MICROSCOPIC ILLUSTRATION OF PELARGONIUM HORTORUM

ABSTRACT: For identification of a crude drug, there are several parameters which standardize it for sure. Microscopic features describe a crude drug very well. Chances of adulteration are very common due to morphological similarities in different species of drugs and to avoid such confusions, standardization via microscopy helps to create a valuable profile of a given crude drug. Involving different parts of plant drug in microscopy viz leaves, stem, roots and flower etc. helps a lot in identifying the original drug. Transverse section of different parts of plant, powder microscopy and determination of leaf constants like stomatal number, stomatal index, vein islet number, vein termination number and palisade ratio of *Pelargonium hortorum* describes the basic features of the drug and authenticate it as the original one.

KEYWORDS: *Pelargonium,* Identification, Microscopic evaluation.

INTRODUCTION:

Pelargonium hortorum is a species of Pelargonium commonly used as an ornamental plant. *Pelargonium* species is probably a hybrib between *Pelargonium zonale* and *Pelargonium inquinans* belonging to family Geraniaceae. Plant can be propagated by stem cuttings and requires peaty or loamy soil and flourishes in sunny conditions [1]. The plant varies from height of 45 to 50

Fig.1a: Leaves

cm with fragrant green colored decorative leaves upto 5 to 7.5 cm in length with reticulate venations and crenate margin. Flowers appears in many colors like red, pink, orange or white having five petals positioned around the center as ball shaped clusters. The inflorescence is long rigid peduncle. Generally tap root system is present in the plant.


Fig.1b: Flowers

Different species of Pelargonium are available abundantly in nature with immense pharmacological potential and exhibit antifungal [2], mosquito repellent [3], anixolytic, antidepressant [4] and pediculicidal activities [5]. Pelargonium derived essential oils (citronellol, geraniol, p-menthone and α-pinene etc.) are extensively used in perfumery, cosmetics, soaps, creams and aromatherapy products [6-7].

MATERIAL AND METHOD:

***Collection of plant*:**

The plant is collected in the month of January 2019 from Govt. College of Pharmacy Rohru, Distt. Shimla, Himachal Pradesh, India and the collected samples were subjected to microscopic examination.

Microscopy: Anatomical sections of the fresh leaf, petiole, stem and roots were prepared for the microscopic studies and examined under Trinocular microscope Olympus-CH-20i model and compound microscope.

For determination of leaf constants like stomatal number, stomatal index, vein islet number, vein termination number and palisade ratio camera lucida was used.

Stomatal number and index determination: The fragment of leaf was cleared by boiling with chloral hydrate solution. Epidermal layer was then peeled out using forcep. A square of 1mm was drawn on a drawing paper using Camera lucida and stomata were counted and stomatal index was calculated using formula-

Stomatal index (S.I.) = $S/E+S \times 100$

Where S= Number of stomata,

E= Number of epidermal cells

Determination of Vein-islet and termination number: Fragments of leaf was cut in 2 mm x 2 mm rectangular shape and boiled in chloral hydrate solution followed by dilute hydrochloric acid for few minutes. A square of 1mm was drawn on a drawing paper using Camera lucida and vein islets and terminations were counted.

Determination of palisade ratio: Fragments of leaf was cut in 2 mm x 2 mm rectangular shape and boiled in chloral hydrate solution followed by dilute hydrochloric acid for few minutes. A square of 1mm was drawn on a drawing paper using Camera lucida and palisade cells were focused underlying four epidermal cells [8-9].

RESULTS AND DISCUSSION:

The microscopic examination of the plant consists of its transverse section of leaf, petiole, stem and root. The results of the T.S, powder characteristics and leaf constants are given in the Figure 2(a-h).

