Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Der Pharmacia Lettre, 2015, 7 (2):65-70
(http://scholarsresearchlibrary.com/archive.html)

ISSN 0975-5071
USA CODEN: DPLEB4

Pharmacognostical standardisation of *Jasminum sambac* Ait. (Oleaceae) leaves

Mittal Arun[a]*, Sardana Satish[a] and Pandey Anima[b]

[a]*Hindu College of Pharmacy Sonipat, Haryana, India*
[b]*Birla Institute of Technology Mesra, Jharkhand, India*

ABSTRACT

Jasminum sambac Ait. (Oleaceae) is a large scrambling sub erect twining evergreen ornamental shrub, which grows up to the height of 2 meter. The plant has numerous applications in traditional medicine but there is a lack of data on the standards of leaves of the plant. So the pharmacognostical study and parameters related to physico-chemical properties have been evaluated as per WHO guidelines. Fluorescent behaviour, microbial contamination, aflatoxin content, heavy metal profile and pH values of drug solution were also assessed for safety purpose. The leaves of Jasminum sambac Ait. are green in colour with characteristic odour and slight bitter taste. Transverse section of leaves shows the presence palisade layer consists of four to five layers of spongy parenchyma. Physicochemical parameters and quantitative standards were also estimated and the data obtained in present study will serve as valuable tool for identification, authentication and detection of adulterants, standardization and quality control of the drug.

Keywords: *Jasminum sambac*, Microscopy, Fluorescence behaviour, Standardization

---

INTRODUCTION

Over the last decade there has been a growing interest in drugs of plant origin in contrast to the synthetic that are regarded as unsafe to human and environment [1]. It is estimated that about 25% of all modern medicine are directly or indirectly derived from higher plants. Jasmine is a genus of shrubs and vines in the olive family Oleaceae with about 200 species throughout the world, out of which around 40 species are reported to be growing in India [2].

Jasminum sambac commonly known as Motia; one of the species of jasmine is native to South-western, Southern, and South-eastern Asia, India, Philippines, Myanmar and Sri Lanka. Its various parts such as the leaf, stem, bark, flower and root are very useful and important in pharmaceutical industries and have been reported to possess medicinal value. Traditionally leaves are used in fever, cough, indolent ulcer, abdominal distention, diarrhoea, lowering the blood glucose level, regulating menstrual flow, to clean kidney waste, inflamed and blood shot eyes [3, 4, 5]. The plant is reported to possess antidiabetic, antitumor, antimicrobial, antioxidant, anti-acne, suppression of puerperal lactation, A.N.S stimulating effect [6-12].

The plant contains sambacin, jasminin, sambacoside A, sambacolignoside, quercitin, isoquercitin, rutin, kaempferol, luteolin, phenyl methanol, linalool, alpha-terpineol, friedelin, lupeol, betulin, alpha amyrin, ursolic acid, and Seco-irridoid glucoside- sambacoside A-G along with oleoside 11-methylester [2].

In spite of the numerous medicinal uses attributed to this plant, it becomes extremely important to make effort towards standardization of the plant material as medicine. Hence, the objective of the present investigation is to evaluate various pharmacognostic parameters including macro and microscopic and physicochemical characterization of the leaves of *J. sambac.*

MATERIALS AND METHODS

Plant collection and authentication

Leaves were collected from healthy plants of *Jasminum sambac* Ait. from the medicinal garden of Hindu College of Pharmacy, Sonepat (Haryana). Herbarium so prepared was authenticated by Dr. H. B. Singh (Scientist F and Head, Raw Materials Herbarium and Museum, NISCAIR, New Delhi) under voucher specimen no. NISCAIR/RHMD/Consult/-2010-11/1627/225 and a specimen was deposited in the department. The plant material was dried under shade and then coarsely powdered.

Macroscopy

Untreated sample was examined under diffused day light and colour of sample was recorded. The powder was rubbed slowly between fingers and odour was examined. Taste of the powder was also checked. Surface material was touched to determine whether it was soft or hard [13, 14].

Microscopy

Thin transverse free hand sections of fresh leaves were made with the help of sharp blade and cleared with chloral hydrate solution. The sections were stained with phloroglucinol and conc. hydrochloric acid and mounted in glycerine. These were observed under compound microscope and photographed [15, 16].

The powder microscopy was carried out after passing the powdered drug through #60. The powder so obtained was treated with chloral hydrate solution and stained with phloroglucinol and conc. hydrochloric acid and mounted in glycerine. This was observed under compound microscope and photographed [15, 16].

