Phytochemical Analysis of Flowers of *Plumeria obtusa*

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ABSTRACT

*Plumeria obtusa* is one of the folkloric medicinal plant belonging to the family Apocynaceae. The plant is also cultivated commercially for its fragrant flowers. The whole plant is reported to have many pharmacological properties anti-microbial, anti-oxidant, anti-proliferative, Insecticidal activity, anti-inflammatory, the decoction of the bark is given in varying doses as purgative or as remedy against Oedemas. The recent study provides information about *Plumeria obtusa* phytochemical analysis. Maceration extract method was carried out using polarity solvent Benzene (BE). The main aim of the present study was to evaluate the phytochemical properties of *Plumeria obtusa* flowers to treat various diseases. The Qualitative Phytochemical Analysis of flower revealed the presence of Volatile oils.

Keywords: *Plumeria obtusa*, folkloric plant, phytochemical, polarity solvent, flowers.

1. INTRODUCTION

*Plumeria obtusa* (L) belongs to the family Apocynaceae commonly known as Gulechin, Graveyard tree or Frangipani [1]. Plumeria is indigenous to tropical America and is found from Southern Mexico to Northern South America and also most abundant in India [2]. It is small, much branched, evergreen or partially deciduous tree [3]. The plant has been used in the management of Diabetics mellitus, Asthma, Gonorrhea and Constipation and also as a Contraceptive, expectorant and anthelmintic [4,5,6]. However, due to its easy propagation through cuttings, many species and hybrids of plumeria are now widely cultivated and distributed in the warmer regions of the world[7].

The leaves are dark green in colour and glossy. Leaves are elliptical and obovate. Apex is rounded. Flowers are white in colour with yellow central portion and rounded obovate petals. The seeds produce the white, red, pink, yellow and multicolored blooms [8]. The plant is widely cultivated for its ornamental and fragrant flowers around the world, where suitably warm climate exits. It is reportedly naturalized in china [9,10]. Plumeria growing height is of 3.0-4.6 m (10-15 ft) tall. In frequently, individuals can grow to be 7.6 m (25 ft). The size of the is upto 20 cm (8 in) long. [11] In traditional medicine used in Cambodia is that decoction of bark is given in varying doses as a Purgative. The plant is also used as Cicatrizant, Pectoral, Purgative and Hemostatic. In Sekhukhune District of South Africa, decoction of leaves is taken three times daily for diabetics [12].
2. MATERIALS AND METHODS

2.1. Plant Material

Plant material of *Plumeria obtusa* were collected from Erode, Tamil Nadu, during the month of August 2019. The plant material was identified with the help of Flora of Presidency of Madras (Gamble & Fischer, 1916 - 1925) and confirmed with the authentic herbarium specimen deposited in Department Of Botany, Vivekanandha College Of Arts And Sciences For Women (Autonomous) Campus, Elayampalayam, Tiruchengode, Tamil Nadu.

2.2. Preparation of extract

The fresh flowers were collected from the plant species of *Plumeria obtusa* (Apocynaceae). It was ensured that plant was healthy and uninfected, then cleaned it up. The particular amount of flowers were dried under shadow at room temperature. The dried samples were powdered in a Wiley Mill (Scientific Equipment Works, New Delhi, India) to be 60 mesh in size. The powder samples were stored in polythene containers at room temperature. The floral samples were chemically screened to detect the presence of certain bio-active compounds.

2.3. Extraction

About 10 gms of the air–dried plant material (flower) of *Plumeria obtusa* was extracted with 75 ml of Benzene, by using maceration method, extraction 24 hrs.

2.4. Preliminary Phytochemical Screening

The crude extract obtained after filtration of Benzene solvent were screened phytochemically. It was carried out using standard procedures to test the presence of bioactive compounds (Amarasingham et al., 1964) 13, (Chabra et al., 1984) 14, (Harbone 1984) 15.

2.4.1. Test for alkaloids

Two ml aliquot of the extract was treated with the following reagents to test the presence or absence of alkaloids. Reagent: Mayer’s reagent, Positive results: White precipitate or turbidity.

2.4.2. Test for steroids and sterols

a. Salkowski’s test

The extract were dissolved in 1 or 2 ml of chloroform and equal volume of concentrated sulphuric acid was added by the sides of the test tube. The upper layer turns red revealing the presence of steroid and sterol compounds in the extract.

b. Libermann-Burchard’ test

The extracts were in 2 ml of chloroform and 10 drops of acetic anhydride and 5 drops of concentrated sulphuric acid were added and mixed. The change of red colour through blue to green indicates the presence of steroids.

2.4.3. Test for triterpenoids

a. Hirshorn test:

The extracts dissolved in 2 ml of chloroform and heated for 10 min. after the addition of 2 ml of trichloro acetic acid. Appearance of yellow colour to red indicates the presence of triterpenoids.

b. Libermann-Burchard’ test

The extracts were in 2 ml of chloroform and 10 drops of acetic anhydride and 5 drops of concentrated sulphuric acid were added. Appearance of red to violet colour indicates the presence of triterpenoids.

2.4.4. Test for proteins and amino acids

a. Biuret test

One ml of extract, 1 ml of 40 per cent sodium hydroxide solution and 2 drops of 1 per cent copper sulphate solution were added. The appearance of violet colour indicates the presence of proteins/amino acids.

b. Ninhydrin test

One ml of the extract, 2 drops of freshly prepared 0.2 per cent ninhydrin reagent was added and heated. The appearance of blue colour indicates the presence of proteins, peptides or amino acids.

2.4.5. Test for carbohydrates

a. Benedict’s Test

Five ml of Benedict’s solution was added to the extract and boiled in water bath. The appearance of red yellow or green precipitate indicates the presence of reducing sugars.
2.4.6. Test for Volatile Oils

Two ml aliquot of extract was evaporated on a porcelain crucible. If the residue has an aromatic smell, it indicates the presence of volatile oils.

2.4.7. Test for fatty acids

The extract was evaporated on a filter paper. A translucent spot indicates the presence of fatty acids.

2. RESULTS AND DISCUSSION

It was observed that the flower extract of *Plumeria obtusa* showed for the presence of volatile oils in abundant amount than the alkaloids, steroids, triterpenoids, protein and amino acids, carbohydrates and fatty acids. Phytochemical screening of *Plumeria obtusa* flowers has been given in Table 1.

![Figure 1. Phytochemical Screening of *Plumeria obtusa* (Flower). A-Habitat, B-Extraction (Maceration), C- Phytochemical screening tests, D- Fatty acids, E- Volatile oils.](image)

**Table 1.** Phytochemical constituents of flower extract of *Plumeria obtusa*

<table>
<thead>
<tr>
<th>Extract Name</th>
<th>Chemical Constituents</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Steroids</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Triterpenoids</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Protein</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Amino Acids</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Carbohydrates</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Volatile Oils</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Fatty Acids</td>
<td>+</td>
</tr>
</tbody>
</table>

+++ - Good result  ++ - Moderate result  + - Poor result

4. CONCLUSION

The secondary metabolites of *Plumeria obtusa* (flower) are reported for the first time in our laboratory. The phytochemical analysis of the floral extract revealed the existence of various constituents including volatile oils. The optimal effectiveness of medicinal plants may not be due to one main bioactive constituent, but in fact to the combined action of different secondary metabolites originally present in the plant.

Conflicts of Interest

There are no conflicts of interest.

References