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PHARMACOGNOSTICO ANALYTICAL EVALUATION OF CHITRAKA HARITAKI AVALEHA AN AYURVEDIC FORMULATION FOR TONSILLITIS

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ABSTRACT

Tonsillitis is a very common prevalent disease seen especially during morbid seasonal variation. It may occur as a primary infection of tonsil, or secondary to upper respiratory tract infections. Acute tonsillitis often affects school going children, but also affects adults, it is rare in infants and in persons who are above 50 years of age. It is one of the disease of oropharynx which compels the patient to feel uneasy, restlessness and sometime bed-ridden condition if complication occurs. The main symptoms of Tonsillitis are sore throat, difficulty in swallowing, fever, earache, headache, malaise, hoarseness of voice etc. *Chitraka Haritaki Avaleha* was taken from *Chakradutta-Nasaroga* Chikitsa, well known text of Ayurveda. **Aim:** To analyze pharmacognostico analytic evaluation of *Chitraka Haritaki Avaleha* **Materials and Method:** A literature search was carried out pertaining to Tonsilllitis (*Tundikeri*)Final product was subjected to pharmacognostical and analytic such as physico-chemical parameters Specific gravity, Acid Value, Refractive index, Iodine Value, Saponification value etc. **Result:** Physicochemical constants like pH, loss on drying, ash value, water soluble extract, HPTLC (High Performance Thin Layer Chromatography) where

evaluated. **Conclusion:** The present work was carried out to standardize the finished product *Chitraka Haritaki Avaleha* in terms of its identity quality and purity.

KEYWORDS: *Chitraka Haritaki Avaleha*, *Tundikeri*, Tonsillitis, HPTLC, Pharmacognosy, Analytic.

INTRODUCTION

In Ayurveda classics *Tundikeri* considered as one of the *Mukharoga* which comes under *Kanthagata*[1] or *Talugata Roga*[2] according to different *Acharayas*. The symptoms of *Tundikeri* such as *Shopha* (inflammation), *Toda* (Pain), *Daha* (Sore Throat), *Prapaka* (Suppurative inflammation) are more similar to Tonsillitis. Tonsils become inflamed when they are fighting a pathogen and inflammation of tonsils is known as Tonsillitis. Acute tonsillitis is acute inflammation of the tonsils. Although it is mainly seen in childhood it is also frequently seen in adults. Oro-dental hygiene, poor nutrition, congested surroundings are important predisposing factors. The main symptoms of Tonsillitis are sore throat, difficulty in swallowing, fever, earache, headache, malaise, hoarseness of voice.[3] The main sign of Tonsillitis is enlarged tonsils, raise in temperature, tonsils are stubbed with yellowish spots, hyperemia of pillars, soft palate and uvula, enlarged tonsillar lymph nodes with tenderness (jugulo-digastric lymphnodes). Tonsils are an important part of immune system throughout life, so it is best to avoid removing them. In Modern science number of medicines like anti-inflammatory, NSAIDS, antibiotics, analgesics etc. are advocated. Moreover, routine use of these drugs leads to GI tract disturbances and suppress the immunity. Further in recurrent attacks of Tonsillitis, there is a need for surgical intervention. In contrast to that Ayurveda has a variety of natural medications in the treatment of *Tundikeri* (Tonsillitis) which are free from GIT disturbances and also enhances the immunity power which decreases the chance of recurrent infection. According to different *Samhitas*, various internal medicines and local procedures are advocated in the management of *Mukharogas*. The present study is an effort to understand the disease according to *Ayurvedic* principles. *Chitraka Haritaki Avaleha* (*Chakradutta-Nasaroga Chikitsa*) has *Rasayana* (immunomodulatory) and *Rogahara* property. It will give an immuno modulatory effect which was effective in the management of Tundikeri (Tonsillitis).

MATERIALS AND METHODS

The study involved the following operating procedures.

