IJP (2019), Vol. 6, Issue 9 **(Research Article)**

IJP International Journal of Pharmacognosy

Received on 15 August 2019; received in revised form, 22 September 2019; accepted, 27 September 2019; published 30 September 2019

PHARMACOGNOSTICAL STUDIES ON *IMPATIENS MINOR* (DC.) BENNET

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Keywords:

Impatiens minor (DC.) Bennet, Lesser Balsam, Balsaminaceae , Macro-microscopy, Physico-chemical

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ABSTRACT: *Impatiens minor* (DC.) Bennet (Balsaminaceae), a small, slender, erect herb, growing about 10 - 15 cm tall, with glassy stem, with oppositely arranged, elliptiac or ovate-lanceolate leaves and have distantly serrated margins is claimed to have many medicinal properties, but not scientifically proved properly. Systematic pharmacognostical evaluation of aerial parts of the plant has been carried out with focus on its macroscopy, microscopy, physic-chemical and phytochemical characterization. Macroscopical and microscopical features of stem and leaf have been documented. Preliminary phytochemical investigations indicated tests the presence of carbohydrates, alkaloids, triterpenoid, steroid, tannins, glycosides and flavonoids. The result of the study could be useful for the identification and preparation of a monograph of the plant.

INTRODUCTION: Many genera and families are known to be represented by a large number of endemic species; one amongst them is the genus, Impatiens L. of the family Balsaminaceae. The genus Impatiens L. comprises over 1000 species worldwide. Many species are cultivated as ornamental and some are used in medicine and cosmetics. *Impatiens minor* (DC.) Bennet is commonly known as Lesser Balsam or Wild Balsam is a small succulent annual herb growing usually during the rainy season. It is a small succulent annual herb growing usually during the rainy season. Leaves are simple, opposite, ovate-lanceolate, serrate and pubescent. Flowers are rose-colored, axillary, solitary or in pairs.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.IJP.6(9).305-09

The article can be accessed online on www.ijpjournal.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.6(9).305-09

Fruits, pale green dehiscent capsules, contain small globose black seeds. It grows well in moist places, rock crevices, on roofs or walls, in shade and also on tree trunks. It is endemic to Peninsular India, widely distributed in the Western Ghats [1, 2]. A review of the literature reveals that no systemic pharma-cognostical studies on the whole plant of *Impatiens minor* (DC). Bennet has so far been carried out. Therefore, the present work was planned to study the detailed macroscopical, microscopical, powder microscopical, physico-chemical and chromate-graphic characteristics of the whole part of this .plant, which would serve as a standard reference for identification, authentification and for distinguishing the plant from its adulterants

MATERIALS AND METHODS:

Collection of Plant Material and Authentication: The whole plant of *Impatiens minor* was collected from Kasaragod, and it was taxonomically identified by the botanist, Mr. Biju P, Assistant professor, Department of Botany, Government

College, Kasaragod. Fresh material was used for anatomical studies whereas shade-dried material was powdered for physicochemical studies.

Macroscopy and Microscopy: The macroscopic or organoleptic characters of leaf, stem, flower, and capsule were studied according to standard methods. Stem and leaf sections were cut by freehand sectioning, and numerous sections were examined microscopically. The selected sections were stained with phloroglucinol and concentrated HCl, mounted on a clean glass micro slide, and observed under projector microscope. Photomicrographs of the microscopical sections were captured with digital microscope [3, 4].

Powder Characteristic: The dried whole plant was powdered until it completely passes through sieve no. 60. A small quantity of powder was treated with phloroglucinol and conc. HCl (1:1) solution for the detection of various tissues seen in histological studies proving the authenticity of the drug. Another sample was mounted in water to see whether it contained calcium oxalate and yet another sample in an iodine solution to detect the presence of starch grains and seen under digital microscope [4, 5].

Physico-chemical Parameters: Physico-chemical parameters such as moisture content, water-soluble extractive value, alcohol soluble extractive value, total ash value, acid insoluble ash value, and water-soluble ash were performed as per Indian Pharmacopoeia [5].

Preliminary Phytochemical Studies: Preliminary tests were carried out on petroleum ether, n-hexane, chloroform, acetone ethanol (70%) and water extract for the presence of carbohydrates, alkaloids, triterpenoid, steroid, tannins, glycosides and flavonoids [6, 7].

