

ISSN 2278-4136

ISSN 2349-8234

JPP 2013; 2 (4): 107-112

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Received: 11-10-2013

Accepted: 26-10-2013

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Pharmacognostic evaluation and preliminary phyto-chemical screening of the dried powder of stem bark of *Mimusops elengi* Linn. and leaf of *Jasminum sambac* Ait.

Dhanashri Mestry, Vidya V. Dighe**ABSTRACT**

The stem bark of *Mimusops elengi* Linn. (Sapotaceae) and leaves of *Jasminum sambac* Ait. (Oleaceae) are known to have many medicinal uses in Indian ethno medicines. These both are famous fragrant plants widely cultivated in all over the world. Establishing pharmacognostic profile of these plants will assist in standardization of their quality, purity and sample identification. The present review is therefore, an effort to evaluate its microscopical powder characteristics, proximate analysis and phytochemicals present in these plants.

Keywords: *Mimusops elengi* Linn., *Jasminum sambac* Ait., Microscopy, Proximate analysis, preliminary phytochemical analysis.

1. Introduction

Herbal medicines are promising choice over modern synthetic drugs. They show minimum or no side effects and are considered to be safe. Generally herbal formulations involve use of fresh or dried plant parts. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal product. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained.

Pharmacognostical parameters like microscopy, physicochemical parameters and phytochemical studies are used in standardization of herbals. Hence, in the present research work, pharmacognostical studies have been carried out for the stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait which are used as wound healing plants. These studies help in identification and authentication of the plant material.

In the literature, microscopy studies of stem bark of *Mimusops elengi* Linn. have been carried out [2] but no systematic proximate analysis, phytochemical analysis has been reported. However, there is no report of any study of the pharmacognostic parameters of leaves of *Jasminum sambac* Ait.

Hence, an effort has been made to establish the pharmacognostic study of the stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait.

2. Materials and methods**2.1 Plant material**

The parts of the plant material used in the present research work are, stem barks of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. They were collected from Keshav shrushti, Mumbai, India. Herbaria of *Mimusops elengi* Linn. and *Jasminum sambac* Ait. were prepared and authenticated from Botanical Survey of India, Pune. Duplicate herbaria are prepared and preserved in Ramnarain Ruia College. Dried plant material was then finely powdered using electric mixer grinder and then sieved through BSS mesh size 85 and stored in an airtight container at room temperature (25±2 °C).

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2.2 Experimental reagents

Iodine, Phloroglucinol, Ruthenium Red and Sudan III stains were procured from Lobachemie. Glycerol (90% purified), Saffranin stain, Glacial acetic acid (AR Grade), Ethanol (AR Grade), Potassium iodide (AR Grade), Lead acetate (AR Grade) were procured from E. Merck. Hydrochloric acid, sulphuric acid, acetic anhydride, FeCl₃, Karl Fischer reagent was procured from sigma Aldrich. Distilled Water used, was purified with a Sartorius water purification unit. (Arium 61315, made in USA).

2.3 Instrumentation

Labomed 2000 microscope was used for the microscopical analysis of the plant material under the magnification of 10x, 40x and 100x lenses of microscope. AV USB 2.0 Capture application software was used for image capturing.

2.4 Proximate analysis^[1, 2, 3]

The parameters such as foreign matter, total Ash content, acid insoluble ash content, water soluble ash content, moisture content, loss on drying were evaluated for proximate analysis.

2.4.1 Foreign matters

250.0 g of the washed and drained stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. were accurately weighed and spread on two separate white, clean muslin cloth. Foreign matters were sorted out by visual inspection using a magnifying lens (6x). The portions of the sorted foreign matter were weighed and the percent content of foreign matter of the sample was calculated¹. The results obtained are given in Table 1.

2.4.2 Total ash

About 2.0 g of dried powder of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. were accurately weighed and transferred to two different Silica crucibles and were ignited with a flame of Bunsen burner, for about 1 hour. The ignition was completed by keeping in a muffle furnace, at 550±20 °C, till a white carbon free ash was formed. The Silica crucibles were then cooled in a desiccator and weighed. The percent total ash content was then calculated for each plant powder. The results obtained are given in Table 1.

2.4.3 Acid insoluble ash

About 2.0 g of the dried powders of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. were accurately weighed and transferred to two different silica crucibles and were ignited with a Bunsen burner, for about 1 hour. The silica crucibles were then kept in a muffle furnace at 550±20 °C, till a white carbon free ash was formed. The ash obtained was taken in conical flask (capacity 50 mL) and to it 25 mL of dilute hydrochloric acid (2N HCl) was added. The conical flasks were kept covered and heated on a water bath, for 10 minutes. They were allowed to cool and contents were filtered through Whatman filter paper no. 41 (E. Merck, Mumbai India). The residues were then washed with water, till washings were free from chloride (as tested with AgNO₃ solution). The filter papers along with the residues of respective plant powders were placed in two Silica crucibles and ignited in a muffle furnace, at 550±20 °C, for 1 hour. The crucibles were cooled and weighed to a constant weight. The percentage of acid insoluble ash was then calculated for each plant powder. The results obtained are given in Table 1.