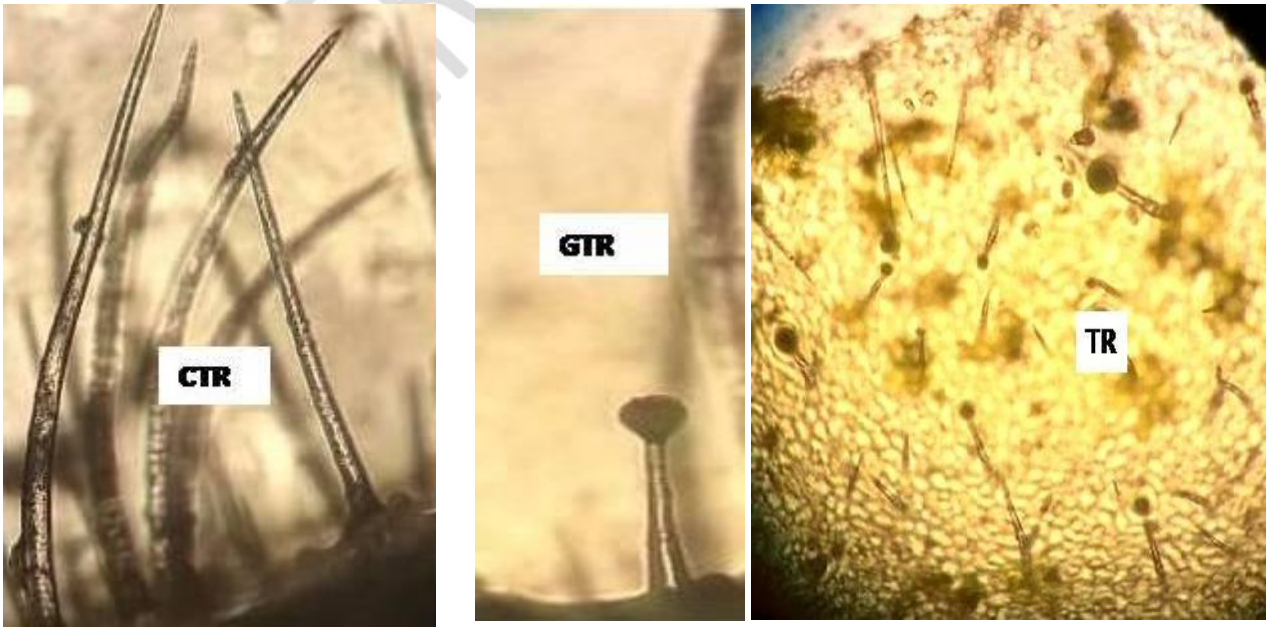

Figure: 2 a: Trichomes- CTR: Covering trichome, GTR: Glandular trichome

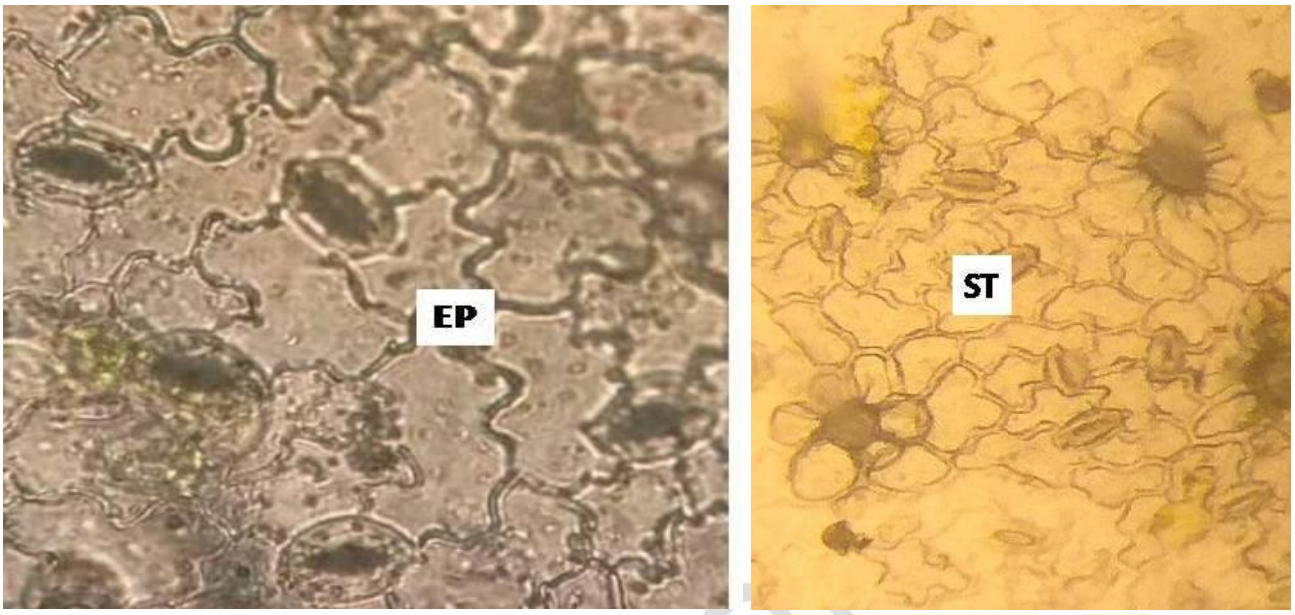

Figure: 2 b: Wavy epidermal