Pharmacognostical study on *Svensonia hyderobadensis* (Walp.) Mold: A rare medicinal plant taxon

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Received on:20-09-2011; Revised on: 15-10-2011; Accepted on:10-12-2011

**ABSTRACT**

Plants are the great sources of medicines, especially in traditional system of medicine, which are useful in the treatment of various diseases, traditional medicines are prepared from a single plant or combination of plants. Indian contribution to herbal market and emphasis on novel research is continuously increasing. The present study is deals the macroscopic and microscopic characters of the leaves and stem of *Svensonia hyderobadensis* used microtome method. The leaf shows epidermis, mesophyll tissue and vascular bundles, whereas the stem showed epidermis, cork, cortex, metaxylem, protoxylem, phloem and medulla. These observations could be of immense value in the botanical identification and standardization of the drug in crude form. This study would help distinguish the species from other species in the drug.

**Key words:** *Svensonia hyderobadensis*, Pharmacognosy, Microscopy.

**INTRODUCTION**

India is a botanical garden of the world and a gold mine of well practiced knowledge of herbal medicine [1]. Herbs are used as medicine since time immemorial, many of the natural products in plant of medicinal value offer us new sources of drugs which have been used effectively in traditional medicine. There is an increased consciousness regionally and globally in production and use of plants with healing property [2]. Traditional medicines have become more popular in the treatment of many diseases due to popular belief that green medicine is safe, easily available and with less side effects [3]. In some countries traditional medicine remains as an integral part of the formal health system and exist on an equal footing with the current therapy. The method of practices of traditional medicine may appear to be numerous and dissimilar, but all represent variations of three basic activities, viz. faith healing, hygienic measures and drug therapy, medicinal plants play an important role in the health care of India [4]. Medicinal plants constitute the main source of new pharmaceuticals and health care products [5]. *Svensonia hyderobadensis* is delicate small shrub belongs to the family Verbenaceae and listed under the rare medicinal plant. It is used to hepatotoxic diseases (antihepatotoxicityblogspot.com), the plant has efficiency against microbial growth and the qualitative phytochemical screening also revealed that the plant is a rich source of secondary metabolites [6-7, 8]. The present study help in identification, authentication of the plant material and the pharmacognostical standardization has been performed for the leaves and stem of the plant.

**MATERIAL AND METHODS**

**Plant material**

Fresh and healthy leaves and stem of *Svensonia hyderobadensis* were collected from Mamandur forest area of Chittoor district, Andhra Pradesh, India.

**Sample Preparation**

The plant material was fixed in a mixture of solvents containing formalin, acetic acid and alcohol (70% v/v) for histological studies. After 24 hours of fixing, the specimens were dehydrated with graded series of tertiary butyl alcohol as per the schedule given by Asokan [9]. Infiltration of the specimens was carried by gradual addition of paraffin wax in tertiary butyl alcohol solution until it attains super saturation. The specimens were cast into paraffin blocks. Transverse (T.S) sections of the different organs of the plant materials were taken using a rotary microtome (RMT-30) and stained with different stains. Microphotographs of the sections were made by using nikkon labhot 2 microscopic unit.

**Stomatal index and frequency**

A thin film or a smear of quick fix was applied on the upper and lower surfaces of the leaves and it was allowed to dry for 5 minutes. The smear was gently peeled off with the help of needle. The peelings were mounted and observed under microscope on the same power in which number of stomata found in microscopic field area were noted [10, 11].

Stomatal index and stomatal frequency were calculated by using the following formula.

\[
\text{Stomatal Index} = \frac{\text{No.of stomata}}{\text{No.of stomata} + \text{No.of epidermal cells}}
\]

\[
\text{Stomatal Frequency} = \frac{\text{No.of stomata}}{\text{Microscopic field area}}
\]

