



PHARMACOGNOSTIC EVALUATION OF STEM OF *OPUNTIA ELATIOR* MILL. (NAGAPHANI)

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ABSTRACT

Opuntia elatior Mill. (Cactaceae), known as a *Nagaphani* or *Hathlo-thore* is a subarborescent or shrubby, having 3 meter high or more. It bears a typical leaf like appearance stem, which used for a curing different disease conditions traditionally. Leaves 7.5 mm long, subulate, recurved, reddish at the tips. A detailed pharmacognostical character of its stem is not reported still yet. An attempt has been made to study the macroscopic and microscopic character of its stem

following standard procedures. Results showed presence of epidermal cells loaded with rosette crystals of calcium oxalate, hypodermis loaded by simple starch grain and central ground tissue, ground tissue cells consists rosette and cluster crystals of calcium oxalate and simple starch grain, xylem made by xylem parenchyma and its fibers and phloem made up of sieve elements fibers. These observed microscopic characters could serve as a measure for authentication and standardization of the plant.

KEYWORDS: *Nagaphani*, *Opuntia elatior*, microscopy.

INTRODUCTION

Opuntia is one of the major genus of the family Cactaceae, more than 2000 species, *Opuntia* about 250 species has been reported across the globe.^[1] In India, three species of *Opuntia* genus are distributed in different regions for their medicinal values, *Opuntia dillenii* Haw. is found mainly in the southern parts of the India while *O. vulgaris* Mill. (Syn *Opuntia*

monocantha Haw.) is distributed mainly in the northern parts; *O. elatior* Mill. is being reported in western India.^[2]

In Gujarat *Opuntia elatior* Mill., a member of Cactaceae family known as *Hathlo-thore* has been reported for its traditional uses as a medicinal plant. It is used as remedy in different disease conditions like anaemia, asthma etc. by tribal of Gujarat state. It is observed that the different species of *Opuntia* are highlighted for their ethno-medicinal claims like antibacterial, anti-diarrheal, anti-inflammatory, analgesic, anti-spermatogenic, anti-microbial and anti-diabetic properties.^[3] Stem of *Opuntia elatior* contain malate of manganese, a fatty acid, citric acid, wax, resin and sugar.^[4] Stem extract of *O. elatior*, due to the presence of cytoprotective active material flavonoid has been reported for antiulcer genic efficacy.^[5] Its fruit is also a rich source of nutrients and vitamins^[6,7] and are eaten fresh, dried or preserved in jams, syrups or processed into candy – like products.^[8,9]

Stem of *Opuntia spp.* are woody branches jointed with large fleshy and compressed limbs. When young it bears small cylindrical or subulate caduceus leaves, when matured leaving axillary scars or areoles from which arise numerous fine barbed bristles & often one or more larger prickles or spines. *Opuntia elatior* is a large succulent shrub; stem joints obovate, areoles with 7-13 straight, slender, tawny or purplish-black spines. Leaves small, subulate, caduceus. Flowers yellow, soon changing to rose-pink or outer tepals red inner dirty yellow. Perianth somewhat campanulate. Stamens purple, hypanthium red, marked with the areoles, but bristles and spines deciduous, top depressed.^[10]

Though used extensively by the traditional practitioner recent review of literature shows that detailed pharmacognostical study of stem *Opuntia elatior* Mill. is not established exact above reported morphological characters.

MATERIALS AND METHOD

Collection of the sample

Stem of *Opuntia elatior* Mill. were collected from its natural habitat, Jamnagar, Gujarat, during the month of February 2015, as per good collection practice standards and identified with the help of botanical texts and flora.^[11,12] The plant specimen was authenticated by the Pharmacognosist of IPGT & RA, GAU, Jamnagar.

Method of preparation of sample

Stem of *Opuntia elatior* Mill. washed, shade dried, powdered through mechanical grinder, sieved through 80 mesh and preserved in an air-tight glass vessel. Fresh sample of stem were preserved for microscopical evaluation, in a solution prepared from 70% ethyl alcohol: glacial acetic acid: formalin (AAF) in the ratio of 90:5:5.^[13]

Microscopical study

Microscopical examinations were carried out by free hand thin transverse section of fresh stem following standard guidelines. Photographs of the section were taken with the help of Canon digital camera attached to Carl-Zeiss trinocular microscope.^[14,15,16]

Powder Microscopy

Powder microscopy of the dried stem powder was carried out following standard guidelines.^[17]

OBSERVATION AND RESULTS**T.S of the stem**

The diagrammatic T.S of modified stem shows outer epidermis, hypodermis and central ground tissue.

The detailed T.S shows, Epidermis consist a single layer barrel shaped cells compactly arranged rarely interrupted by sunken stomata. Epidermis strongly covered with thick cuticle. Epidermal cells loaded with rosette crystals of calcium oxalate. Hypodermis 2-3 layers compactly arranged rectangular to irregular shaped cells. These cells are loaded by simple starch grains.