Collection, identification and authentification of raw drugs

The raw drugs except Honey and Jaggery were procured from the Pharmacy, Gujarat Ayurveda University, Jamnagar, Gujarat, India. Honey and Jaggery were procured from local market of Jamnagar, Gujarat, India. The ingredients and the part used are given in the Table 1. The raw drugs were identified and authenticated by the department of Dravyaguna and Pharmacognosy laboratory of IPGT and RA, Gujarat Ayurveda University, Jamnagar, Gujarat, India. The identification was carried out based on the morphological features, organoleptic characters and powder microscopy of the individual drugs and formulation as per API standards for the authentification.

Preparation of the drug

Chitraka Haritaki Avaleha has been prepared at Pharmacy of Gujarat Ayurved University, Jamnagar.

Method of preparation

The ingredients *Chitraka, Amalaki, Guduchi, Dashmoola* (*Kwatha Dravyas*) of the formulation were washed, dry and powdered separately. The drugs were made into coarse form. *Haritaki* was dried and powdered separately and ingredients *Yavakshara, Shunthi, Pipalli, MAricha, Dalchini, Tejpatra, Ela* (*Prakshepa Dravyas*) of the formulation composition was finely powdered. Required amount of water was added to the *Kwatha Dravya*, heated to reduce one fourth and filtered through a cloth. All the *Kwatha Dravyas* mixed together. Jaggery, was added and boiled till it got dissolved and filtered through a cloth. *Kwatha* was reduced to a thicker consistency by gradual heating. *Haritaki Churna* was added and stired thoroughly during process. Powdered *Prakshepa Dravyas* were added and mixed thoroughly to prepare a homogenous mass. Whole product allowed cooling to room temperature. *Madhu* was added and mixed thoroughly. And then formulation packed in the air tight container.

Pharmacognostical evaluation

Organoleptic and Microscopic studies of the prepared drug were done as per the guidelines of Ayurvedic pharmacopoeia of India at Pharmacognosy Lab, I.P.G.T and R.A, Jamnagar, Gujarat, India. The sample drugs were dissolved in small amount of distilled water for a while and then mounted in glycerin. Powder microscopy of both the samples was carried out without stain and after staining with Phloroglucinol + HCL. By powder microscopy, the characters were observed and the chemical nature of the cell wall along with the form and

chemical nature of the cell contents was determined. Microphotographs were taken under Carl-Zeiss trinocular microscope that was attached with the camera.[4]

Physicochemical analysis of the *Chitraka Haritaki Avaleha*

Chitraka Haritaki Avaleha was analyzed by using, qualitative and quantitative parameters as per guidelines at Pharmaceutical Chemistry Laboratory of I. P. G.T and R. A., Gujarat Ayurveda University, Jamnagar, Gujarat, India.[5]

RESULTS

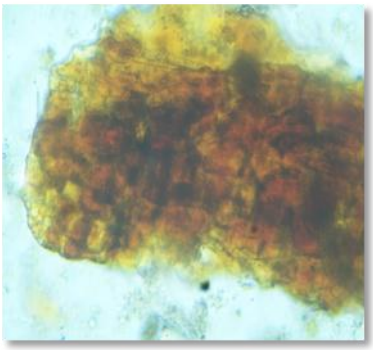
Pharmacognostical study of compound formulation *Chitraka Haritaki Avaleha* Organoleptic characters. The organoleptic characters and microscopic characters of *Chitraka Haritaki Avaleha* are depicted in Table 2.

Microscopic Evaluation

Chitraka Haritaki Avleha ingredients showed the Border pitted vessles of *Chitraka*, Cork cells with tannins of *Chitraka*, Collenchyma cells of *Guduchi*, Crystal fibres of *Bilwa*, Epicarp cells of *Haritaki*, Epidermal cells of *Yavkshara*, Fibers of *Bibhitaka*, Fibers of *Shunthi*, Lignified cork of *Shyonaka*, Oil globules of *Tejapatra*, Pollen grains of *Honey*, Prismatic crystals of *Agnimantha*, Prismatic crystals of *Kantakari*, Prismatic crystals of *Patla*, Rhomboid crystals of *Gambhari*, Rosette crystals of *Ela*, Scleroids of *Amalaki*, Silica deposition of *Amalaki*, Scleroids of *Haritaki*, Scleroids of *Shyonaka*, Simple unicellular trichome of *Shalparni*, Spiral vessles of *Prishnaparni*, Starch grains of *Yavakshrara*,, Stellate trichome of *Kantakari*, Stone cells of *Bilwa*, Stone cells of *Gokshura*, Stone cells of *Maricha*, Stone cells of *Pipalli*, Stone cells of *Shyonaka*, Tannin content of *Twaka*, Trichomes of *Tejapatra*, Stone cells of *Guduchi*, Epicarp cells of *Pipalli*, Oleoressins of *Pipalli*, Cork cells of *Guduchi*, Mesocarp cells of *Amalaki* were found. (Photo Plate-1)