RESULTS:

Macroscopical Character: The macroscopic or organoleptic characters of leaf, stem, flower, and capsule were studied according to standard methods and are tabulated in **Table 1** and shown in **Fig. 1**.

WHOLE PLANT

THE FLOWER

CAPSULE AND SEED

FIG. 1: *IMPATIENS MINOR* (DC.) BENNET

TABLE 1: RESULT OF MACROSCOPIC FEATURES OF *IMPATIENS MINOR*

S. no.	Plant part	Features	Observation
1	Leaf	Colour	Pale-dark green
		Odor and taste	No characteristic odor and taste
		Size	3-4 × 1-3.8 cm
		Shape	simple, opposite, ovate-lanceolate, sessile to shortly petiolate, semi cordate at base, apiculate crenate to serrate at margins, acute to acuminate at apex, glandular at the base, hairy above and glabrous below
		Touch and texture	Smooth
2	Stem	Colour	Transparent –green
		Odor and taste	No characteristic odor and taste
		Size	8-50 cm height
		Shape	Semi terete, branched and glabrous
		Touch and texture	Smooth
3	Flower	Colour	Pink-violet
		Odor and taste	No characteristic odor and taste
		Size and number	0.8 - 1.5 cm across and 1 - 3 per axil
		Shape	Lateral sepals- linear to lanceolate, acute at apex, hairy on costa dorsally Standard petal- ovate to orbicular and acute at apex
4	Capsule	Touch and texture	Smooth
		Colour	Pale green
		Odor and taste	No characteristic odor and taste
		Size	1 – 1.5 × 2 – 4 mm
		Shape	ellipsoid to fusiform
		Touch and texture	Rough

Microscopy of Leaf: Transverse section of a leaf of *I. minor* shows dorsiventral nature. Lamina consists of Upper epidermis single-layered, rectangular cells with cuticularized outer walls, anomocytic stomata, and uniseriate multicellular trichomes. The mesophyll is differentiated into palisade and spongy parenchyma. Palisade single-layered, compact and cells radially elongated. Spongy parenchyma many-layered, loosely arranged with intercellular spaces and vascular strands are found in the upper layers of spongy parenchyma. The lower epidermis is identical to upper epidermis. Epidermal layers of lamina are continuous in the midrib region also. Strips of collenchyma appear below the upper and above the lower epidermis. This is followed by cortical parenchyma, and in the central of cortical parenchyma is the bicollateral vascular bundle as shown in **Fig. 2.**

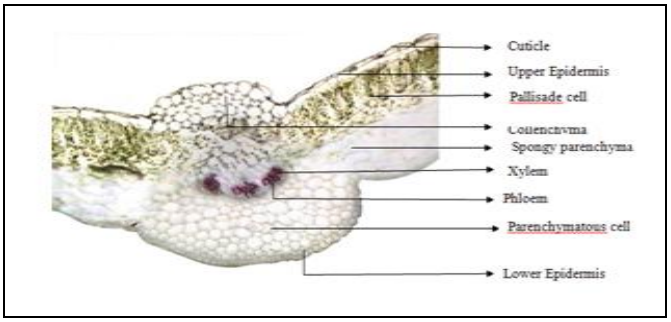


FIG. 2: TRANSVERSE SECTION OF LEAF OF *I. MINOR*

Stem: The transverse section of the stem is more or less circular. The outermost layer epidermis is single-layered and cuticularized. Cortex is found next to epidermis, and it is made of thin-walled parenchymatous cells arranged several layers with intercellular spaces. Vascular bundles are collateral, closed and arranged in a ring. The central region of the stem is occupied by the pith. It is made up of thin-walled parenchymatous cells with intercellular spaces as shown in **Fig. 3**.

