Pharmacognostical and Preliminary Phytochemical Screening of the Leaf extract of Jasminum auriculatum Vahl.

T. Gowdhami*, A. K. Rajalakshmi and N. Sugumar

Department of Botany, Annamalai University, Annamalai Nagar-608002, Chidambaram, Tamil Nadu, India.

E-mail address: tgowdhami@gmail.com

Keywords: Jasminum auriculatum Vahl. Quantitative Microscopy, Physicochemical and Phytochemical screening.

ABSTRACT. Jasminum auriculatum belonging to the family Oleaceae are reported to have good medicinal values in traditional system of medicines. The present study deals with pharmacognostical examination of morphological and microscopical characters and phytochemical investigations of Jasminum auriculatum leaves including determination of loss on drying, ash values and extractive values. The preliminary phytochemical screening of powdered drug was also carried out, the qualitative chemical examinations revealed the presence of various phytoconstituents like alkaloids, steroids, terpenoids, saponins, carbohydrates, Glycosides, protein, mucilages, phenols, tannins and flavonoids.

1. INTRODUCTION

In last few decades, the field of herbal medicine has gained popularity, in both the developed and developing countries. WHO has reported that nearly 65-80% of world’s population in developing countries depends on the traditional medicine for their primary health care and treatment of ailments. The reasons for wide acceptance of herbal medicines are of their being comparatively less expensive, lesser side effects and being natural in origin and hence socially and culturally acceptable (Muniappan Ayyanara et al., 2011).

It contains all species of mainly deciduous shrubs and small scrambled plants. They Jasminum auriculatum (common name Needle jasmine) is a genus of flowering plants of the family which includes Oleaceae are widely distributed throughout Andhra Pradesh. It is native to southern and south eastern Asia and distributed and cultivated more or less throughout South India, Srilanka, Pakistan, Nepal, Malaysia, Indonesia, Australia. Jasmine plant varieties are countless, with over 200 natural and cultivated species, one would definitely be spoiled for choice; Jasmine is native to the old world. Rang and Dale pharmacology text book 6th edition and (Rajinder Raina and Shahid Parwez et al., 2008). Jasmine flower plant can either be a shrub or a climber with woody vines depending upon its species. Jasminum auriculatum is evergreen the foliage is glossy bright green, about 2 - 3 inches long oppositely and pinnately compound with five to nine leaflets. The petals are either five or more than five lobed white sweet scented and extremely fragrant. Jasminum auriculatum is a shrub used in traditional medicines, Ayurveda, Siddha and Unani (Bedi S et al., 2008). Studies conducted on it show that it possess beneficial effects as aphrodisiac, antiseptic, anthelmintic, aromatherapy, cardiac tonic, corns, diuretic, deobstruant, emollient, hyperpiesia, leprosy, nephrolithiasis, odontalgic, opthalmomopathy, stomatopathy, strangury, suppurative, skin diseases, thermogenic, urolithiasis, ulcers and wounds (Vaidyaratanam P S et al., 2003 and Singh Baljinder et al., 2011).

The roots are used to treat skin diseases especially for ringworm and bitter, acid, sweet, refrigerant, astringent, and depurative in nature. They flowers are useful in burning sensation, (Ghosh MN., 1984 ). The leaves contain lupeol and Jasminol (Deshpande SM et al., 1967). Alcoholic and aqueous extracts of flowers of Jasminum auriculatum showed diuretic activity by increasing the total volume of urine and concentrations of potassium and sodium salts in urine (Bahuguna Y Jyuay V et al., 2009 a) and antiurolithiatic activity by reducing the elevated urinary oxalate synthesis (Bahuguna Y Rawat M S M et al., 2009 b). The present study highlights the
various pharmacognostical phytochemical and pharmacological properties of *Jasminum auriculatum* an unexplored potential plant.

**Taxonomical Classification:**

- **Kingdom:** Plantae
- **Subkingdom:** Tracheobionta – Vascular plants
- **Super division:** Spermatophyta – Seed plants
- **Division:** Magnoliophyta – Flowering plants
- **Class:** Magnoliopsida – Dicotyledons
- **Sub class:** Asteridae
- **Order:** Scrophulariales
- **Family:** Oleaceae – Olive family
- **Genus:** Jasminum – jasmine
- **Species:** *auriculatum* Vahl

2. **MATERIALS AND METHOD:**

**Collection of plant material:**

Fresh plants were collected from Villupuram District, Tamil Nadu, India. The plant *Jasminum auriculatum* Vahl. It was identified and authenticated at Department of Botany, Presidency College Chennai. The leaves were separated from the plant washed, shade dried and then milled in to coarse powder be a mechanical grinder.