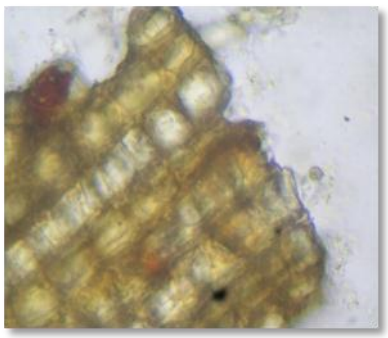
Photo plate-1 Microscopic characters of *Chitraka Haritaki Avaleha*

Border pitted vessels of *Chitraka*

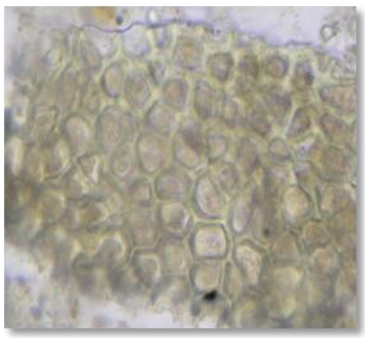


Cork cells with tannins of *Chitraka*

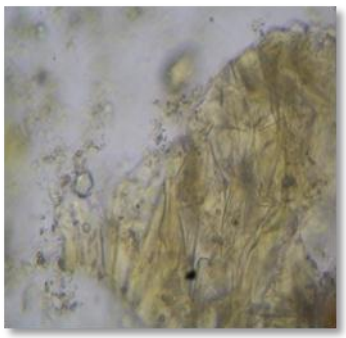
Collenchyma cells of *Guduchi*



Crystal fibers of *Bilwa*

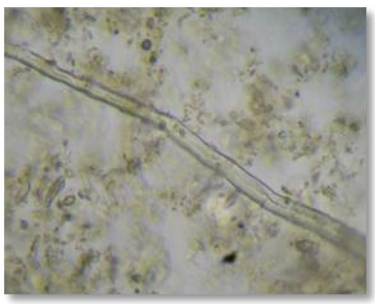


Epicarp cells of *Haritaki*



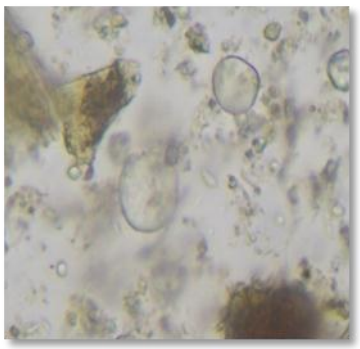
Epidermal cells of *Yavakshara*

Fibers of *Brihati*

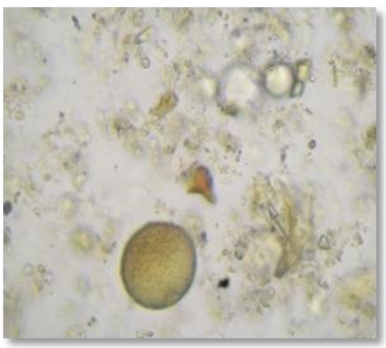


Fibers of *Shunthi*

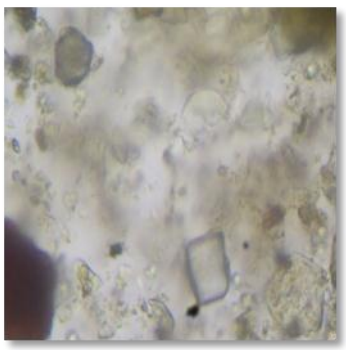
Lignified cork of *Shyonaka*



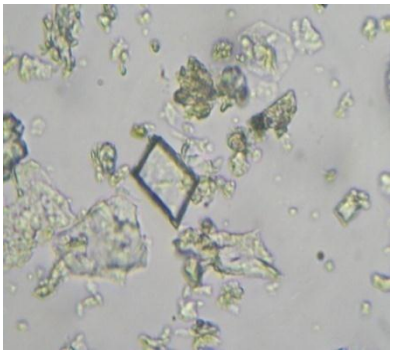
Oil globules of *Tejapatra*