cells and stomata-EP: Epidermal cells, ST: Stomata

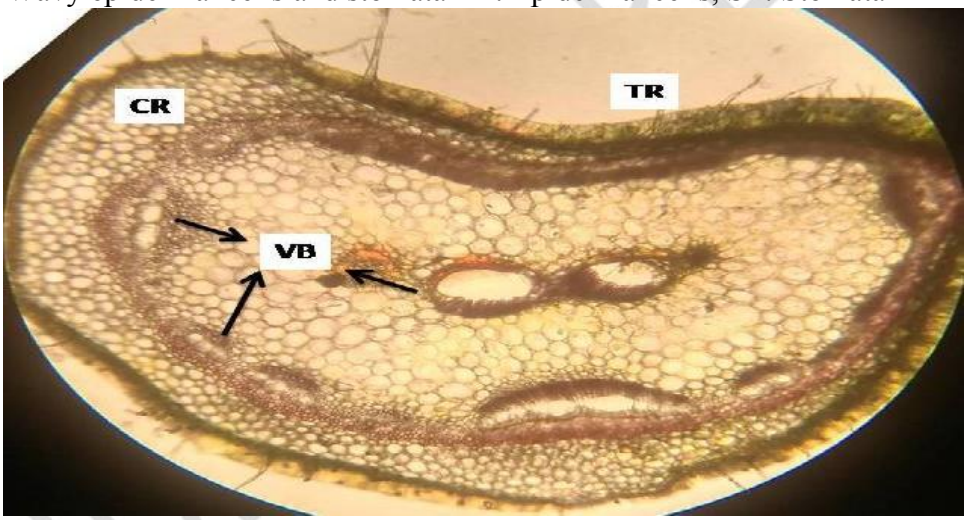

Figure: 2 c: Transverse section of Petiole-VB: Vascular bundles, CR: Cortex, TR: Trichome