2.4.4 Water soluble ash

About 2.0 g of the dried powder of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. were accurately weighed and transferred to two separate Silica crucibles and were ignited with a Bunsen burner, for about 1 hour. The crucibles were then kept in a muffle furnace at 550±20 °C, till a white carbon free ash was obtained. After cooling, the ash was taken in conical flask (capacity 50 mL) and to it 25 mL of distilled water was added, and conical flasks were kept covered and heated on a water bath, for 10 min. Each conical flask was allowed to cool and contents were filtered through Whatman filter paper no. 41 (E. Merck, Mumbai India). The filter paper and the residue were placed in Silica crucibles and ignited in a muffle furnace, at 550±20 °C, for 1 hour. The crucibles were cooled and weighed to a constant weight. The weight of the residue obtained was subtracted from the weight of total ash to get the value of weight of water soluble ash. The results obtained are given in Table 1.

2.4.5 Moisture content

The moisture content in plant material can be determined by using the Karl Fischer Titrimetric method.

About 100 mg of accurately weighed dried powders of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. were transferred to the reaction vessel. The results obtained are given in Table 1.

2.4.6 Loss on drying

About 3.0 g of dried powders of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. were accurately weighed, in previously dried, wide mouthed flat weighing bottles. The bottles were then placed in an air oven, maintained at 100±2 °C, for 2 hours. The bottles were then removed, covered and placed in a desiccator. The respective bottles were weighed after cooling to room temperature and were reheated until two consecutive weightings do not differ by more than 5 mg. The percent loss on drying was then calculated for each plant powder. The results obtained are given in Table 1.

2.5 Preliminary phytochemical analysis^[2]

Following tests were carried out for Preliminary photochemical analysis of dried powder of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait.

2.5.1 Tannins:

About 0.2 g of each plant material was weighed, to it 10 mL distilled water was added. The solution was filtered through Whatmann filter paper no. 41. The aqueous filtrate was collected. 2 mL of alcoholic FeCl₃ was added to the 2 mL of the above aqueous filtrate.

Formation of blue precipitate indicated the presence of tannins.

2.5.2 Alkaloids:

About 0.2 g of each plant material was weighed; to it 10 mL methanol was added. The solution was filtered through Whatmann filter paper no. 41. The methanolic filtrate was collected. 1mL of 1% HCl and 6 drops of Dragendroff's reagent was added to the above aqueous filtrate.

Formation of orange precipitate indicated presence of alkaloids.

2.5.3 Saponins:

To 0.5 mL of above methanolic filtrate was taken, 5 mL of distilled water was added.

Formation of persistent frothing on shaking indicated the presence of saponins.

2.5.4 Terpenoids:

To 2.0 mL of methanolic filtrate, 2 mL acetic anhydride followed by slow addition of 1 mL of conc. H₂SO₄ was added.

Formation of blue ring indicated presence of terpenoids.

2.5.5 Cardiac glycosides:

To 2.0 mL of methanolic filtrate, 1 mL glacial acetic acid followed by addition of 1 drop alcoholic FeCl₃ and 1 mL of conc. H₂SO₄.

Formation of green ring indicated presence of cardiac glycosides.

2.5.6 Steroids:

About 0.2 g each plant material was weighed, 10 mL chloroform was added to it. The solution was filtered through Whatmann filter paper no. 41. The filtrate was collected. In 2 mL of filtrate, 2 mL of acetic anhydride and 1 mL of conc. H₂SO₄ was added.

Formation of blue ring indicated presence of steroids.

2.5.7 Flavonoids:

About 0.2 g each plant material added, 10 mL of ethanol was added to it. The solution was filtered through Whatmann filter paper no. 41. The filtrate was collected. In 2 mL of filtrate 1 mL conc. HCl

and a small piece of magnesium ribbon was added.

Formation of tomato red color indicated presence of flavonoids.

The results of preliminary phytochemical analysis are discussed in 3.2.

2.6 Microscopical evaluation of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait.^[4, 5]**Staining and mounting of plant powder**

The desired stain was taken on a clean watch glass and was diluted with water if needed. A clean glass slide was taken and a pinch of powdered plant material was placed on the slide. Few drops of stain were added to the powdered plant material with the help of dropper. The powdered plant material was allowed to stain properly by mixing the powder in the stain solution with the help of a needle. The specimen i.e. powdered plant material on the slide was then slowly covered with cover slip with the help of forceps, to avoid any air bubbles entrapped between the cover slip and slide. The excess of liquid outside the cover slip was wiped with blotting paper. The specimen was then placed and observed under the magnifying lenses of 10x, 40x and 100x magnification of the microscope.