Pollen grains of *Madhu*

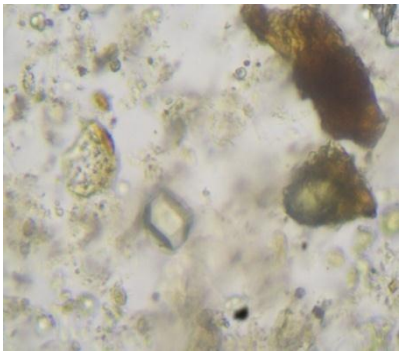


Prismatic crystals of *Agnimantha*

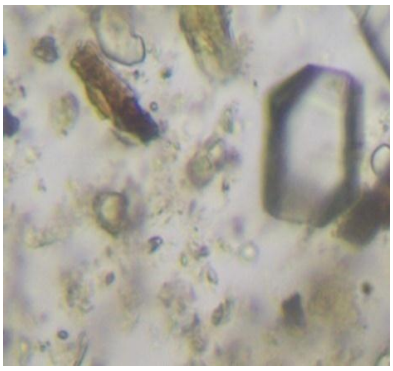


Prismatic crystals of *Kantakari*

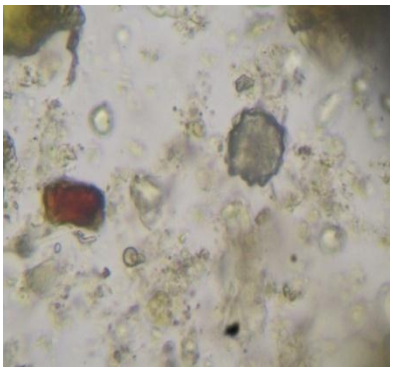
Stellete trichome of *Kantakari*



Prismatic crystals of *Patla*

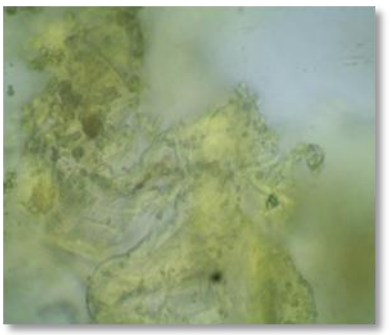


Rhomboid crystals of *Gambhari*

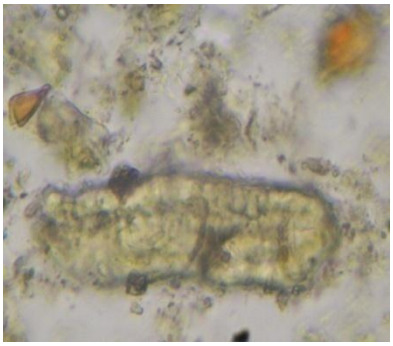


Rosette crystals of *Ela*

Scleroids of *Amalaki*



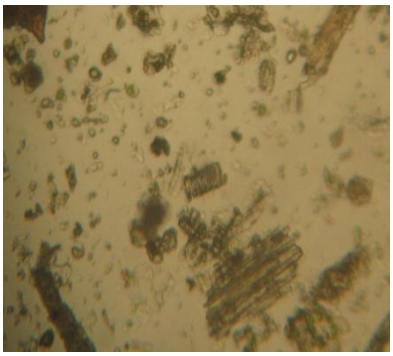
Mesocarp cells of *Amalaki*



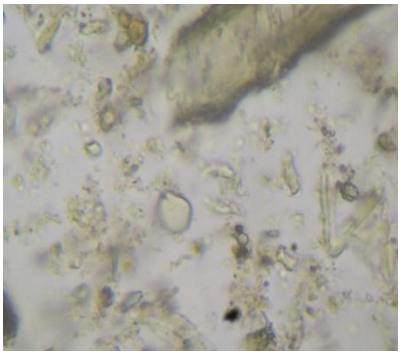
Scleroids of *Haritaki*

Scleroids of *Shyonaka*

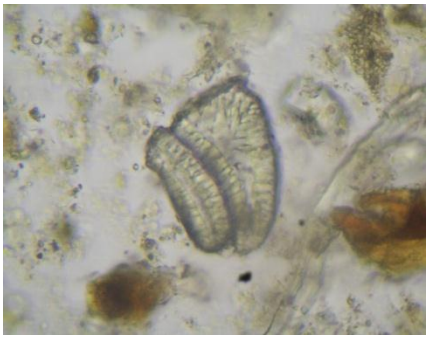
Simple unicellular trichome of *Shalaparni*