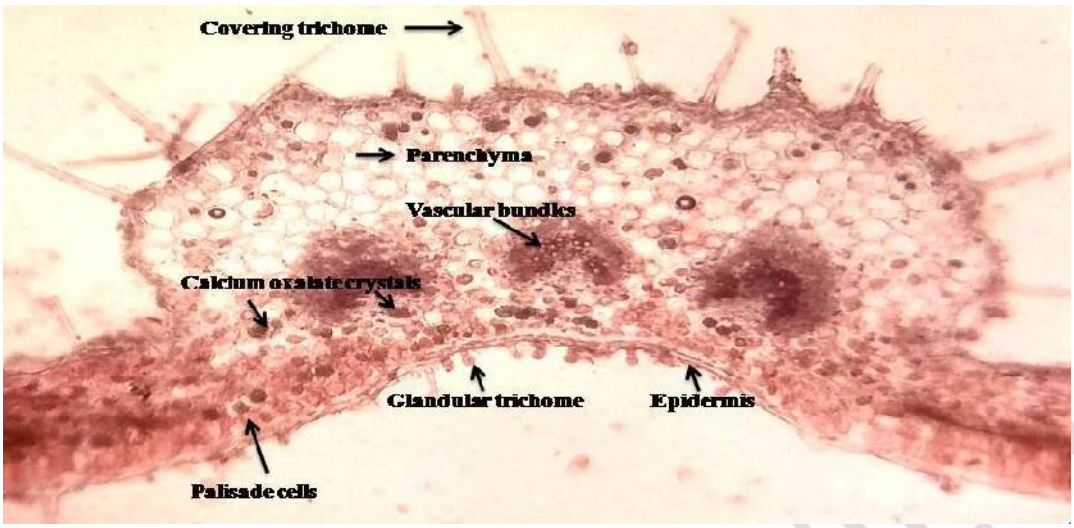

Figure: 2 d: Transverse section of leaf

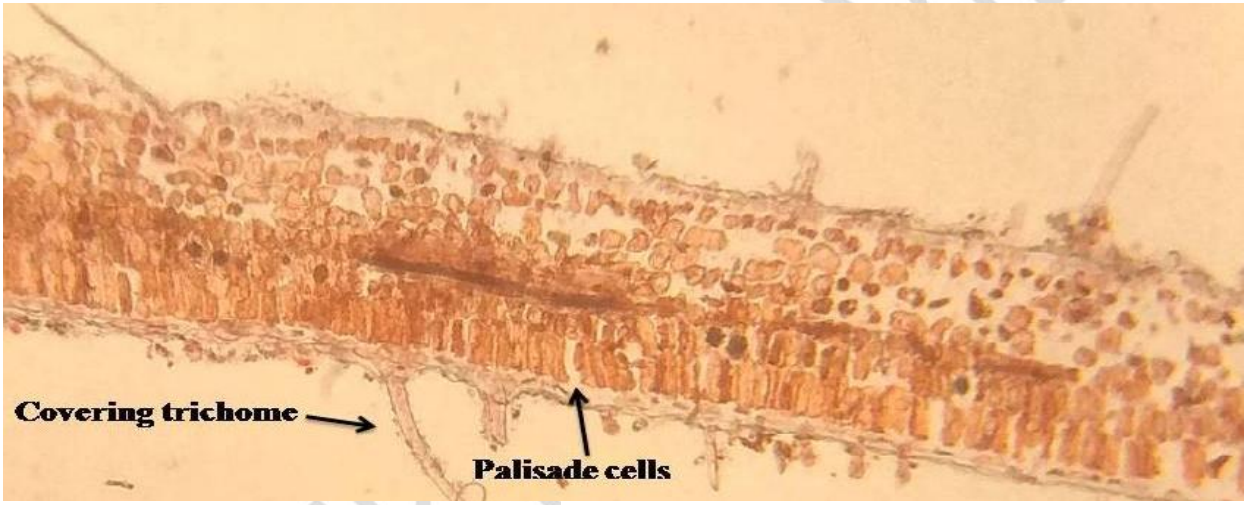

Figure: 2 e: Transverse section showing