The images of characters found under microscope are discussed in 3.3.

3. Results and Discussion**3.1 Results of proximate analysis**

Table 1: Results for proximate analysis of dried powder of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait.

Parameters	Stem bark of <i>Mimusops elengi</i> Linn. Mean±S.D. (n=3)	Leaves of <i>Jasminum sambac</i> Ait. Mean±S.D. (n=3)
% Foreign matter	0.34±0.03	0.23±0.03
% Total ash	7.20±0.28	8.48±0.44
% Acid insoluble ash	1.33±0.21	0.55±0.18
% Water soluble ash	4.84±0.05	3.09±0.33
% Moisture Content	4.25±0.17	5.49±0.16
% Loss on drying	7.83±0.26	7.00 0.22

3.2 Preliminary phyto chemical analysis dried powder of stem bark *Mimusops elengi* Linn. and leaf of *Jasminum sambac* Ait.

In the dried powder of stem bark *Mimusops elengi* Linn., tannins, alkaloids, saponins, terpenoids and flavonoids were found to be present whereas, cardiac glycosides and steroids were found to be absent.

In the dried powder of leaf of *Jasminum sambac* Ait. tannins, alkaloids, saponins, and flavonoids were found to be present whereas, terpenoids, cardiac glycosides and steroids were found to be absent.

3.3 Microscopic characters found:**3.3.1 Dried stem bark powder of *Mimusops elengi* Linn.**

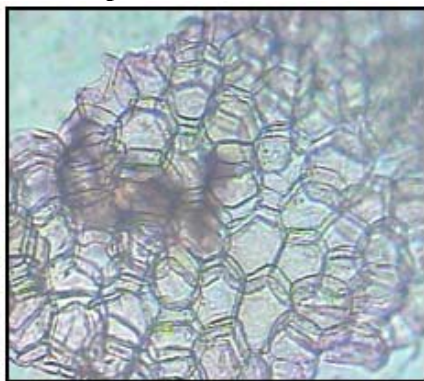
In the powder of stem bark of *Mimusops elengi* Linn. various characters were observed. Isodiametric, slightly elongated, compact parenchyma with oval to polygonal in shape was observed (Figure 1). Cork cells having thick wall, flat polygonal cells with reddish brown matter were seen (Figure 2). Fibres with lignified, tapering ends and narrow lumen were observed. (Figure 3). Stone cells were also observed (Figure 4). The powder also showed the presence of

well-developed prismatic calcium oxalate crystals (Figure 5), simple eccentric starch grains (Figure 6) and fragmented oil cells. (Figure 7)

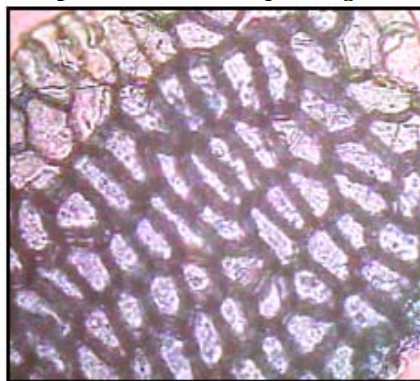
3.3.2 Dried leaf powder of *Jasminum sambac* Ait.

The dried powder of leaves of *Jasminum sambac* Ait showed epidermal cells with anomocytic stomata. Epidermal cells were straight walled polygonal (Figure 8). Spiral (Figure 9), Pitted (Figure 10 and 4.11 II) and scalariform (Figure 11 I) vessels were observed. Stone cells in rectangular to oval shape with pitted and lignified walls were present (Figure 12). Long, multicellular, unbranched, uniseriate trichome with 4-5 cells was observed (Figure 13), Multicellular glandular trichome with unicellular stalk was also seen (Figure 14). Cluster of glandular trichome (Figure 15) and epidermal cells with glandular trichome was observed (Figure 16). Large, single and well developed prismatic calcium oxalate crystal was observed (Figure 17). Fragmented oil cells (Figure 18) and fibres (Figure 19) were also observed under the microscope.

Microscopic characteristics of dried stem bark powder of *Mimusops elengi* Linn.



