ABSTRACT
Medicinal plants have been used for centuries as remedies for human diseases because they contain therapeutic value. As per World Health Organization (WHO) about 80% of world population use medicinal plants to treat human diseases. Natural products, either as pure compounds or as standardized plant extracts furnish infinite opportunities for new drug pilots due to the unparalleled availability of chemical diversity. India is a varietal emporium of medicinal plants and is one of the richest countries in world with regard to genetic resources of medicinal plants. However out of 16,000 medicinal plants only 10% have so far been exploited for development of new biological sources for drugs. Thus we explored different chemical constituents present in hexane, ethyl acetate, ethanolic and aqueous extracts of *Guazuma ulmifolia* Lam. of the family Sterculiaceae by using standard tests for various chemicals like steroids, triterpenes, saponins, alkaloids, carbohydrates, flavonoids, tannins, glycosides and polyphenols.

KEY WORDS: Human diseases, Medicinal plants, Biological drugs, Chemical diversity, Alkaloids.

INTRODUCTION
Plant is a biosynthetic laboratory with its primary products such as carbohydrates, proteins, lipids and with secondary metabolites such as glycosides, alkaloids, coumarins, flavonoids, terpenoids, phenolic compounds etc. These products are known to showed inhibitory effect against the growth of pathogens. Therefore their products should be utilized to combat the disease causing pathogens. Antimicrobial compounds of plants origin may occur in stems,
roots, leaves, bark, flowers and fruits of plants. Plant extracts has been used to treat a number of infectious diseases including those caused by bacteria, fungi, protozoa and viruses (Soylu et al 2005, Nejad and Deokul 2009). A number of reports are available in vitro and in vivo efficacy of plant extracts against plant and human pathogens causing bacterial infections (Joy et al. 2008).

A significant opportunity exists to identify new, natural plant derived antimicrobial agents for treatment of diseases in human beings. For this purpose, *Guazuma ulmifolia* Lam. of the family Sterculiaceae is studied for screening of phytochemical components and antimicrobial activity.

*Guazuma ulmifolia*, commonly called Bastard cedar, is native to tropical American countries. It was introduced into India more than 100 years ago. It has naturalized to the local climatic conditions. This species has high medicinal importance. A beverage prepared from crushed seeds soaked in water is used to treat ailments like diarrhea, dysentery, cold, cough and venereal disease. It is also used as a diuretic and astringent (Valleijo and Oveido, 1994). It is popularly used in the treatment of dandruff, hypocholesterolemic (Feltrin et al., 2012). In West Indies, inner bark is used as a remedy for elephantiasis, in clarifying sugar juice, disease of chest and cutaneous. An extract of the leaves is used to reduce corpulence. Seeds are used for astringent, carminative and antidiarrheal.

**METHODOLOGY**

**Preliminary Phytochemical Screening**

Leaves of selected species were washed with water, chopped into small fragments and shade dried and then at 60°C in a hot air oven. The dried samples were grounded into powder and stored in polythene containers at room temperature. These samples were used for further screening of secondary metabolites. 25g. of powder was soaked in each 250ml. of Hexane, Ethyl acetate, Ethanolic and aqueous solvents and were kept in dark for one day. These extracts were concentrated under reduced pressure to one third volumes and used for testing of 9 components namely Steroids, Triterpenes, Saponins, Alkaloids, Carbohydrates, Flavonoids, Tannins, Glycosides, and Polyphenols respectively. Preliminary phytochemical analysis was under taken using standard quantitative methods as described by Amarasingham *et al.* (1964), Das and Battacharjee (1970), Brain and Turner (1975), Horborne (1984) and Venkata Raju (1996).
Assessment of Anti Microbial activity

*Guazuma ulmifolia* ethanol leaf extract was tested for antimicrobial activities in all the selected micro organisms such as *Staphylococcus aureus* - a (+ ve), *Pseudomonas aeruginosa* – a (–ve) and *Aspergillus niger* - (a fungi).

The Muller Hinton Agar (MHA) media plates are prepared according to the manufacturers recommendations. They are dried in an incubator at 37°C for 30 minutes. The standard working inoculums of three different organisms are also taken. The bacteria are inoculated on to this media plates. Potato dextrose sugar media is used for the growth of a fungus. All the inoculated plates are left to dry at room temperature for about 10 minutes with closed lid. Then the impregnated filter paper discs with different concentrations of crude leaf extracts are placed in the inoculated plates.