Qualitative parameters

Extractive values and successive extractive values of *Jasminum sambac* Ait. leaves powder were determined according to standard procedures using petroleum ether (60-80°C), chloroform, ethanol and water. Total ash, water soluble ash and acid insoluble ash values were studied according to standard procedures [17-22].

Preliminary phytochemical analysis of successive extract of leaves extracts was performed according to standard procedure [16, 21, 22].

Fluorescence analysis was conducted according to standard procedure [23-24].

Quantitative studies

Loss on drying, foaming index, swelling index, volatile oil content, crude fibre content, aflatoxin content, microbial contamination, heavy metal analysis of leaves powder and pH values of 1% w/w and 10% w/w powder in water were determined as per WHO guidelines [17-22].

RESULTS AND DISCUSSION

Macroscopy

Leaves are simple and variable in shape usually ovate or elliptic or glabrous. The apex is spinous, margin entire, base symmetrical, petiolated (3-6mm), 3-11.8cm (length) by 2.2-6.3cm (breadth) as shown in Figure 1. The leaf blade are not completely rounded, spine like aperature is formed. The fresh leaf is green in color with characteristic odor and slightly bitter taste.

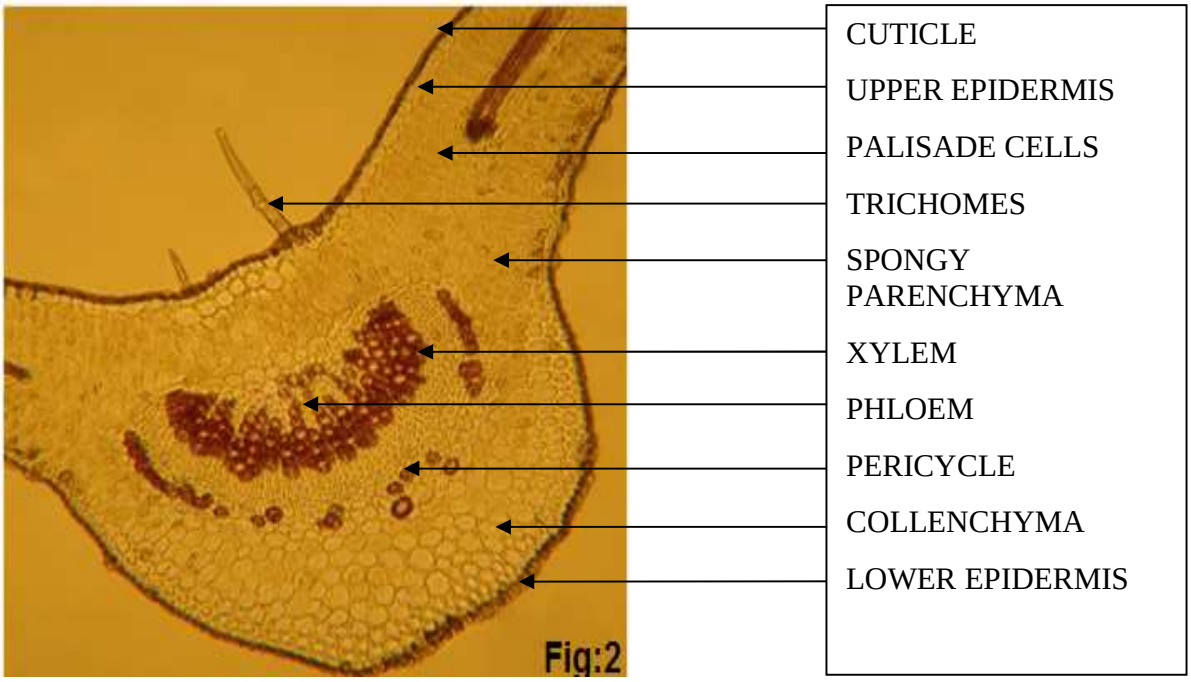
Fig:1

Microscopy
T.S of the leaflet passing through midrib shows the following structure as shown in Figure 2.

The leaflet is typical dorsiventral having both upper and lower epidermis. The epidermis is single layered with flat rectangular cells. Upper one is covered by thin cuticle while lower is covered by thick cuticle. Both epidermis have uniseriate (unicellular and multicellular) covering trichomes. Glandular trichomes having multicellular head are also present. Paracytic stomata are present only on the lower epidermis.

Below the upper epidermis, the laminar region has two layers of palisade cells having long elongated compactly packed parenchymatous cells. Palisade is followed by four to five layers of spongy parenchyma having several vascular strands encircled by parenchymatous sheath.

In the midrib region upper epidermis is followed by multilayered collenchymatous cells. The vascular tissue is present in the centre forming the shape of half moon followed by surrounding xylem. Between the phloem region and lower collenchymatous region is present scattered bundles of sclerenchymatous cells.



