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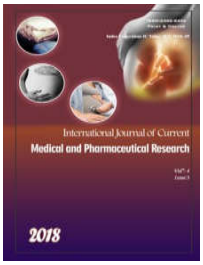

PHARMACOGNOSTICAL STUDIES OF *APAMARGA (ACHYRANTHESASPERA LINN.)* AND *it's TIKSHNA KSHARA*

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ABSTRACT

Apamarga (*Achyranthesaspera* Linn.) *Tikshna kshara(Strong potency alkaline)* is analkaline substance obtained from filtrate of water soluble contents of *Apamarga ash,* after evaporating it to dryness. *Achyranthesaspera* Linn. isfrom Amaranthaceae family which called *Apamarga* in Sanskrit and Chaff tree in English. *Achyranthesaspera* is very usefull plant of Ayurveda which is use in different diseases condition like vomiting, bronchitis, heart diseases, piles, dysentery, blood diseases and as laxative, stomachic, tonic etc. The present study involves the macroscopy, microscopy and physicochemical evaluation studies of *Achyranthesaspera* of whole plant (steam, leaf, root, and seed) as well its *Tikshna Kshara(plant alkali)*. These observations will help in proper authentication and standardization of the drug and also to check adulteration in the raw drug.

INTRODUCTION

Achyranthesaspera linn is a species of plant in the Amaranthaceae family [1]. It is distributed throughout the tropical world which is called *Apamarga* in sanskrit and prickly chaff-flowerin as English name. Itis wild small, erect, perennial herbs with woody base about 30-90 cm in height, Stems are angular, simple and ribbed with tinged purple colour. Leaves are opposite, simple, ovate finely attached to stem on both sides. Flowers are bracteolate, complete, bisexual, greenish white in colour and seeds of *Apamarg* (*Achyranthesaspera)* are endospermic reddish brown in colour subcylindric at apex and rounded at the base[2]. It is used as anti-inflammatory, analgesic, antidote, antiseptic, nasal decongestant, carminative, appetizer, antacid, anthelmintic, blood purifier, diuretic, diaphoretic and antipruritic [1]. *Kshara(plant alkali)* is analkaline substance which is obtained from filtrate of water soluble contents of plants ash, after evaporating it to dryness. Although *kshara (plant alkali)* is a highly alkaline substance but its function is inherited from the mother plant used for its preparation. Ancient surgeon *Sushruta* abides the supremacy of the *kshara* (*plant alkali)* than any of the surgical and para-surgical technique. Its action is like the surgical procedure such as excision, incision, drainage and scraping of unhealthy tissues of body and it is used in very special circumstances [3]. According to its therapeutic use *sushruta* described two types, *pratisaraniya kshara* and *paneeya kshara.* According to its potency *kshara (plant alkali)* has been recognized as three types'*mridukshara* (mild potency), *madhyam kshara* (moderate potency) and *tikshna kshara* (high potency)[4].

MATERIAL AND METHODS

Collection of plant material: The fresh plant of *Achyranthesaspera* was collected in the month of November from locality of jamnagar and authenticated by Dr. C. R. Harisha, Pharmacognosy Laboratory of Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India. The fresh plant was collected and placed immediately for anatomical studies. From the pharmacy of IPGT&RA, GAU, Jamnagar, India i have collected *kshara(plant alkali)* sample for my thesis work.

Macroscopic*:* The fresh plant *of Achyranthesaspera* were studied for morphological investigation of its characters such as size, shape, margin, nature, texture, apex, surface, colour, odour, taste as well as organoleptic character of *kshara (plant alkali)*[Figure-1]

Microscopic*:* For microscopy, free hand section of stem, root, and leaf were cut and stained through hand peeling method [5]. Semiliquid *kshara (plant alkali)* was also observed in microscope. Both upper and lower surface was used to surface study through hand peeling method. Micrometric readings of

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both surface i.e. stomatal length, stomatal index etc. were scientifically studied and mean value taken in to consideration [6]. Microscopy of shade dried seed powder were observed. *Tikshana kshara* was subjected in microscope for the study. All photomicrographs were taken with microscope attached camera.

