Pharmacognostic Study of Garden Sage Grown in Nilgiris

Ramu G[1*], Krishna Mohan G[2]

[1]Department of Pharmacognosy, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, Nilgiris, Tamilnadu, India
[2]Centre for Pharmaceutical Sciences, Jawaharlal Nehru Technological University, Kukatpally, Andhrapradesh, India

Abstract
The present research aims to evaluate some of the pharmacognostic characters of the garden sage leaf (*Salvia officinalis*). The evaluation was done in terms of macroscopy, microscopy in addition to physicochemical and preliminary phytochemical studies. Qualitative and quantitative microscopy of the transverse section (TS) was performed to determine the presence and dimensions of cells and cell contents. Physicochemical standards and preliminary phytochemical screening were carried out according to methods reported earlier. The data reported in our study could be useful in the identification of the different species of *Salvia* and for compiling a monograph of *Salvia officinalis*.

Keywords: Pharmacognosy, garden sage, diagnostic characters, identification.

INTRODUCTION
Medicinal plants, their concentrates and separated compounds have shown a range of biological activities. These have been utilized and kept on being utilized as medication in non codified or folk systems or on the other hand food supplement for different issues (Rajan, 2009). One such plant, Sage (*Salvia officinalis*) is one of the plants that meet some of the requirements of human beings. *Salvia officinalis* leaf is used medicinally in the homoeopathic system for cough, tickling phthisis, night sweats and galactorrhea in the Nilgiris district (Mugendhiran et.al., 2020). The present study aims at evaluating the macroscopic, physicochemical and microscopic characters of the leaf that will be useful for the identification and differentiating the other species of *Salvia*.

MATERIALS AND METHODS
Plant Material and methods
For collection and authentication of plant, leaves were collected from the local fields of kattabettu village, Nilgiris, India in August 2014. Their identification and authentication were done by the Survey of Medicinal Plants and Collection Unit, Nilgiris, with voucher specimen number: Pharmacog./1054. Dried leaves immersed in alcohol 70% for one day and cleared with chloral hydrate solution, washed with water and stained with safranin were utilized to prepare sections. Quantitative Microscopy of leaf constants such as stomatal number and index, vein islet and termination number and palisade ratio respectively were also carried out (Harbone, 1998). Photomicrographs were captured with Nikon Digital camera. Phytochemical screening and reaction of leaf powder with different chemical reagents were performed on the treat section and powder of the drug to identify the presence of major cell wall components such as cellulose, lignin, tannins, proteins, starch, calcium oxalate crystals etc. (Evans & Trease, 2003).

RESULTS
Leaves are green to grey coloured and nearly whitish underneath with many hairs and flowers are blue to purple unlike *Salvia verbenaica* (wild sage) which is a tall herb with a hairy stem, leaves are basal with toothed arms varying from 4-10 cm. Flowers are violet to purple. *Salvia officinalis* does not contain mucilage like wild sage. The flowering and fruiting period for both the plants were from June – September. The foreign organic matter and moisture content were found to be 0.45% w/w and 5.5% w/w respectively. Total ash, acid insoluble ash and water-soluble ash were found to be 7.25% w/w, 4.0% w/w

and 3.72% w/w respectively. Various extractive values (%w/w) determined were water-soluble extractive, 7.23%, alcohol soluble extractive, 9.83%, petroleum ether soluble extractive, 6.12%, chloroform soluble extractive, 12.5% and methanol soluble extractive 10.65% respectively. The preliminary phytochemical study of powder has been performed which reveals the presence of steroids, saponin, triterpenes and phenolic compounds. Reactions with different reagents showed lignin, cellulose, proteins, tannins and calcium oxalate crystals as cell wall constituents. The results of leaf constants are shown in table 1.

Single layered epidermal cells covered by thick cuticle was seen in the TS of the petiole. Most of the epidermal cells project to form uni to bi, tricellular trichomes and glandular trichomes. The epidermis is followed by 1 to 2 layers of collenchymatous hypodermis and 4 to 5 layers at a distal end of the wing-like projections followed by 1 to 2 layers of palisade cells and two small accessory vascular bundles prominently present on either side of the wing-like projections. Many layered thin-walled rounded parenchymatous cells were also present. Centrally well-developed collateral vascular bundle present with xylem and phloem capped with phloem fibres. Single-layer of epidermis covered by a cuticle was also seen in the TS of the leaf passing through the midrib. Most cells of the epidermis project to form uni to bi, tricellular trichomes and glandular trichomes. Followed by 1 to 2 layers of hypodermis lies underneath both the epidermis of the midrib, followed by many layers of palisade parenchyma cells in the lamina region and sides of the midrib. Few layers of thin-walled and rounded parenchymatous cells were also present. Centrally well-developed collateral vascular bundle present with xylem and phloem capped with phloem fibres (Figure 1).