Powder Microscopy

The dried leaf powder was green in color with characteristic odor and slightly bitter taste. Microscopy of the powder revealed the presence of fragments of unicellular and multicellular covering trichomes, paracytic stomata, pitted xylem vessels and some fragments of epidermal cells in their surface view as shown in Figure 3(A-D).

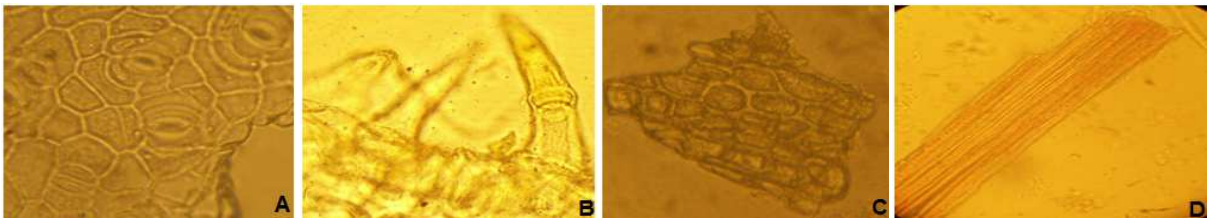


Figure 3: A: Paracytic stomata, B: Multicellular uniserate trichome, C: Epidermal cell (Surface view), D: Xylem vessel

Qualitative Analysis

The ethanol soluble and water soluble extractive values were found to be 13.66% and15.68% w/w respectively. The leaves yielded successive extractive values of 1.60%, 2.46%, 12.19% and 14.54% w/w with petroleum ether (60-80°C), chloroform, ethanol and water respectively. The total ash value of the crude drug was revealed to be 10.05% w/w while water soluble ash and acid insoluble ash values were determined as 2.98% and 1.14% w/w, respectively. The preliminary phytochemical examination showed the presence of Steroids, Saponins, Flavonoids, Tannins & phenolics compounds. The fluorescence behaviour of the powder of leaves, moistened with solvents and chemical reagents; under UV (long and short) and normal day light is given in Table.

Table 1: Fluorescence analysis of Leaves of *J. sambac*

Treatment of Powder with	Observation under		
	Visible light	UV light	
		254 nm	356 nm
As such	Dull Green	Dark green	Green
1N HCl	Dull brown	Bluish black	Greenish brown
1N H_2SO_4	Greenish brown	Bluish black	Greenish brown
1N HNO_3	Brown	Dark green	Dark green
5% $FeCl_3$(Alc.)	Black	Dark blue	Dark blue
5% $FeCl_3$(Aq.)	Greenish black	Yellowish green	Greenish black
1N NaOH(Alc.)	Greenish brown	Dark green	Dark green
1N NaOH(Aq.)	Yellowish green	Yellowish green	Yellowish green
1% nitrocellulose in amyl acetate	Dark green	Greenish blue	Dark green
1N NaOH(Alc.) +1% nitrocellulose in amyl acetate	Brownish green	Greenish blue	Dark green
1N NaOH(Aq.) +1% nitrocellulose in amyl acetate	Yellowish green	Dark green	Dark green
1N HCl +1% nitrocellulose in amyl acetate	Greenish brown	Greenish dark blue	Green

Quantitative Studies

Loss on drying content and crude fibre content was determined to be 6.75% and 8.36% w/w respectively. The drug was devoid of volatile oil content and foaming index was found to be less than 100. The swelling index of crude drug was also found to be nil. Aflatoxin content and microbial contamination of leaves powder were confirmed to be within limits as shown in Table 2. Heavy metal analysis revealed that each element was present within specified limits as per Ayurvedic Pharmacopoeia of India as shown in Table 3. The pH values of 1% and 10% w/w drug solutions were found to be 7.4 and 6.6, respectively.

Table 2: Aflatoxin and Microbial Contamination Test

Parameter	Value	Specified limit
Total bacterial count	304 c.f.u./g	$1 X 10^5$ c.f.u./g
Total yeast/mould count	Nil	$1 X 10^3$ c.f.u/g
E. coli	Nil	Nil
Salmonella sp.	Nil	Nil
S. aureus	Nil	Nil
P. aeruginosa	Nil	Nil
Aflatoxin B_1	Absent	0.5 ppm
Aflatoxin B_2	Absent	0.1 ppm
Aflatoxin G_1	Absent	0.5 ppm
Aflatoxin G_2	Absent	0.1 ppm

Table 3: Heavy Metal Content

Heavy metal	Result (ppm)	Specified limit (ppm)
Arsenic	Nil	3.00
Cadmium	0.11	0.30
Lead	2.10	10.0
Mercury	Nil	1.00

CONCLUSION

From ancient times; herbs are main contributors in traditional systems of medicine throughout the world, there acceptability in modern medicine and in developed world is remarkably low, largely due to lack of standardization. Standardization is an essential tool to judge identity, quality and purity of crude drugs. So in present scenario pharmacognostic studies and phytochemical screening can serve as a basis for proper identification and investigation of a plant. Before any drug can be included in the pharmacopoeia, these standards must be established. The present study was carried out to record the pharmacognostical standards, chemical constituents, heavy metal and aflatoxin contents of *Jasminum sambac* which could be useful for establishing its authenticity and maintaining quality, safety and reproducibility.