RESULT AND DISCUSSION

Fresh plant of *Apamarga* (*Achyranthesaspera* linn) was collected from Garden of Gujrat Ayurveda University and identified through various flora in lab of pharmacognosis of IPGT&RA, Jamnagar, India. *Tikshna kshara* was collected from the Pharmacy of IPGT&RA Jamnagar, India. Leaves were separated from the stem, leaves and stem washed with running fresh water and few pieces stored in solution of AAF (Alcohol: Acetic acid: Formalin) in the ratio of (90:5:5) to utilize them for microscopic studies. *Tikshna kshara* sample was diluted in distil water for microscopic study.

in both surface. Rosette crystals of calcium oxalate found scattered in ground tissues, prismatic crystals, and simple warty trichome, fragment of annular vessels, yellow brownish contents were seen [Figure-2].

Microscopic

Transverse section of Stem

Transverse section of Stem diminish downward up to the base where it becomes cylindrical which showed 6-10 prominent ridges, lignified, thin-walled cork cells; pericycle a discontinuous ring of lignified fibers and epidermis was single layered externally with a thick cuticle. Vascular tissues show anomalous secondary having 4-6 incomplete rings of xylem and phloem were important characters observed in the stem. Cortex was composed of 6-10 layers of parenchymatous cells; many of them contain rosettes of calcium oxalate crystals. Pith was occupied in the central part of the stem in which two