palisade cells in leaf

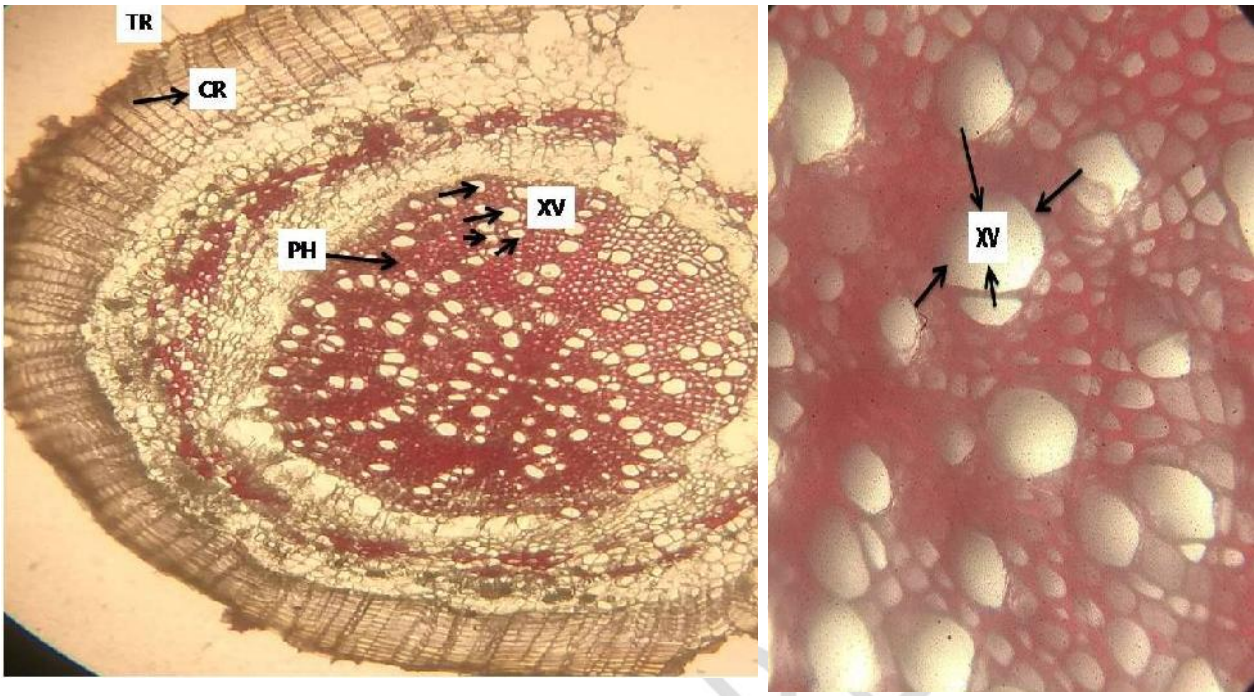

Figure: 2 f: Transverse section of root-TR: Trichome, CR: Cortex, PH: Pith, XV: Xylem vessles