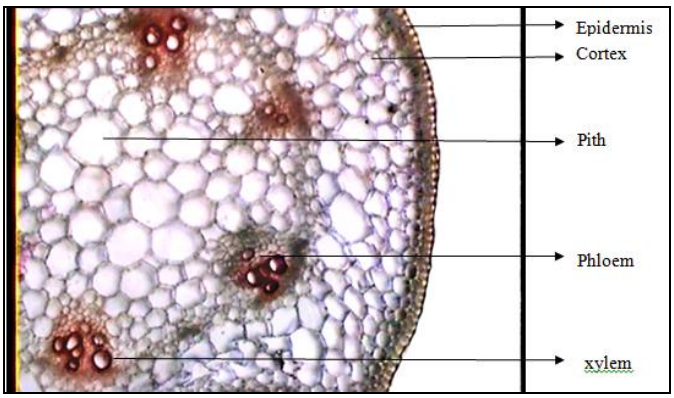
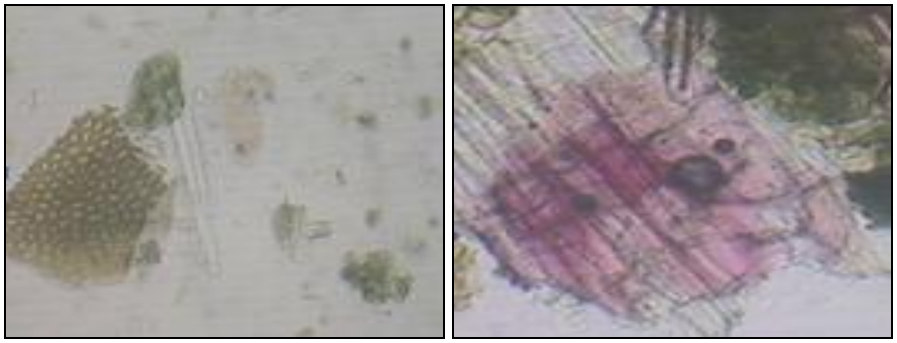


FIG. 3: TRANSVERSE SECTION OF *I. MINOR* STEM

Powder Characteristic: The powder is greenish-brown in color with characteristic odor. The powder observed under microscope showed epidermal cells, xylem vessels, uniseriate multicellular trichomes, and anomocytic stomata as shown in **Fig. 4**.



EPIDERMAL CELL **XYLEM VESSEL**

VASCULAR STRANDS **UNISERIATE MULTICELLULAR TRICHOME** **ANOMOCYTIC STOMATA**

FIG. 4: POWDER CHARACTERISTICS OF *I. MINOR*

Physico-chemical Parameters: The Physico-chemical parameters such as moisture content, water soluble extractive value, alcohol soluble extractive value, total ash value, acid insoluble ash value and water soluble ash are presented in **Table 2**.

TABLE 2: PHYSICO-CHEMICAL PARAMETERS OF *I. MINOR*

S. no.	Characters	% w/w
1	Moisture content	8.67
2	Water soluble extractive value	16.4
3	Alcohol soluble extractive value	30.6
4	Total ash	0.556
5	Water soluble ash	0.435
6	Acid insoluble ash	0.363

Preliminary Phytochemical Studies: The extracts were subjected to qualitative chemical analysis for the identification of various phytoconstituents. *Viz* alkaloids, glycosides, phenolics, flavonoids, carbohydrates, proteins and amino acids, terpenoids, sterols, and saponins. Petroleum ether and n-hexane extract showed the presence of steroids and terpenoids.

Chloroform extract showed the presence of steroids. Ethanol (70%) and water extract showed the presence of carbohydrates, tannins, glycosides, and flavonoids.

DISCUSSION: Pharmacognostical studies on the plant *I. minor* have been reported for the first time. The macroscopical or morphological description helps in the identification of the plant. Microscopical study in entire and powdered form of the drug is one of the aspects of histological evaluation. Physico-chemical pharmacopoeial standards for this plant have been derived as per standard methods.

Among the chemical class present in this plant, carbohydrate, glycosides, tannins, steroids, flavonoids and phenolic compounds stand as a class of major importance in the development of new drugs.

CONCLUSION: There results of the present investigation provide dependable diagnostic features of the vegetative organs of the plant for the identity of the drug in entire and in fragmentary condition.

ACKNOWLEDGEMENT: Nil

CONFLICT OF INTEREST: Nil

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How to cite this article:
Sukumaran A: Pharmacognostical studies on *impatiens minor* (dc.) bennet. Int J Pharmacognosy 2019; 6(9): 305-09. doi link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.6(9).305-09.