The disc diffusion method is followed to assess the growth of colonies. The crude extract of sample dissolved in dimethyl sulfoxide (DMSO) and the concentrations of 10 mg/1 ml of sample is applied to sterile whatmann filter paper discs. All these plates are incubated for 18 hrs. in an incubator at 37°C. After 18 hrs. the zone of inhibition is measured with the help of a ruler and the data is tabulated. Antimicrobial activity of crude extract is assessed by measuring the diameter of the growth inhibition zone in millimeters.

**Preparation of Plant extract**

The plant material was dried in shade and powdered in a mechanical grinder. The powder (25.0 g) of the plant material was initially defatted with ethyl alcohol by using a Soxhlet extractor for 72 hours at a temperature not exceeding the boiling point of the solvent. The extract was filtered using Whatmann filter paper (No.1). While hot and concentrated it is filtered in vacuum under reduced pressure using rotary flask evaporator, and dried in a desiccator. The ethyl alcoholic extract yields a dark greenish solid residue. The extract was then kept in sterile bottles, under refrigerated conditions, until further use. The extract was preserved at 2 to 4°C. This crude extract of ethyl alcohol was used for further investigation for potential of antimicrobial properties.

**RESULTS**

The preliminary phytochemical screening study revealed the presence of 6 tested components such as steroids, alkaloids, flavonoids, tannins, glycosides and polyphenols in all the four i.e. Hexane, ethyl acetate, Ethanolic and aqueous extracts. Triterpenes are
identified in two i.e. ethyl acetate and ethanolic extracts. Carbohydrates are identified in ethanolic and aqueous extracts. Saponins are completely absent in all the four tested extracts. These results are given in a table.

Studies on antimicrobial activity of ethanolic leaf extract was shown higher zone of inhibition against *Staphylococcus aureus* +ve (2.8 mm) when compared to the *Pseudomonas aeruginosa* –ve (2.3 mm.) and *Aspergillus niger* - a fungi. (2.0 mm.). These results are shown in plates 1, 2 & 3.

Table: Phytochemical Screening of Plant Leaves in Different Extracts - *Guazuma ulmifolia*

<table>
<thead>
<tr>
<th>S.No</th>
<th>Secondary metabolites</th>
<th>Hexane</th>
<th>Ethyl acetate</th>
<th>Ethanollic</th>
<th>Aqueous</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steroids</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Triterpenes</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Saponins</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Alkaloids</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Carbohydrates</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>Flavonoids</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Tannins</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Glycosides</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>Polyphenols</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Plate 1: Ehanolic leaf extract effect on *Pseudomonas aeruginosa* – a (+ve) bacteria

Plate 2: Ehanolic leaf extract effect on *Staphylococcus aureus* – a (-ve) bacteria
**DISCUSSION**

Alkaloids, flavonoids, steroids, triterpenoids, tannins, glycosides and polyphenols are observed in leaf extracts of *G. ulmifolia*. The physiological activity of alkaloids on animals, especially on humans renders them important as potential drugs and exhibited a variety of biological activities in controlling recurrent fevers, in ophthalmology, in prevention of motion sickness, in the treatment of high blood pressure, leukemia and anticancer effects (Atal and Kapoor, 1982). Tannins are known to have antimicrobial properties (Chhabra *et al.*, 1984). Flavonoids, known to posses antiviral, antifungal and arthritic properties (Fairbairn, 1959; Tripathi and Rastogi, 1981). Triterpenoids are known to possess anti inflammatory, lipolytic activities (Chhabra *et al.*, 1984, Chawla *et al.*, 1987) Tannins are known to produce anthelmintic activities (Niezen *et al.*, 1995). Polyphenols have many health beneficial functions including antimutagenicity, anti carcinogenicity and anti-aging.

Recently, the acceptance of traditional medicine as an alternative form of health care and the development of microbial resistance to the available antibiotics has led authors to investigate the antimicrobial activity of medicinal plants (Bisignano *et al.*, 1996; Hammer *et al.*, 1999). In this concern, ethanolic leaf extract of the studied plant is showed higher inhibition zone against *Staphylococcus aureus*, a gram + ve bacteria and is active against a gram –ve bacteria, *Pseudomonas aeruginosa* and a fungi, *Aspergillus niger*.

**REFERENCES**

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