**Pharmacognostical Evaluation**

**Macroscopic analysis:**

Macro morphological evaluation of leaf or leaflets was done in the laboratory. Some of characters which are studied includes surface appearance and texture, lamina Structure (Nayak BS et al., 2007) Shape of lamina, Margin, Apex, Base, Venation (Balchin L et al., 2002). The leaves were subjected to macroscopic studies which comprised of colour, odour, and appearance taste, smell followed by (Brain et al., 1975).

**Leaf Microscopic analysis:**

The microscopically studies, cross section were prepared and stained as per the procedure of Johansen. Microscopy was done by taking the thin hand sections of the midrib and lamina region of the leaves. The thin sections were cleared with chloral hydrate solution and stained with phloroglucinol and hydrochloric acid, then mounted in glycerine for the identification of various contents. A powdered dried leaf was treated with phloroglucinol, hydrochloric acid and glycerine to study various characteristics. Similarly the powder was also stained in iodine solution, ruthenium red solution for the identification of Starch grains, Calcium oxalate crystals etc. As a part of quantitative microscopy Stomata number, stomata index, Vein-islets number and vein termination number were determined followed by (Evans WC et al., 2005 and Kokate CK et al., 2008).

**Powder analysis:**

Fluorescence study followed by the methods of (Chase CR et al., 1949 and Kokoshi CJ et al., 1958). This fine powder was placed in a watch glass containing chloral hydrate solution, boiled to clear the chlorophyll. Then it was stained by using phloroglucinol and concentrated hydrochloric acid. After staining, the powder was taken on a clean slide with the solution, then the slide was covered with cover slip and excess solution was wiped with the help of filter paper/tissue paper. This slide was observed under microscope to knowing the presence of Starch grains, lignin, mucilage, calcium oxalate crystals etc (Evans WC et al., 2005).
Physico-chemical analysis:
Percentage of ash values like total ash, acid insoluble ash and water soluble ash. Extractive values like alcohol soluble and water soluble extract were performed by the method (IP 1996).

Phytochemical screening:
The dried powdered leaves were subjected to successive solvent extraction (Kokate CK et al., 1991).

Preparation of extract:
Dried coarsely powdered *Jasminum auriculatum* was placed in Soxhlet extractor and extracted successively with solvents of increasing polarity. Each time before extracting with next solvent, it was completely dried. The liquid extracts were collected in flask individually and solvents were distilled off. The percentage yield of extracts was calculated in terms of percentage w/w on dry basis. The colour and consistency of the extracts was determined.

Preliminary phytochemical screening:
Preliminary phytochemical screening was carried out by using the method (Harborne JB et al., 1998).

3. RESULTS AND DISCUSSION:
Macroscopical characters of leaf:
*Jasminum auriculatum* is a scandent, pubescent or velvety shrub with grey-pubescent branchlets having shiny minute lateral leaflets simple central leaflet broadly ovate, acuminate or rounded, main nerves few inconspicuous, petioles very short. The plants produce numerous star shaped white scented flowers loosely arranged corolla lobes 5-8; fruits globose, black (Figure 1).

![Figure 1: Morphological features of Jasminum auriculatum Vahl. (Whole plant) and Leaf](image)
4. Microscopically Evaluation

In transverse section the outer single layered upper epidermis composed of flat rectangular cells covered by thin cuticle while lower epidermis covered by thick cuticle. The uniseriate, unicellular and multilocellar trichomes were present in the upper and lower epidermis. The glandular trichomes were multilocellar with single stalk. Stomata restricted in lower epidermis. Mesophyll consists of single layered long elongated palisade cells followed by spongy parenchymatous cells. The midrib region consisted of closely packed multilayered collenchymatous cells and spongy parenchyma were loosely packed with intracellular spaces. There is a ‘C’ shaped or half moon shaped vascular bundles were present composed of xylem and phloem cells (Figure.2).

Powder Characters:

On microscopical examination the powder showed uniseriate, multilocellar covering trichomes. Anomocytic type stomata were observed. Broken pits of mesophyll, lignified fibers and xylem vessels were observed Rosette crystals of calcium oxalate and starch grain are also observed.