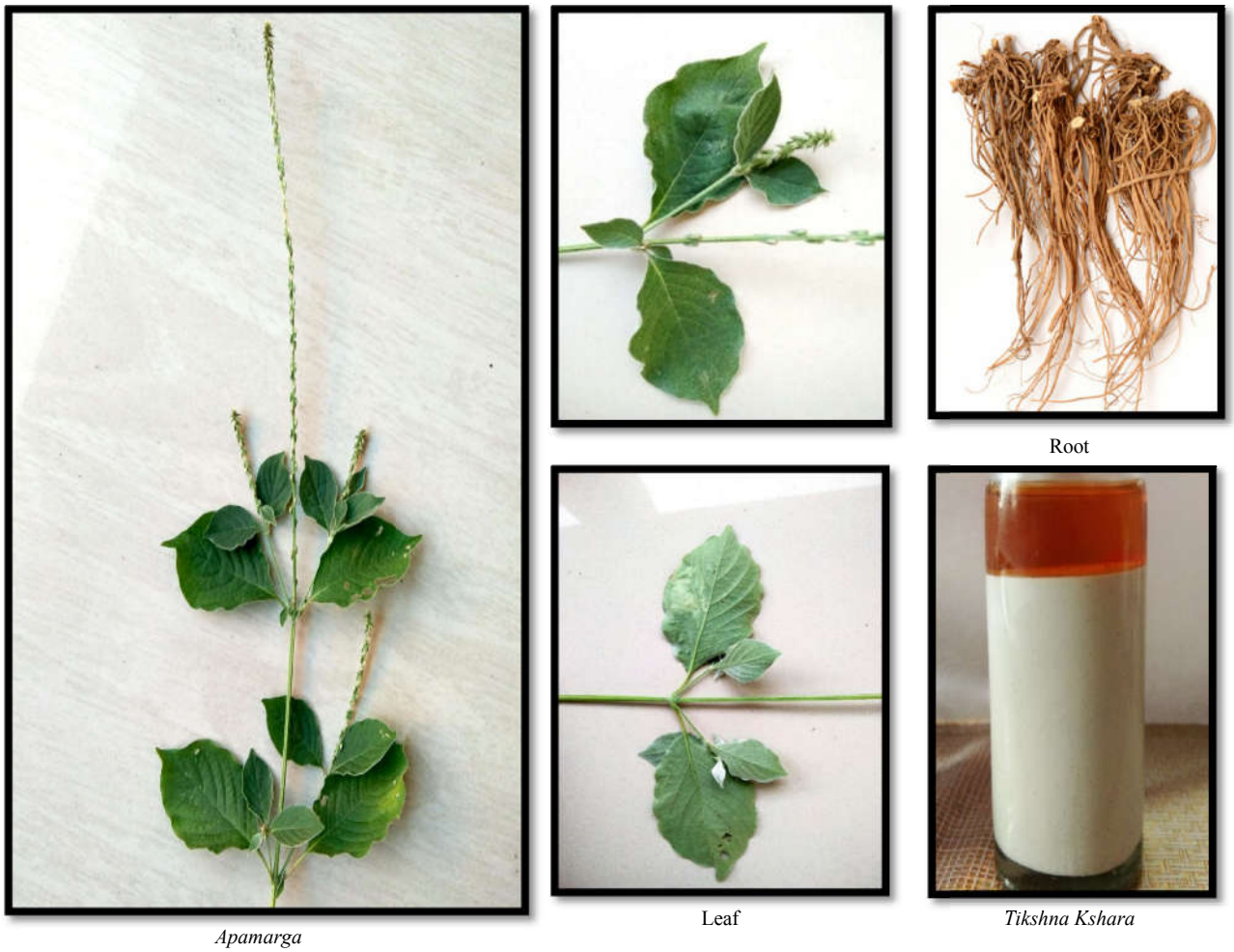


Figure 1 Natural habitat of plant & *Tikshna Kshara*

Transverse section of Midrib

Throw mid rib Transverse section of leaf showed a single layered epidermis, epidermis followed by 2-3 layered collenchyma cell on lower side and 4-5 layered on upper side on both surfaces; consisting of thin walled ground tissue; number of vascular bundles were in parenchymatous cells; each vascular bundle shows below the xylem vessels, thin layers of cambium, followed by phloem and a pericycle represented by 2-3 layers of thick-walled, non-lignified cells; leaves idioblast containing oxalate distributed in palisade and spongy parenchyma cells; anomocytic and stomata anisocytic

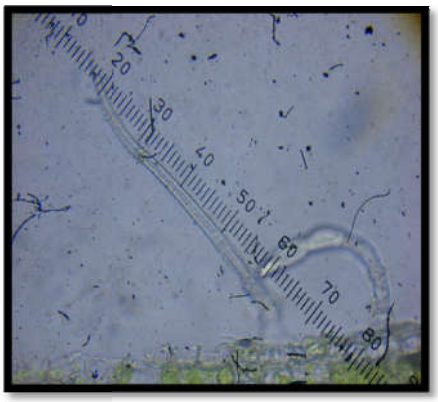
medullary bundles were found either separate throughout or fused in some cases. Distinctive characters, rosette crystals, annular vessels, fragment of border pitted vessels, short warty trichoms were identified [Figure-3].

Transverse section of Root

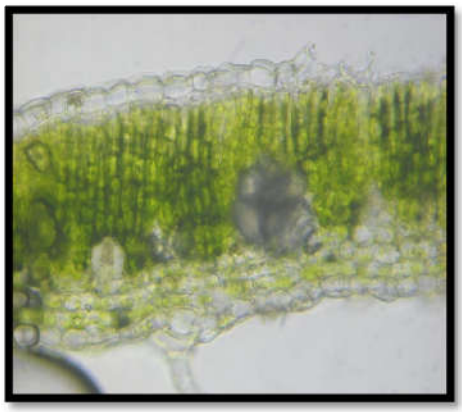
Transverse section of root showed single layered epidermis, followed by 6-19 layered, rectangular, tangentially, elongated, thin-walled cork cells. Conjunctive parenchymatous tissues and Arcas or patches of phloem were much smaller and hence appear embedded in the xylem mass in the stem. Pith was absent and Xylem composed of tracheids, fibers and parenchyma; vessels with both simple and bordered pits.