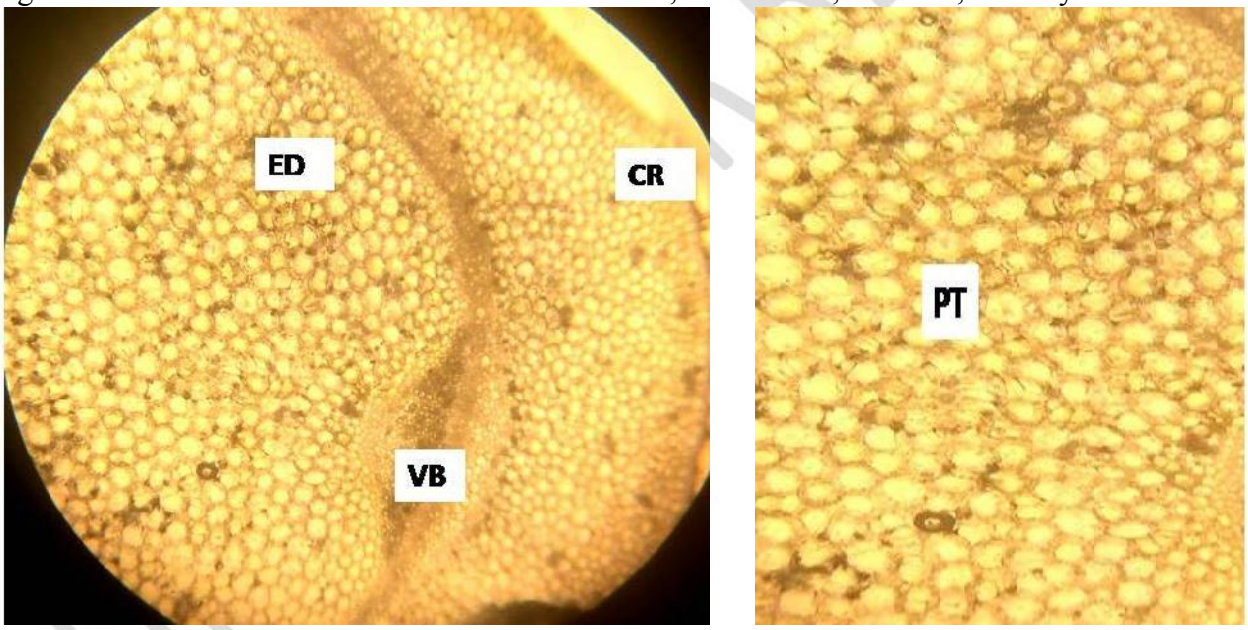

Figure: 2 g:Transverse section of stem-ED: Endodermis, VB: Vascular bundle, CR: Cortex, PT: Pith

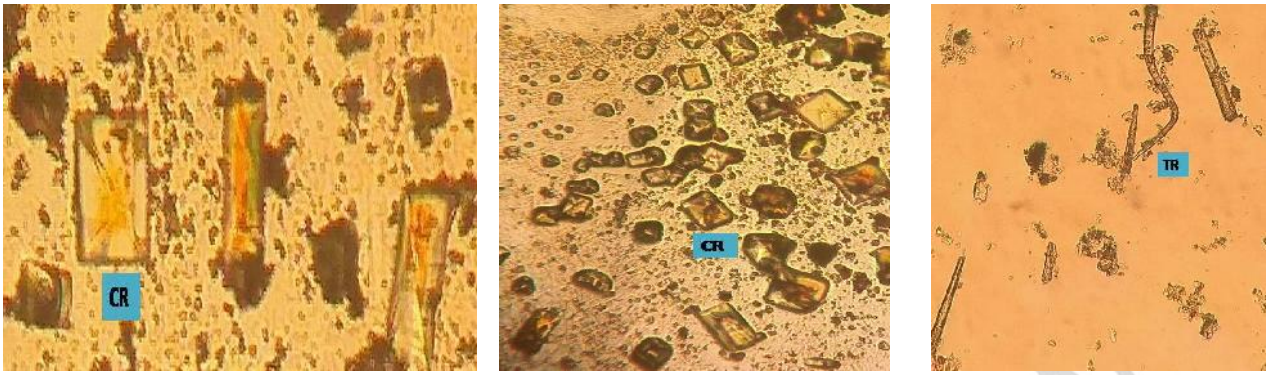

Figure: 2 h: Powder microscopy of leaf-CR: Crystals, TR: Trichomes

Conclusion

The macroscopic study reveals the physical characteristics of plant whereas the microscopic studies give us vital information about the histological arrangement of different plant parts. Transverse section of leaf showed the presence of unicellular covering, glandular trichomes, anomocytic stomata, bilayered rectangular arrangement of palisade cells, wavy walled epidermal cells, five to six layered parenchymatous tissue, few calcium oxalate crystals and vascular bundles. In petiole five to ten celled layered cortex are present with circularly arranged vascular bundles in parenchymatous tissue. Stem portion showed presence of endodermis with 15-20 layered cortex, circularly arranged vascular bundles and pith. Roots showed presence of covering trichomes with 15-20 layered cortex and xylem vessels with lignified phloem**.** Powder characteristic of leaf showed presence of prismatic calcium oxalate crystals, abundantly scattered unicellular covering trichomes and fragmants of parenchymatous cells. Evaluation of different leaf constants like stomatal number (262-280), stomatal index (12-16.6), vein islet number (4-8), vein termination number (12-18), palisade ratio (2-6) helps in framing the microscopic illustration of *Pelargonium hortorum,* family Geraniaceae.

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