerins, Palmarumycins CPI, JC1 and JC2 have been isolated from stem of *Jatropha curcas* Linn. [3].

Leaves are galactagogue, rubefacient, suppurative, insecticidal and are used in foul ulcers and tumors. It is successful local remedy for scabies, eczema and ringworm [4]. Literature survey reveals that there is no report available regarding antimicrobial activity of leaves *Jatropha curcas* Linn. In present investigation we have subjected the *Jatropha curcas* leaves to antimicrobial activity against various organisms by using different concentration of petroleum ether and aqueous extract.

Material and Methods

**Procurement of Plant material**

The leaves of *Jatropha curcas* Linn. have been collected from the local area of Nandurbar (Maharashtra). This plant is authentifying by Dr. Santosh Tayade, Dept. of Botany, Art’s, Science and Commerce College, Lonkheda, Shahada, Dist-Nandurbar (MS).

**Preparation of extract**

Leaves were air-dried, pulverized and extracted with light petroleum ether (40-60°C) and macerated with water. Extract was dried over anhydrous sodium sulphate and solvent was removed in vacuum at 40°C by using rotary evaporator (Rotavapour Buchii, Switzerland) [5, 6]. Different concentrations of petroleum ether and aqueous extracts equivalent to 50 µg/ml, 100 µg/ml and 200 µg/ml were prepared.

**Evaluation of Anti-Microbial activity**

The anti-microbial activity of the extracts of *Jatropha curcas* Linn. leaves were performed by Agar cup-plate method [7]. The extracts and reference standard were dissolved separately in DMF (Di-methyl formamide) at concentrations of 50 µg, 100 µg and 200 µg / ml. Benzyl penicillin was used as a reference standard. Solvent control (only DMF) was also maintained throughout the experiment. The selected microorganisms for the study of anti-microbial activity were *Staphylococcus aureus* and *Escherichia coli*.

The zone of inhibition of antimicrobial activity of various extracts of *Jatropha curcas* Linn. leaves was calculated by measuring the inhibitory effect towards the growth of microorganism around nutrient agar cup and also compared with the standard drug (Benzyl penicillin). The results were mentioned in Table no. 1.

**Results and Discussion**

Results of antimicrobial activity showed that aqueous extract possess potential antimicrobial activity as shown in the Table no.1. The result obtained indicates that the aqueous extract had shown maximum zone of inhibition at 200 µg/ml in both the case of bacteria. The zone of inhibition for *Staphylococcus aureus* and *Escherichia coli* was 20 mm and 19 mm respectively.
The minimum zone of inhibition at 100 µg/ml & 50 µg/ml for *Staphylococcus aureus* and *Escherichia coli* was 19 mm and 16 mm & 17 mm and 15 mm respectively.

The result obtained indicates that the petroleum ether extract had shown maximum zone of inhibition at 200 µg/ml in both the case of bacteria. The zone of inhibition for *Staphylococcus aureus* and *Escherichia coli* was 16 mm and 17 mm respectively. The minimum zone of inhibition at 100 µg/ml & 50 µg/ml for *Staphylococcus aureus* and *Escherichia coli* was 14 mm and 10 mm & 13 mm and 9 mm respectively. All the results are compared with standard antibiotics Benzyl Penicillin for antimicrobial activity.

Quantitative Chemical investigation revealed the presence of Flavonoids and Saponins in aqueous extract. Antimicrobial activity may be attributed due to the presence of flavonoids [8, 9]. The detailed chemical nature of active principle responsible for antibacterial and antifungal property is under progress.

From above result it was concluded that the antimicrobial activity of aqueous extract of *Jatropha curcas* Linn. leaves was maximum at 200µg/ml for organism *Staphylococcus aureus* and *Escherichia coli*.

### Table No. 1

**Antimicrobial Activity of leaves of *Jatropha curcas* Linn.**

<table>
<thead>
<tr>
<th>Name of Organisms</th>
<th>Zone of Inhibition in mm</th>
<th>Concentration in µg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Petroleum ether Extract</td>
<td>Aqueous Extract Std.</td>
</tr>
<tr>
<td></td>
<td>50 100 200</td>
<td>50 100 200 100</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em> (Gram +ve)</td>
<td>10 14 16</td>
<td>16 19 20 24</td>
</tr>
<tr>
<td><em>Escherichia coli</em> (Gram –ve)</td>
<td>09 13 17</td>
<td>15 17 19 25</td>
</tr>
</tbody>
</table>

# Values are average of three determinations.

Standard antibiotic Benzyl penicillin for antimicrobial activity.
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References