Physico-chemical analysis:

The following results were tabulated the percentage of total ash, acid insoluble ash and water soluble ash (Table. 1) water soluble and alcohol soluble extractive value (Table. 2). The fluorescence analysis of the powdered (Table. 3) the dried powdered leaves were extracted with successive solvents and the results are shown in (Table. 4).

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Values in percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alcohol soluble extract</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>Water soluble extract</td>
<td>33</td>
</tr>
</tbody>
</table>
Table 2: Extractive values of powdered leaves of *Jasminum auriculatum*

<table>
<thead>
<tr>
<th>S. No</th>
<th>Parameters</th>
<th>Values in percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total ash</td>
<td>11.2</td>
</tr>
<tr>
<td>2</td>
<td>Acid insoluble ash</td>
<td>1.24</td>
</tr>
<tr>
<td>3</td>
<td>Water soluble ash</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Table 3: Fluoroscence studies of powdered leaves of *Jasminum auriculatum*

<table>
<thead>
<tr>
<th>Powder + Reagent</th>
<th>Visible light</th>
<th>U.V light Short Wavelength</th>
<th>Long wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder + 1N HCl</td>
<td>Light green</td>
<td>Yellowish green</td>
<td>Light yellow</td>
</tr>
<tr>
<td>Powder + 50% H₂SO₄</td>
<td>Greenish yellow</td>
<td>Light brown</td>
<td>Dark brown</td>
</tr>
<tr>
<td>Powder + 50% HCl</td>
<td>Greenish yellow</td>
<td>Light brown</td>
<td>Dark brown</td>
</tr>
<tr>
<td>Powder + 50% HNO₃</td>
<td>Greenish yellow</td>
<td>Light brown</td>
<td>Dark brown</td>
</tr>
<tr>
<td>Powder + 1N NaOH in water</td>
<td>Yellowish green</td>
<td>Yellow</td>
<td>Dark brown</td>
</tr>
<tr>
<td>Powder + 1N NaOH in methanol</td>
<td>Yellow green</td>
<td>Light brown</td>
<td>Light green</td>
</tr>
<tr>
<td>Powder + 50% H₂SO₄</td>
<td>Brown</td>
<td>Dark Brown</td>
<td>Black</td>
</tr>
</tbody>
</table>

Table 4: Percentage of yield and consistency of leaf extracts of *Jasminum auriculatum*

<table>
<thead>
<tr>
<th>Solvent used</th>
<th>Yield% (w/w)</th>
<th>Consistency of extracts</th>
<th>Colour of extract Under Visible Light</th>
<th>Under Short Wavelength</th>
<th>Under Long Wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pet ether</td>
<td>2.47%</td>
<td>Semisolid</td>
<td>Dark green</td>
<td>Dark green</td>
<td>Black</td>
</tr>
<tr>
<td>Chloroform</td>
<td>1.24%</td>
<td>Semisolid</td>
<td>Black</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>3.0%</td>
<td>Semisolid</td>
<td>Dark green</td>
<td>Dark green</td>
<td>Orange</td>
</tr>
<tr>
<td>Ethanol</td>
<td>19%</td>
<td>Semisolid</td>
<td>Dark green</td>
<td>Orange brown</td>
<td>Dark green</td>
</tr>
</tbody>
</table>
Phytochemical screening showed the presence of alkaloids, glycosides, terpenoids, mucilages, carbohydrates, flavanoids, steroids, saponins, proteins, tannins and phenolic compounds (Table 5).

5. CONCLUSION
The present study showed the pharmacognostical and preliminary Phytochemical screening the leaves of *Jasminum auriculatum* Vahl. Pharmacognostical studies like organoleptic evaluation, powder microscopy, physicochemical analysis of leaf extracts of *Jasminim auriculatum* provides valuable information to the identification and authentication of this plant materials. Preliminary phytochemical investigation of the powdered leaf extract revealed the presence of alkaloids, phytosterols, terpenoids, saponins, carbohydrates, glycosides, mucilage, and phenols tannins, and flavonoids.

ACKNOWLEDGEMENT
The authors sincerely thanks to Head of Department, Annamalai University, Annamalai Nagar, for providing the necessary laboratory facilities to carry out study.
References


[19]Rajinder Raina and Shahid Parwez et al., 2008, Studies on the alcohol free defatted extract of J. auriculatum leaves has been reported to contain lupeol and jasminol (Deshpande & Upadyaya, 1967).