(Fig 1) Compact parenchyma



(Fig 2) Cork cells



(Fig 3) Fibres



(Fig 4) Stone cells



(Fig 5) Calcium oxalate crystals

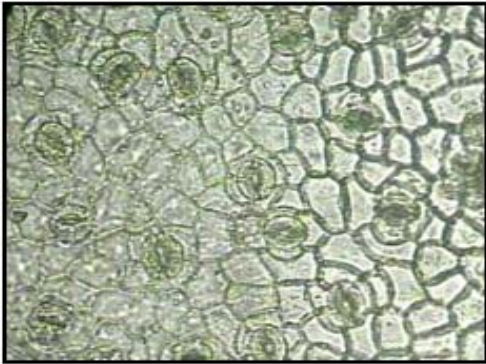


(Fig 6) Eccentric starch grains



(Fig 7) Fragmented oil cells

Microscopic characteristics of dried leaf powder of *Jasminum sambac* Ait.



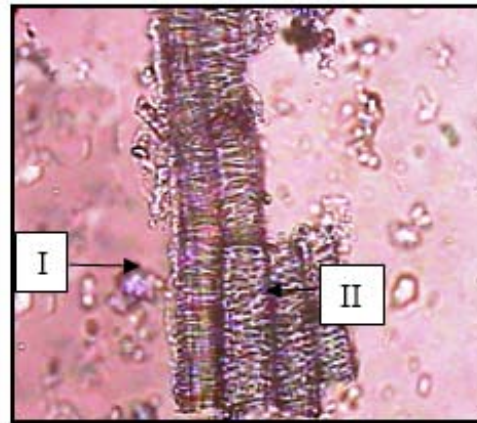
(Fig 8) Epidermal cells with



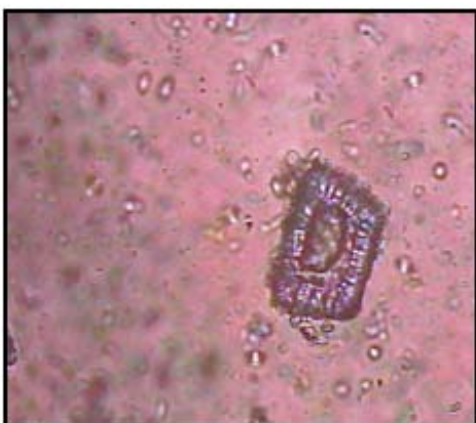
(Fig 9) Spiral vessel anomocytic stomata



(Fig 10) Pitted vessel



(Fig 11) I. Scalariform and II. pitted vessel



(Fig 12) Stone cell



(Fig 13) Uniseriate trichome

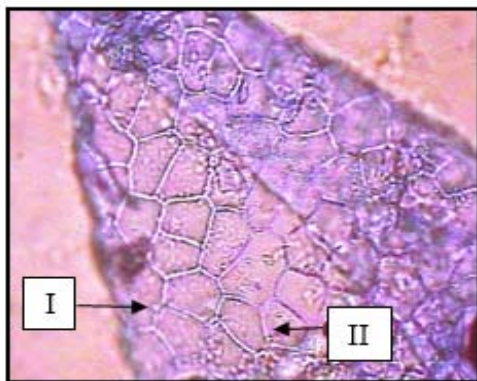
Microscopic characteristics of dried leaf powder of *Jasminum sambac* Ait.



(Fig 14) Glandular trichom



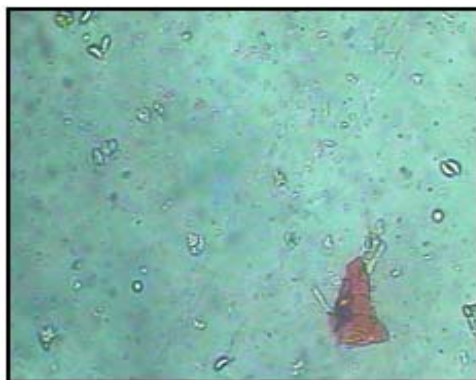
(Fig 15) Cluster of glandular trichomes



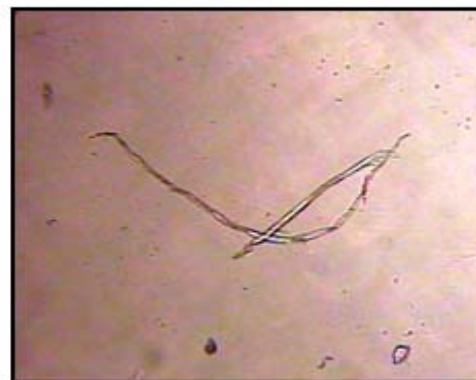
(Fig 16) I. Epidermal cells with II.



(Fig 17) Calcium oxalate crystal glandular richome



(Fig 18) Fragmented oil cell



(Fig 19) Fibres

4. Conclusion

The methods carried out in the present research work namely, powder analysis, proximate analysis and phytochemical studies will serve as standard reference for identification and distinguishing powder of stem bark of *Mimusops elengi* Linn. and leaves of *Jasminum sambac* Ait. from its substituents and adulterants. This work would assist in the identification of the crude drug in future.

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