

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

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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 scrambling 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, cardio tonic, corns, diuretic, deobstruant, emollient, hyperpiesia, leprosy, nephrolithiasis, odontalgic, ophthalmopathy, stomatopathy, strangury, suppurative, skin diseases, thermogenic, urolithiasis, ulcers and wounds (Vaidyaratnam P S *et al.*, 2003 and Singh Baljinder *et al.*, 2011).

The roots are used to treat skin diseases especially for ringworm and bitter, acrid, 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 Juyal 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	: <i>Jasminum</i> – jasmine
Species	: <i>auriculatum</i> 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 by 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

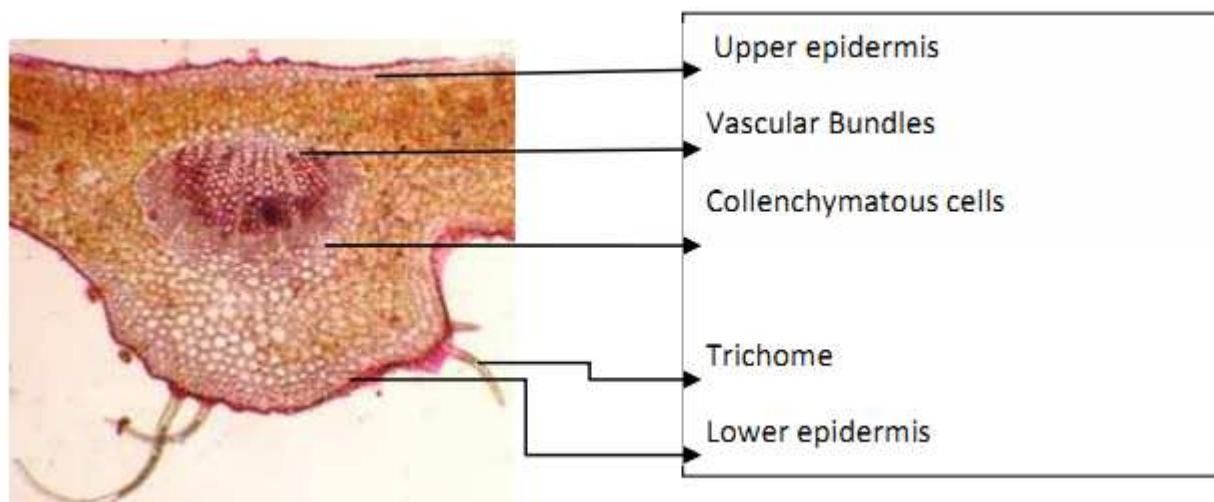


Figure.2: T.S of *Jasminum auriculatum* Vahl. Leaf

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 multicellular trichomes were present in the upper and lower epidermis. The glandular trichomes were multicellular 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, multicellular 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: 1 Ash values of powdered leaves of *Jasminum auriculatum*

S.No	Parameters	Values in percentage
1	Alcohol soluble extract	32
2	Water soluble extract	33

Table : 2 Extractive values of powdered leaves of *Jasminum auriculatum*

S. No	Parameters	Values in percentage
1	Total ash	11.2
2	Acid insoluble ash	1.24
3	Water soluble ash	3.2

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

Powder + Reagent	Visible light	U.V light Short Wavelength	Long wavelength
Powder+1N HCl	Light green	Yellowish green	Light yellow
Powder+50%H ₂ SO ₄	Greenish yellow	Light brown	Dark brown
Powder+50%HCl	Greenish yellow	Light brown	Dark brown
Powder+50%HN ₃	Greenish yellow	Light brown	Dark brown
Powder+1N NaOH in water			
Powder+1N NaOH in methanol	Yellowish green	Yellow	Dark brown
Powder+ 50% H ₂ SO ₄	Yellowish green Brown	Light brown Dark Brown\	Light green Black

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

Solvent used	Yield% (w/w)	Consistency of extracts	Colour of extract Under Visible Light	Under Short Wavelength	Under Long Wavelength
Pet ether	Semisolid	2.47%	Dark green	Dark green	Black
Chloroform	Semisolid	1.24%	Black	Black	Black
Ethyl acetate	Semisolid	3.0%	Dark green	Dark green	Orange
Ethanol	Semisolid	19%	Greenish yellow	Orange brown	Dark green

Table 5: Preliminary phytochemical screening of leaf extracts of *Jasminum auriculatum*

Tests for constituents	Petroleum ether extract	Chloroform extract	Ethyl acetate extract	Ethanol extract
Alkaloids	+	-	+	+
Carbohydrates	-	+	-	+
Flavanoids	-	+	-	+
Tannins	-	-	+	+
Phenol	-	-	+	+
Protein	-	-	-	-
Mucilages	-	-	-	-
Steroids	-	+	+	+
terpenoids	-	-	+	+
Glycosides	-	-	-	+
Saponins	-	-	+	+

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.