**RESULTS AND DISCUSSION**

**Macroscopic studies**

The plant average of 0.5 to 2.0 M in length. Stem is green in colour, hard, branched, branchlets 4-angular, pubescent. Leaves are 6-8 cm long, 2-4 cm in broad. Opposite phyllotaxy, elliptic-ovate to obovate, coarsely serrate, acute, base rounded to decurrent, charataaceous, lateral nerves 6 pairs. Flowers...
Fig. 1: 1, 2 - T.S. of leaf 3, 4 - Stomata and 5, 6, 7, 8 - T.S. of stem of Svensonia hyderobadensis
g. Metaxylem, h. Protoxylem, i. Pith, j. Xylem, k. Bundle sheath, l. Ground tissue,
m. Spongy parenchyma, n. Stomata, o. Palisade parenchyma, p. Epidermal cell, q. Xylem rays
are pink-purple in colour, small, terminal spikes, bracts linear-lanceolate, scarios. Calyx tubular, unequally 5-toothed, 5-ribbed, splitting along 2 longer-teeth. Corolla salver-form, slightly widened above, obscurely 2-lipped, lobes 5. Stamens 4, inserted at the dilated portion of corolla-tube, included, filaments hairy. Ovary bicarpellary, bilocular; ovule 1 per locule, basal, stigma bilobed. Fruits of 2 oblong, 1-seeded pyrenes. Flowering and fruiting season is November-February [13].

Microscopic studies

The transverse section of the leaf shows epidermis, Mesophyly parenchyma tissue and vascular bundles; epidermis was found as upper epidermis where it covered the lower surface, epidermis covered with cuticle. Mesophyll tissue is arranged with spongy parenchymatous tissue and palisade tissue. A single vascular bundle is present in the middle portion of the mesophyll tissue. The vascular bundle is surrounded by a bundle sheath made of parenchymatous tissue. Vascular bundle is conjoint, collateral and open having xylem towards upper epidermis and phloem towards lower epidermis (Fig.1 (1-2)). In Svensonia hyderobadensis the stomata are Brachyparacytic type and present in both surface (amphistomatic) of leaf stomata index in upper is 4.68, and in lower side 148.51 stomata frequency upper side is 658.8 and lower side 2217.8 (Fig.1 (3-4)).

The transverse section of Svensonia hyderobadensis stem showed three different regions from outside to inside. The outermost region is made up of periderm where cork, cork cambium and secondary cortex are present. Many layers cortex made of parenchymatous is present below the periderm. Endodermis is not clear, pericycle is in the form of schlerenchymatous caps alternates with parenchymatous cells. Secondary phloem is very small consisting of limited on of cells, secondary xylem is arranged in many rows having metaxylem outside and protoxylem inside the cortex. The central region of the stem compress wide pith is made of loosely arranged cells (Fig.1 (4-8)).

In recently several workers studied the pharmacognostical values in leaves of Glycosmis pentaphylla [14] and Cordia rotthii [16]; stem bark of Ficus racemosa [15]; root of Saccharum munja [16] and Withania somnifera [17], root tubers of Chlorophylylum borivilianum [18]; leaf and stem bark of Terminalia citrine [19]; leaves and roots of Bepharis molluginifolia by Pattar and leaves, stem, roots of Macrotymola unifiform by Kumar [21]. There has been an emphasis in standardizing of medicinal plants of therapeutic potential. Despite the modern technique, identification and evaluation of plant drugs by pharmacognostical studies is still more reliable, accurate and inexpensive means [18]. According to World Health Organization (WHO) the macroscopic and microscopic description of a medicinal plant is the first step towards establishing its identity and purity and should be carried out before any tests are under taken [21].

Plants serve as vast source for varied phytoconstituents exhibiting varied pharmacological property, identifying such potential plants is of significance in medicine [23]. So it becomes necessary to study the pharmacognostic characteristic of the plant before its use in the field of research and also in pharmaceutical formulation. Moreover, it also helps in distinction from other allied species and adulterants. In this connection, in the present study the pharmacognostical characteristics of the stem and leaf of Svensonia hyderobadensis was examined. The macromorphological features and the microscopic features of the plant identify by pharmacognostical study, may serve in assigning botanical standards.

CONCLUSION

The present study may be useful to supplement the information with regard to its standardization and identification and in carrying out further research and its use in traditional system of medicine.

REFERENCES


Source of support: Nil, Conflict of interest: None Declared