T. S. through midrib

Covering Trichrome

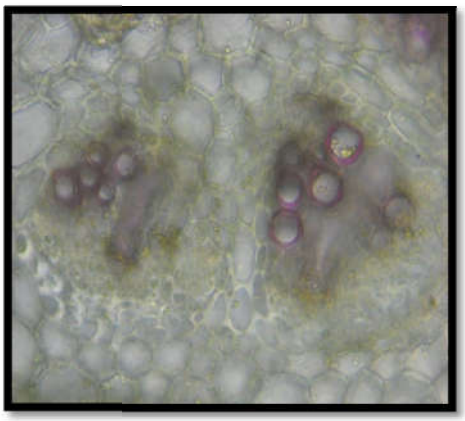


Covering Trichrome with measurement



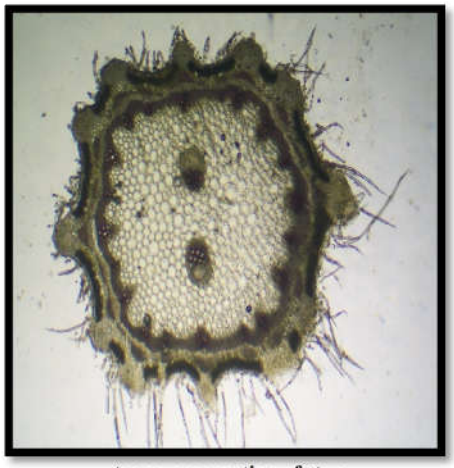
Palisade cell & spongy parenchyma along with rosette crystal

Glandular Trichrome & Covering Trichrome

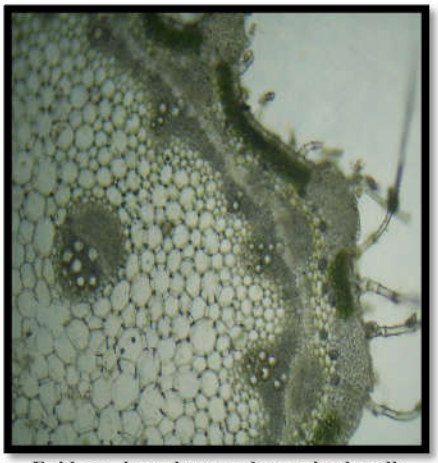


Vascular bundles with phloem and xylem with stain.

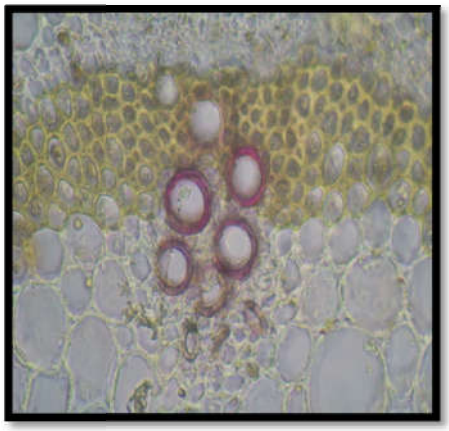
Figure 2 Transverse section of leaf through mid-rib



transverse section of stem



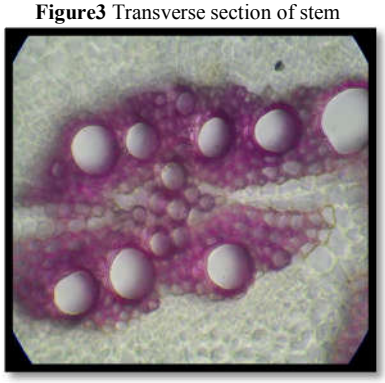
Epiderm, hypoderm and vascular bundle.