DISCUSSION

Evaluation of a crude drug ensures identity, quality and purity by detecting adulteration. A very less amount of foreign organic matter was identified in the crude drug. The presence of excess moisture in the crude drug will cause loss of its efficacy or quality of active constituents. The determination indicates that the powder is less hygroscopic. Ash value determined is useful for identifying the presence of sand or silica and other earthy materials.

Table 1. Leaf constants

S.No	Parameters	Values
1	Stomatal number	Lower epidermis - 10-15-25/sqmm^2 Upper epidermis - 4-6-7/sqmm^2
2	Vein islet number	10-12-14/sqmm^2
3	Vein termination number	8-10-12/sqmm^2
4	Palisade ratio	5-6-7/sqmm^2

All the ash values were within the limit indicating less contamination with silica and also calcium oxalate. Extractive values which are the approximate measures of the active ingredients were carried out to determine the position of extracting solvents extracting considerable and desired quantities. Preliminary phytochemical investigation revealed the presence of many chemical constituents thereby indicating their therapeutic potential. The presence of tannins which are believed to have antibacterial activity was revealed in the powder study with ferric chloride solution. Microscopic analysis of petiole shows vascular bundles, palisade cells and collenchymatous hypodermis whereas leaf shows tricellular glandular trichomes, parenchymatous cells and collateral vascular bundles.

CONCLUSION

Our study helps in the authentication of the genuine drug by comparing it with the other species of *Salvia* and for further revalidation of the drug *Salvia officinalis.* The data reported in our study could be also useful for compiling a monograph of *S.officinalis*.

ACKNOWLEDGMENT

The author would like to thank The Department of Pharmacognosy, JSS College of Pharmacy, JSS Academy of Higher Education & Research (JSS AHER), Ooty, Nilgiris, Tamilnadu, India for providing the necessary research facilities.

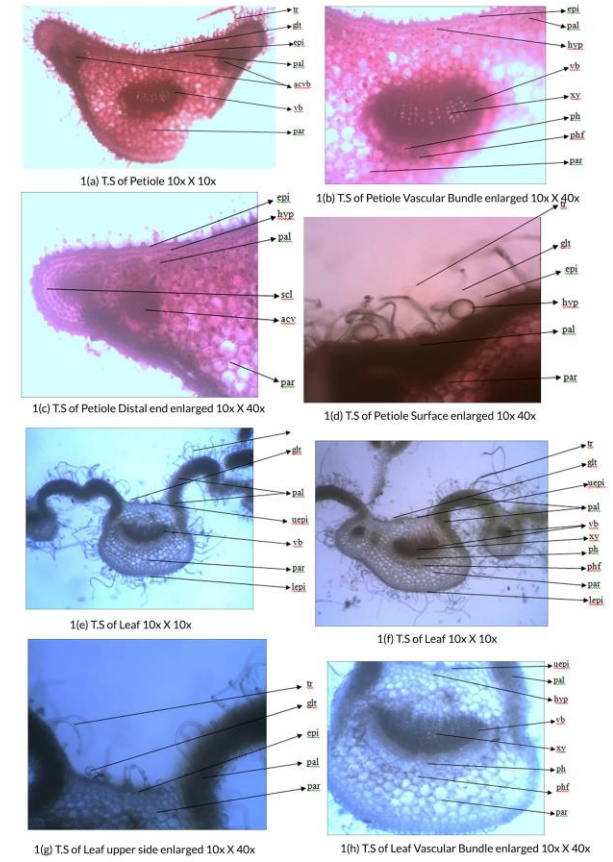

Fig 1: Microscopical Characters

REFERENCES

1. Rajan, S., and Tilak, M. (2009). Medicinal Plants of Nilgiris-an Organic Perspective, Institute of Commercial Horticulture. Tamilnadu Agricultural University: Nandi Seva Printers, Ootacamund: 2009; 2nd ed: pp. 172.
2. Mugendhiran. S., Shashikanth, J and Murali, M. (2020). Plants in the family Lamiaceae are used medicinally in the Homoeopathic system found in the Nilgiris District,
3. Tamilnadu, India. Asian Journal of Pharmaceutical and Clinical Research. 13(4): 59-64.
4. Harbone J B. (1998). Method of extraction and isolation. In: Phytochemical methods, Chapman & Hall, London. pp. 60-66.
5. Evans WC. (2003). Trease and Evans Pharmacognosy. Saunders Ltd, London. 15th ed: pp. 545-547.

Corresponding Author – Ramu G, Faculty, Department of Pharmacognosy, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, Nilgiris, Tamilnadu, India