WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 6, Issue 2, 1043-1050. Research Article ISSN 2277– 7105

MICROMORPHOLOGICAL AND MICROMETRIC EVALUATION OF *OPUNTIA ELATIOR* MILL. FLOWER

***Hemil D. Patel[1], Harisha C. R.[2], Rabinarayan Acharya[3] and Switu Jani[4]**

[1]M.D. Scholar, Dravyaguna Dept, [2] Head, Pharmacognosy Laboratory, [3]Professor, Dravyaguna Dept, [4]PhD Scholar, Pharmacognosy Laboratory, IPGT&RA, G.A.U, Jamnagar.

Article Received on
09 Dec. 2016,

Revised on 29 Dec. 2016,
Accepted on 19 Jan. 2017

DOI: 10.20959/wjpr20172-7797

***Corresponding Author**
Dr. Hemil D. Patel
M.D. Scholar,
Dravyaguna Dept,
Pharmacognosy
Laboratory, IPGT&RA,
G.A.U, Jamnagar.

ABSTRACT

Opuntia species have been traditionally used as ethno-medicine to cure various ailments. The present study reveals the micromorphology and micrometric evaluation of *opuntia elatior* Mill flower. It is seen from the literature that *Opuntia elatior* Mill. of Cactaceae family is an important plant for its medicinal uses in the treatment of anaemia, asthma etc. Till date Swarasa of fruit of this plant has been evaluated for its activities such as analgesic, anti inflametary,anti diabetic, antihyperglycemic, antispermatogenic. Till date reference have not been found regarding flower micromorphorphology and its micrometric evaluation. Present study was carried out to evaluate detail pharmacognostical characters on flower including its micrometric evaluation of *O.elatior* Mill. Results shows measurement of Pollen grain, multicellular trichome, Stomata, Androecium, Gynoecium, etc.

KEYWORDS Analgesic, Flower, Microscopic, Micrometric, *opuntia.*

INTRODUCTION

The use of traditional medicine has increased recently, mainly due to the failure of modern medicine to provide effective treatment for chronic diseases and the emergence of multi-drug resistant bacteria and parasites.[1] It is estimated that about 80% of the world population till rely mainly on medicinal plants, as they are affordable and accessible source of primary health-care for them. Studies reveal that there are more traditional medicine providers than the allopathic providers especially in the rural areas.[2] Hence, it is the highest time to validate the quality standards of herbal medicine through available parameters.

Mainly Cactaceae are succulents of new world. Members of this family are found in semi-desert or dry regions of India, they are mostly xerophytic, perennial shrub. Mostly the stem is modified into fleshy leaves like appendages and the leaves are modified into spines.[3]

Opuntia elatior Mill is large succulent shrub, stem joints obovate, areoles with 7-13 straight, slender, tawny or purplish-black spines. Leaves small, subulate, caduceus, tuft of bristles develop from areoles.[4]

Flower is key character of plant. It plays vital role for the differentiation and determination of species.[5] Flowers yellow in colour, soon changing to rose-pink or outer, tepals red and inner dirty yellow. Perianth somewhat campanulate. Stamens purple. Hypanthium red, marked with the areoles, but bristles and spines deciduous, top depressed.[6]

MATERIAL AND METHODS

COLLECTION

Fresh flowers of *O.elatior* Mill were collected from the many suburbs of Jamnagar in the month of may- June 2014 as per collection standards. The plant specimen was authenticated by the Pharmacognosist of IPGT & RA, GAU, Jamnagar.

Flower morphology

Collected flowers were observed carefully for its identical morphological characters. Morphological characters like colour, shape, size were noted down. Characters of flower such as perianth, androecium, gynoecium were studied as per taxonomy.[8]

Microscopic study: Fresh flowers were taken for detailed microscopic study. Free hand sections of various parts like Tepal, Ovary etc were taken. Microphotographs were taken by using Carl Zeiss Trinocular microscope attached with camera. Same procedure was followed for detailed powder microscopy.[9]

Micrometric evaluation: Trichomes, cluster crystals,Pollen Grains etc. characters were measured for its length, breadth. Mean value was taken into consideration and noted down. Micrometric evaluation was carried out with the help Carl Zeiss Trinocular microscope attached with camera with preloaded micrometric analysis software.[10]

RESULTS AND DISCUSSION

MICRO MORPHOLOGY

- **Inflorescence**

Terminal single flowered Cyme. Fig.1

- **Flowers**

Bracteate, bracteolate, pedicellate, complete, actinomorphic, hermaphrodite, tetramererous, epigynous.