REFERENCES

[1] P. P. Joy, J. Thomas, S. Mathew, B. P. Skaria. Medicinal Plant, Naya Prokash, Calcutta, **2001**; 449-632.
[2] A Mittal; S Sardana; A Pandey. *J. Pharmaceutical and Biomedical Sci.*, **2011**, 11(05), 1-5.
[3] The wealth of India, Raw material, Council of science and Industrial research, Vol. 5th New Delhi, **2003**; H-K, 279-291.
[4] K. R. Kirtikar, B. D. Basu. Indian Medicinal Plants. 2nd edition, vol 7, Popular Prakashan, Bombay, **2003**; 2093-2108.
[5] K. M. Nadkarni. Indian Matreria Medica, Indian plants and drugs with their medicinal properties and uses. 2nd Edition, vol 1, Asiatic Publishing House, **2007**; 704.
[6] AB Upaganlawar; A Bhagat; CR Tenpe; PG Yeole. *Pharmacologyonline*, **2009**, 1, 1-6.
[7] S Radu; CY Kqeen. *Malaysian J. Med. Sci.*, **2002**, 9(2), 23-33.
[8] RA Hussaini; AM Mahasneh. *Molecules*, **2009**, 14, 3425-3435.
[9] FA Latif; P Edou; F Eba; N Mohamed; A Ali; S Djama; LC Obame; I Bassole; M Dicko. *African J. Plant Sci.*, **2010**, 4(3), 38-43.
[10] RS Harisaranraj; S Babu; K Suresh. *Ethnobotanical Leaflets*, **2010**, 14, 84- 94.
[11] P Shrivastav; K George; N Balasubramaniam; MJ Padmini; A Thomas; AS Kanagasabhapathy. *Australian and New Zeland J. Obstetrics and Gynaecology*, **1988**, 28(1), 68–71.
[12] T Hongratanaworakit. *Natural Product Communications*, **2010**, 5 (1), 157-162.
[13] K. R. Brain, T. D. Turner. The Practical Evaluation of Phytopharmaceuticals. Bristol: Wright-Scientechnica, **1975**; pp. 4-9.
[14] M Bansal; A Mittal; S Aggarwal; AK Gupta; S Sardana. *Int. J. Pharma. Innovation*. **2011**, 1(1), 1-10.
[15] SK Sharma; N Kumar. *J. Pharmacy Res.* **2012**, 5(2), 1116-1118.
[16] C. K. Kokate. Practical Pharmacognosy. Ist edition, Vallabh Prakashan, New Delhi, **1994**; pp. 15-30.
[17] DJ Pandya; TR Desai; NP Nadpara; HA Mehta; MA Modi. *Int. J. Pharmacogn. Phytochem. Res*., **2010**, 2(3), 1-5.
[18] The Ayurvedic Pharmacopoeia of India, 1st ed., Ministry of Health and Family Welfare, Government of India. Department of Indian Systems of Medicines and Homeopathy, New Delhi, **1996**; A53-A55.
[19] WHO Geneva. Quality Control Methods for Medicinal Plant Materials. A.I.T.B.S. Publishers and Distributors, New Delhi, **2002**; pp. 22-34, 46.
[20] A Sharma; A Mittal; S Aggarwal; AK Gupta; S Sardana. *J. Pharmacy Res.*, **2011**, 4(6), 1673-1674.
[21] D Kumar; K Kumar; S Kumar; T Kumar; A Kumar; O Prakash. *Asian Pacific J. Trop. Biomedicine*. **2012**, 2(3), 169-175.
[22] PV Kadam; RS Deoda; RS Shivatare; KN Yadav; MJ Patil. *Der Pharmacia Lettre*, **2012**, 4(2), 607-613.
[23] RJ Pratt; CR Chase. *J. Am. Pharm. Assoc*., **1949**, 38, 324-333.
[24] CJ Kokoski; RJ Kokoski; FJ Salma. *J. Am. Pharm. Assoc*., **1958**; 47, 715-717.