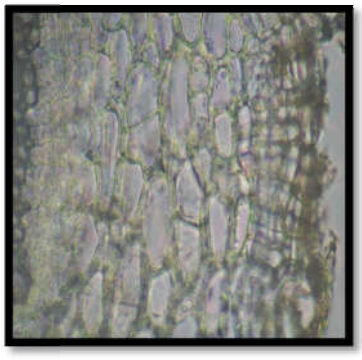
VB with Xylem and phylum

Figure3 Transverse section of stem

T.S. of root



Vascular bundles



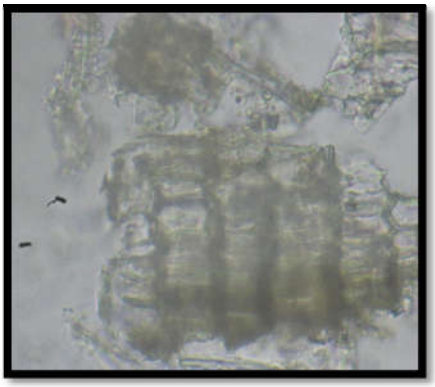
Cortex and cork

Figure 4 Transverse section of root

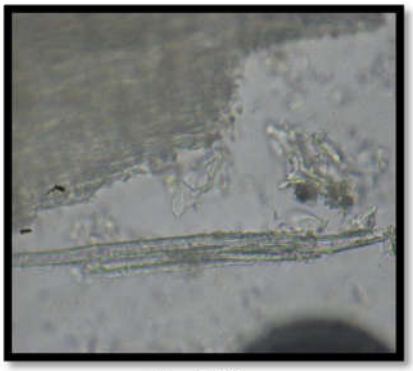
Distinctive characters cork in transverse and surface view, prismatic crystals of calcium oxalate, fragment of border pitted vessels, fibres passing through medullary rays and border pitted vessel were identified [Figure-4].

Panchanga (Whole plant) Powder Microscopy

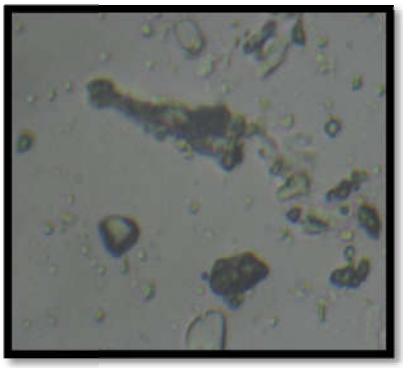
Microscopic characters of *Panchang* (Whole plant) powder showed covering trichome, glandular trichome, calcium