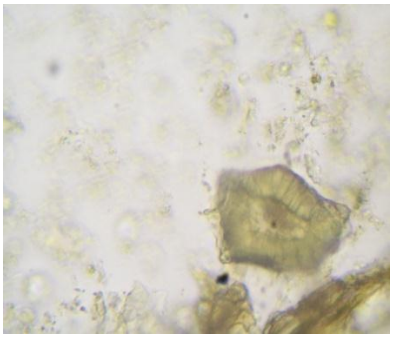
Spiral vessel of *Prishniparni*



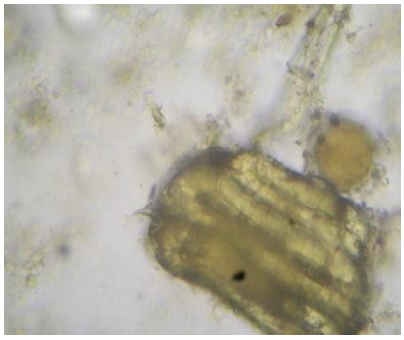
Starch grains of *Yavakshara*



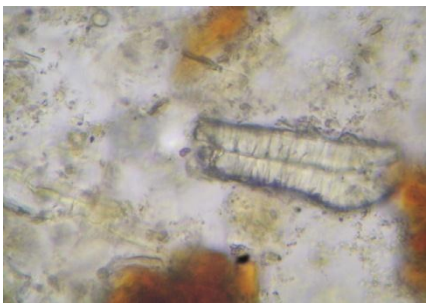
Stone cells of *Bilwa*



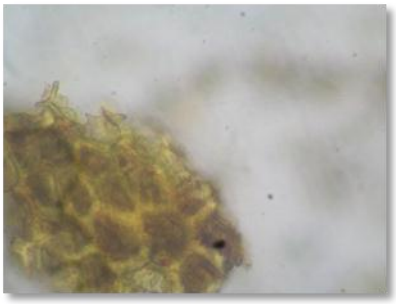
Stone cells of *Gokshura*



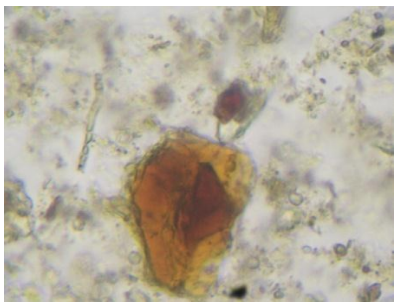
Stone cells of *Maricha*



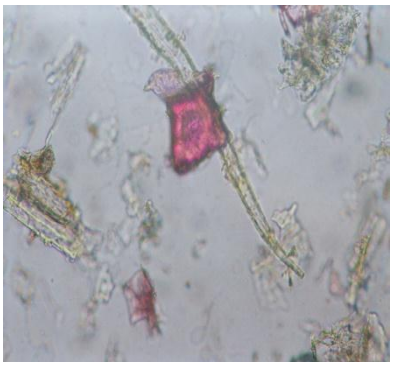
Stone cells of *Pippali*



Epicarp cells of *Pippali*

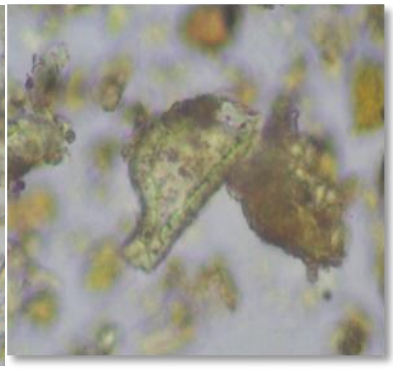


Tannin content of *Twaka*

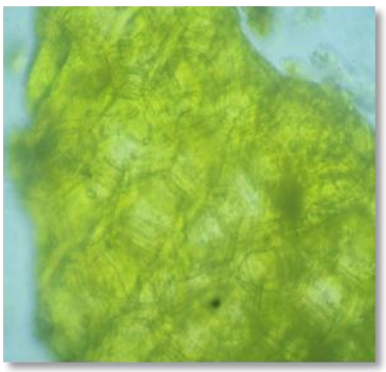


Stone cells of *Shonyaka*

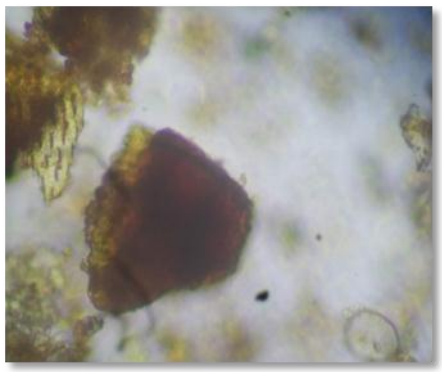
Trichomes of *Tejpatra*



Stone cells of *Guduchi*



Cork cells of *Guduchi*



Oleoresin of *Pippali*

Analytical study of *Chitraka Haritaki Avaleha*