Perianth: perianth parts numerous, showing gradual transition from sepals to petals, Sepals 4, Petaloid, valvate, persistent, petals epigynous, gamosepalous, forming tube lobes free and scarlet coloured.

Androecium: Stamens 8, dithecous, versatile, filament long exerted from tube.

Gynoecium: polycarpellary, syncarpous, ovary inferior, unilocular parietal placentation, style 1 and simple, stigma as many as carpels.

Floral formula: $+, \overset{\frown}{\varnothing}, P_{\infty}, A_{\infty}, \underline{\overline{G_{(\infty)}}}$. (fig-2)

Micromorphology: the measurements of micromorphology of the various part of plants are depicted in the table. Table-1

MICROSCOPY AND MICROMETRY

Outer tepal of perianth

Diagramatic transverse section of the tepaloid shows upper and lower epidermis, ground tissue many layered parenchymatous cell, filled with chlorophyll pigment with spongy parenchyma, sometime terminated by large mucilaginous cavities. Below the both the epidermis rosette crystals of calcium oxalate are loaded in parenchyma cells. Vascular bundles are open, collateral situated in the ground tissue. The T.s of perianth masser about 1.8 mm^2 Plate 1, Fig 3,4,5

Inner tepal of perianth: Diagramatic transverse section of the petaloid shows outer epidermis consist of single layered of rounded or barrel shaped parenchyma cell withthick cuticle. Lower epidermis consist somewhat oval shaped epidermal cells with thin cuticle filled with colouring pigments. Ground tissue consists of parenchyma cells with interruption

of many mucilaginous cavities. Vascular bundles open, collateral disturbted all over the ground tissue. The T.S of perianth massers about 2mm×0.2mm Plate 1, Fig. 6,7

ANDROECIUM

Crushed part of the anther shows two anther lobes, pollen grain, and outer epidermis shows pappilose. Crushed part of the filament portion shows epidermis embedded by pappilose cells and rosette crystals of calcium oxalate. Pollen grains mainly with many protrubances with wavy smooth outer edge. Plate 1,Fig 9-14

GYNOECIUM

T.S. of Polycarpellary ovary consists of outer epidermis single layer tubular parenchyma cells, covered by the cuticle. Ground tissue made up of parenchyma cells with central coloumn, some of the cells filed with rosette crystals of calcium oxalate crystals. Muscilaginous cavities are abundant in the ground tissue. 5-6 vascular bundle present around the central coloumn, madeup of phloem and xylem. Stigma multibranched many overlapped and hood like structure. Style is simple with numerous pollen grains inside the tube. Plate 1, Fig.15-20

ORGANOLEPTIC CHARACTERS

Colour: Reddish, Odour: Aromatic, Taste: Bitter, astringent.

POWDER MICROSCOPY

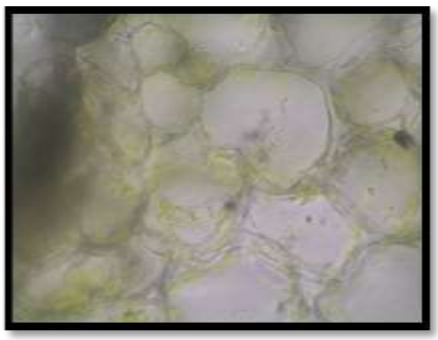
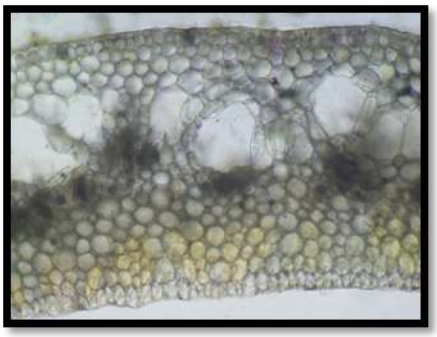
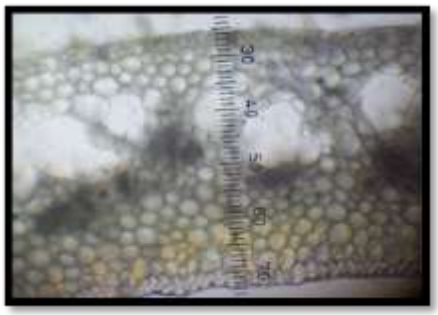
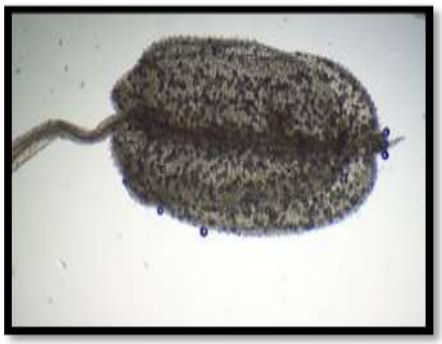
Diagnostic character of flowers shows rosette crystals of calcium oxalate, fragments of multicellular trichome, Plate 2,fig-21-34