Ground tissue occupied a large area rounded to uneven shaped parenchyma cells, some of the parenchyma cells leads into a large cavities termed as mucilage cavities. Ground tissue cells consists rosette and cluster crystals of calcium oxalate and simple starch grain. 5-6 vascular bundles circularly arranged towards the centre made up of xylem and phloem. Xylem made up of xylem parenchyma and its fibers. Phloem made up of sieve aliments fibers. (Plate 1 a-i)

Powder microscopy**Organoleptic characters**

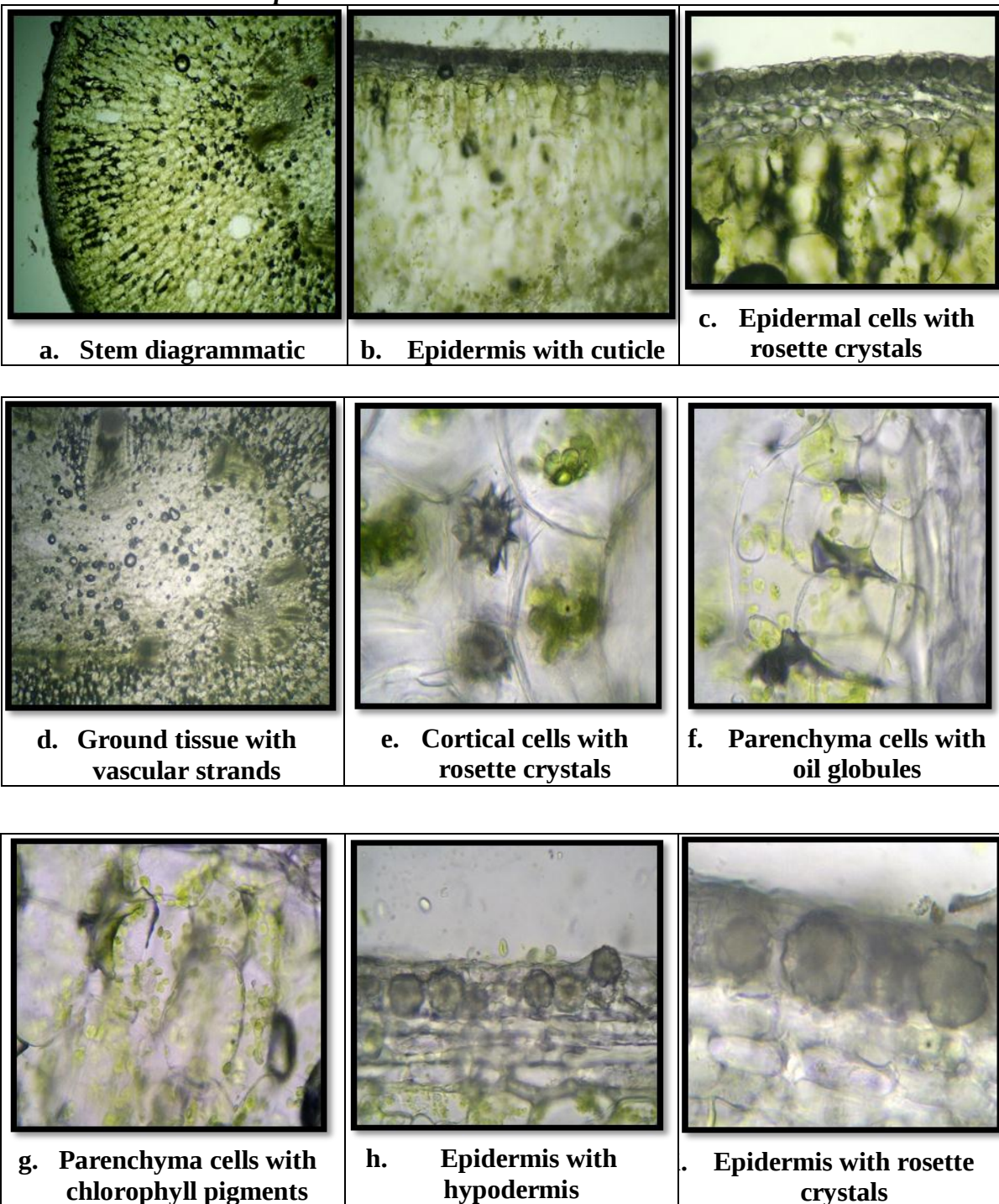
Powder shows light green in colour, taste mucilaginous, characteristic odour and coarse in touch.

Microscopic characters

Detailed powder microscopy shows rosette crystals of calcium oxalate, annular and spiral vessels, oil globules, epidermal cells, parenchyma cells with cluster crystals, simple starch grain, stomata, scleriform vessels and simple fibers. (Plate 2 a-i)

PHOTOGRAPHS

Plate 1: T S of Stem – *Opuntia elatior* Mill.