Cork cell

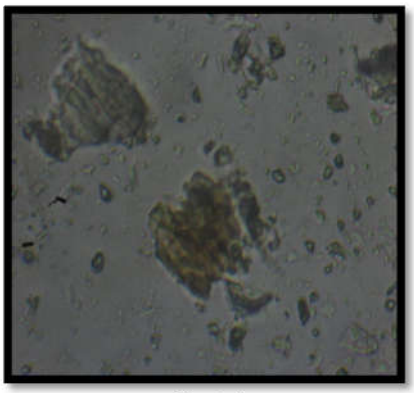


Simple fibres

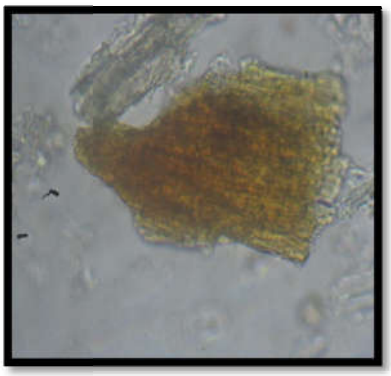


Prismatic crystals

Border of pitted vessel

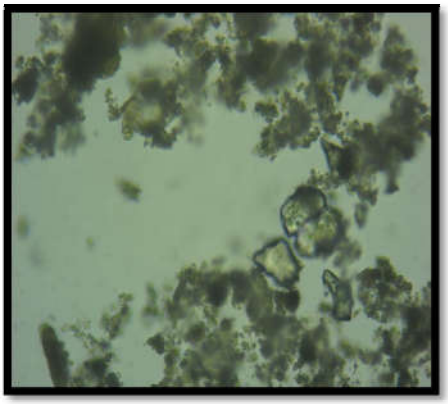


Crystals

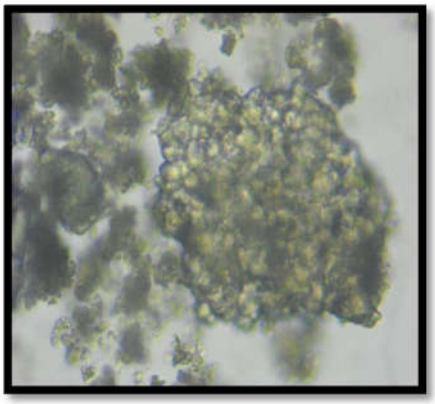


Tannin content

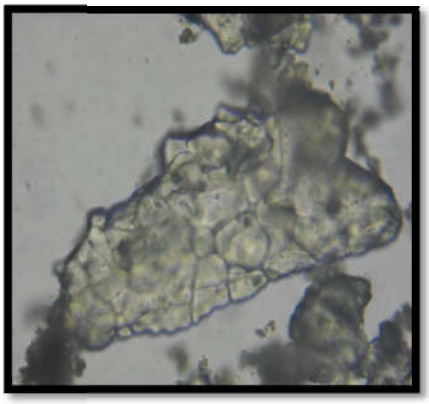
Figure 5 Whole plant powder



Microscopy of *Tikshna Kshara*

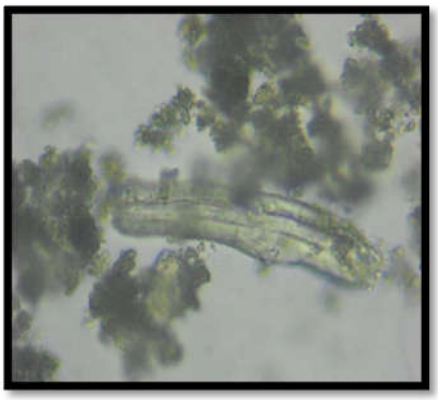


Crystal mass

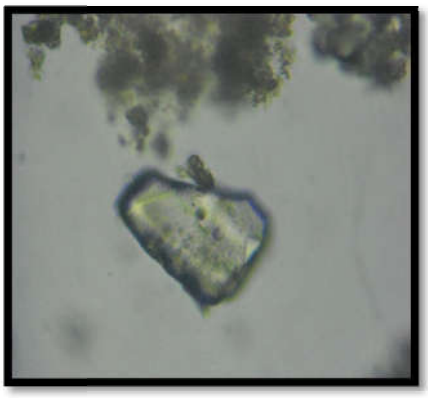


Uneven shaped of crystal

Stone cell of chitrakmool



Scleride of chitrakmool



Prismatic crystal

Figure 6 Microscopy of *Tikshna Kshara*

oxalate crystals of the stem, vessels of the roots showing bordered pits, pitted vessels of the stem, tracheid of the stem with simple pits, Prismatic and Rosettee crystals, Simple fibres, Lignified fibres, Yellow brownish content (tannins), Oil globules, Annular vessels, Short warty trichoms along with starch grain, Stomata anomocytic, Epidermal cells, Polyhedral pollan grains and Spiral vessels [Figure-5].

Table 1 Organoleptic characters of Panchanga (Whole plant) powder.

Parts	Colour	Order	Touch	Taste
***Panchang*Powed**	Creemish yellow	Astringent	Course	*Kashaya*

Microscopy of Apamarga Tikshna Kshara

Microscopic of *Tikshna kshara* (Strong potency alkaline) *showed* Crystal mass, Brown content, Uneven shaped of crystal, Stone cell of chitrakmool, Scleride of chitrakmool, Prismatic crystal. Crystal cluster was observed in proper *Tikshna kshara* (Strong potency alkaline) which was not observed in previous which was not proper *Tikshna kshara* (Strong potency alkaline) or in *Madhyam kshara* (Mderate potency alkaline) [Figure-6]

Table 2 Organoleptic Parameters of *Apamarga TikshanaKshar*

Sr.no.	Parameter	Results
1	Colour	Whitish
2	Odour	Like urine
3	Taste	Salty, Alkaline
4	Texture	Hygroscopic
5	Touch	Irritant to tongue : gives cooling sensation

CONCLUSION

Pharmacognostical study of *Achyranthesaspera* Linn. & its *Tikshna kshara* reveals specific parameters that will be helpful in the individual characteristics, identification and authentication of the *Achyranthesaspera* Linn. & its *Tikshna kshara.* Prismatic and Rosette crystals, Simple fibres, Lignified fibres, Pollen grain this helps in further research. Crystal cluster was observed in proper *Tikshna kshara* (Strong potency alkaline). Till date pharmcognosy study was not mention in pharmacopeia of *Tikshna kshara* so this result may consider in pharmacopeia in future and further research is required in lager batch.

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