Micrometric evaluation: The micrometric values like length and breadth of various cell contents, i.e., pollen grains, etc. depicted in Table no.2.

CONCLUSION

From the micro morphology and micrometric evaluation of character like measurement of pollen grains, Trichomes and other characters give scientific evidence be useful identification tool for adulteration and substitute.

Plate 1: MICROPHOTOGRAPHS OF FLOWER

<table>
<tr>
<td> 
1. Flowering Plant</td>
<td> 
2. Morphology of flower</td>
<td> 
3. T.S of Calyx</td>
</tr>
<tr>
<td> 
4. Mucilage contain cell</td>
<td> 
5. Micro measurement of Calyx</td>
<td> 
6. TS of Corolla</td>
</tr>
<tr>
<td> 
7. Micro measurement of Corolla</td>
<td> 
8. Spiral vessels</td>
<td> 
9. Androceium</td>
</tr>
<tr>
<td> 
10. Anther lobe</td>
<td> 
11. Anther lobe showing Pepulose</td>
<td> 
12.Micro-measurement of Pollaingrain</td>
</tr>
</table>

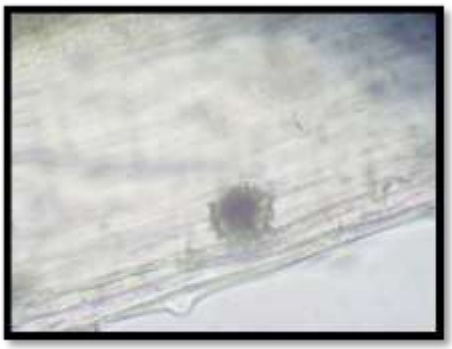
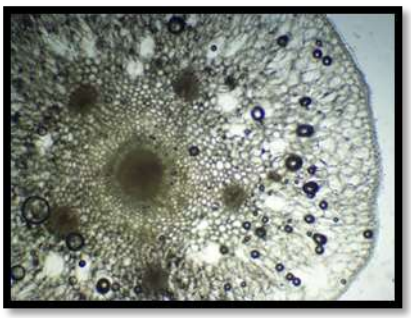
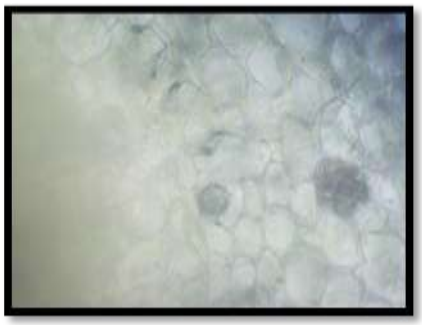
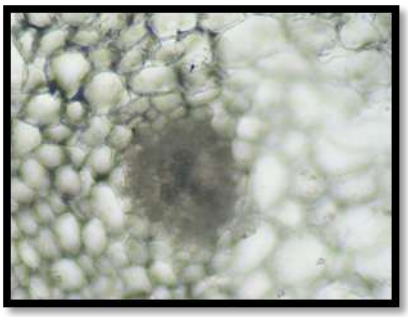
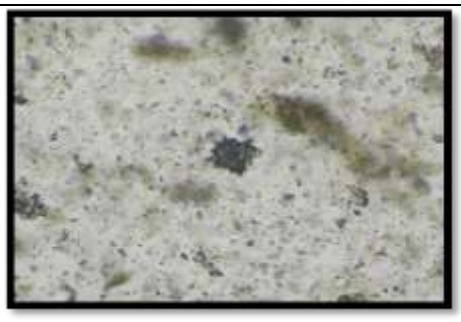
 13. Filament of Androicium	 14. Pappilose and Crystals of Filament	 15. Gynoecium- Stigma & Style
 16. Micro morphology of Gynoecium	 17. T.S of Ovary	 18. Five Vescular bundle
 19. Rossete Crystals of calcium oxalate	 20. Singal Vescular bundle	