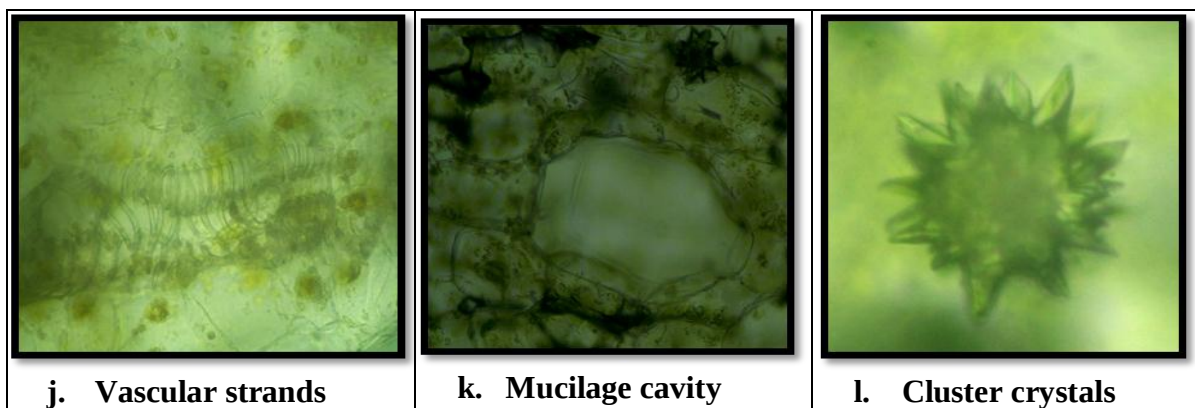
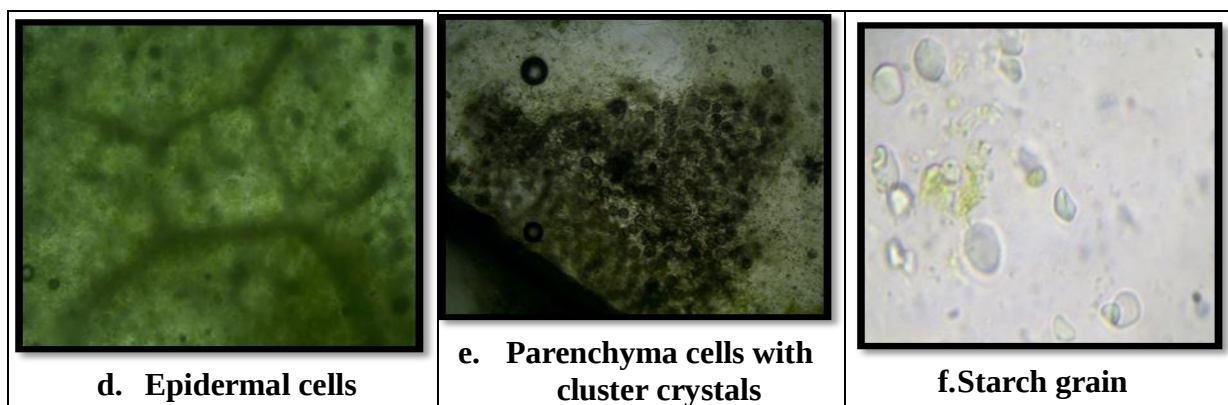
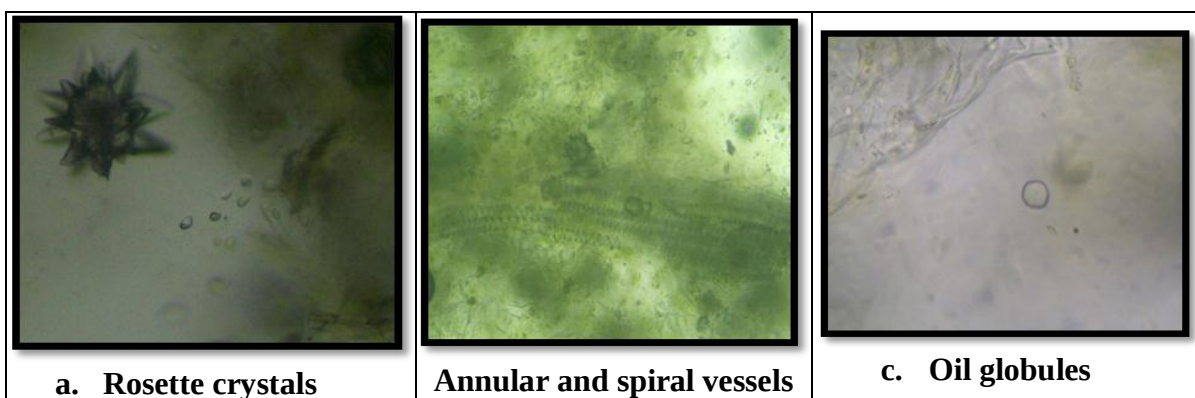


Plate 2: Powder microscopy of - *Opuntia elatior* Mill.



CONCLUSION

The stem of *Opuntia elatior* Mill. shows the presence of mucilaginous cavity, rosette crystals in the epidermal cells, distinct epidermis and collapsed hypodermis. These distinctive characters may be useful to establish the botanical standards for identification and standardization of *Opuntia elatior* Mill.

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