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References

- [1] Balchin L, Hart SM, Lo BWH. Jasmine absolute (*Jasminum grandiflorum* L.) and its mode of action on guinea-pig ileum *in vitro*. *Phytotherapy Research*. 2002; 16: 437-439.
- [2] Bedi S, Tanuja, Vyas SP. A Hand Book of Aromatic and Essential Oil Plants. Agrobios Pvt. Ltd. Bombay. 2008; 280-284.
- [3] Bahuguna Y., Juyal V., Rawat M.S.M., Jalalpure S. Diuretic activity of flowers of *Jasminum auriculatum* Vahl, *Journal of Pharmacy Research*, 2009 a; 2 (2): 215-216.
- [4] Bahuguna Y., Rawat M.S.M., Juyal V., Gupta V., Antilithiatic effect of flowers of *Jasminum Auriculatum* Vahl, *Int J Green Pharm.*, 2009 b ; 3: 155-8.
- [5] Brain KR and Turner TD. The practical Evaluation of Phytopharmaceuticals, Wright-Scientifica, Bristol. 1975, 4-9.
- [6] Chase CR, Pratt RS. Fluorescence of powdered vegetable drugs with particular reference to development of a system of identification. *Journal of American Pharmacology Association* 1949; 38: 324-33.
- [7] Deshpande SM; Upadyaya R.R., Chemical studies of *Jasminum auriculatum* (VAHL) leaves, *Curr Sci.*, 1967; 36: 233.
- [8] Evans WC: Trease and Evans. *Pharmacognosy*. International ed., WB Saunders, 2005:456.
- [9] Ghosh MN, *Fundamentals of experimental pharmacology*. Scientific Book Agency, Calcutta, Edition IInd, 1984: 156-157.
- [10] Harborne JB. Methods of extraction and isolation. In: *Phytochemical Methods*, Chapman and Hall, London, 1998, 60-66.
- [11] *Indian Pharmacopoeia*, 4th ed., Vol. II, Government of India, Ministry of Health and welfare. Controller of Publications, New Delhi. 1996, A53-54.
- [12] Johansen DA. *Plant Microtechnique*, McGraw Hill, New York. 1940, 182
- [13] Khandelwal KR. *Practical Pharmacognosy*. 16th ed. Nirali Prakashan, Pune, 2006: p. 149-153.
- [14] Kokate CK and Gokhale SB. *Practical Pharmacognosy*. 12th ed. Nirali Prakashan, 2008: p. 129.
- [15] Kokoshi CJ, Kokoshi RJ, Sharma FT. Fluorescence of powdered vegetable drugs under ultraviolet radiation. *Journal of Pharmaceutical Asses* 1958; 47: 715-717.
- [16] Kokate CK. *Practical Pharmacognosy*, 3rd ed., Vallabh Prakashan, New Delhi. 1991, 107-111.
- [17] Muniappan Ayyanara, Savarimuthu Ignacimuthu. Ethnobotanical survey of medicinal plants commonly used by Kani tribals in Tirunelveli hills of Western Ghats of India. *Journal of Ethnopharmacology*. 2011; 134: 851-864.
- [18] Nayak BS., Mohan K. Influence of ethanolic extract of *Jasminum grandiflorum* Linn. flower on wound healing activity in rats. *Indian J Physiol Pharmacol*. 2007; 51: 189-194.
- [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).
- [20] Singh Baljinder. Anti microbial potential of poly herbo-mineral formulation JatyadiTaila- A review. *International Journal of Research in Ayurveda and Pharmacy*. 2011; 2(1): 151-156.
- [21] Vaidyaratnam P S. *Indian Medicinal Plants- A compendium of 500 species*. Orient Longman Private Ltd: Hyderabad. 2003; Vol. 3: 164-165.

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