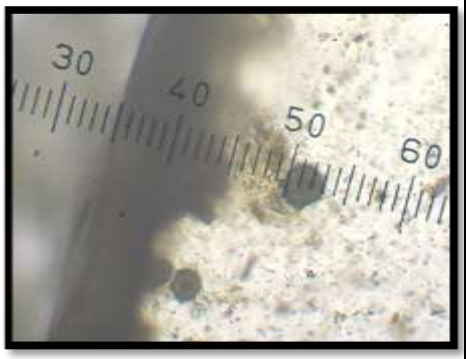
Plate 2: Photographs of Powder Microscopy

 21 . Bi-lobed trichome	 22. Rosette crystal- calcium oxalate	 23. Pollen grains

24. Simple trichome

25.Parenchayma with prismatic crystals

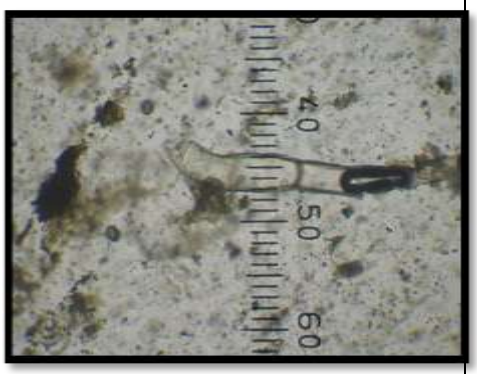
26. Arrow safe trichome



27. Rossete crystals with measurement

28.Palaside cells

29. Multi cellular trichome



30. Multi cellular trichome

31. Fargment of epidermal cells of gynoecium

32. Stomata from perianth (sepaloid)

33. Brown content

34. Annular and spiral vessels from gynoecium

Table No.1 Micromorphology Values of Individual Character

Sr. No	Characters	Measurements	
1.	Petal	Length – 3cm	
		Width	Base-0.5cm
			Widdle- 1cm
			Top-0.6cm
2.	Androecium	2cm	
3.	Gynoecium	3cm	
4.	Stigma stile	2.7cm	

Table No.2 Micrometric Values of Individual Character

Sr. No	Characters	Measurements
1.	Measurement of pollen grains (40X)	0.5mm
2.	Measurement of multicellular trichome	7.5mm×0.2mm
3.	Measurement of rosette crystal (4X)	1mm
4.	Stomata measurement (40X)	1.5mm×0.9mm
5.	Cluster crystals	0.7mm

REFERENCES

1. Alviano DS,Alviano CS, Plant extracts search for new altermatives to treat microbial diseases Curr Pharm Biotechnol 2009; 10: 106-21.
2. WHO. Who Traditional Medicine Strategy 2002-2005. Geneva World Health Organization; 2002.
3. O P Sharma, Plant Taxonomy, 2nd ed. 2009Tata Mc Graw-Hill Education Private Limited New Delhi p.no .339
4. O P Sharma, Plant Taxonomy, 2nd ed. 2009Tata Mc Graw-Hill Education Private Limited New Delhi p.no. 340
5. A C Dutta Botany, For Degree Student, 6th edi. Oxford university press. 2008,p.no.535
6. H.O.Saxena, Flora of the Orissa, Volume 2, Regional research laboratory, Bhuvneshwar, April 1995, p.no.763.
7. Pg. 761, the flora of Orissa, Saxena ho, Brahmam M, vol II, oriisa forest development and corporation ltd., Bhubaneswar, 1995.
8. Trease and Evans, Pharmacognosy, 15th Ed., W.B. Sunders Company Ltd. 1996 p.569, 570.
9. Wallis TE, Text book of Pharmacognosy, 5th Ed., New Delhi: CBS Publishers & Distributors2002 p. 123-132, 210-215.)