The prepared drug was analyzed for the physical and chemical parameters such as loss on drying, pH, ash value, sugar content, water soluble extract and alcohol soluble extract,

reducing and non-reducing sugar, HPTLC. The results are cited in Table 3. And HPTLC graph given in figure.1,2,3. And result in table 4.

Method for HPTLC

Methanol extract of *Chitraka Haritaki Avaleha* and *Haridradi Pratisarana* were spotted on pre coated silica gel GF 254 aluminum plates by means of CAMAG Linomate V sample applicator fitted with a 100 µL Hamilton syringe. The mobile phase consisted of Toluene, Ethyl acetate and Acetic acid in a ratio of 7:2:1 v/v. After development densitometric scan was performed with a CAMAGT. L. C. scanner III in reflectance absorbance mode at 254 and 366nm under control of Win CATS Software.

Densitometric analysis of *Chitraka Haritaki Avaleha* at 254nm and 366nm

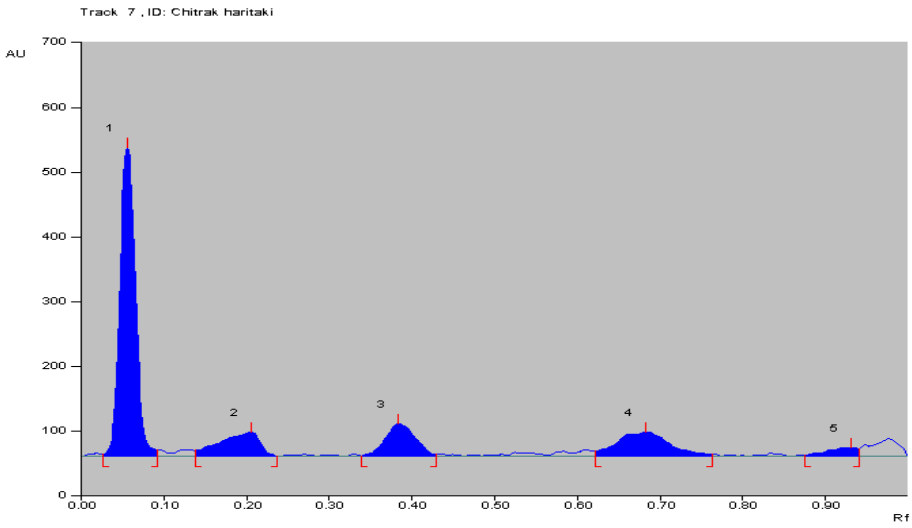


Fig1: Peak display at 254 nm

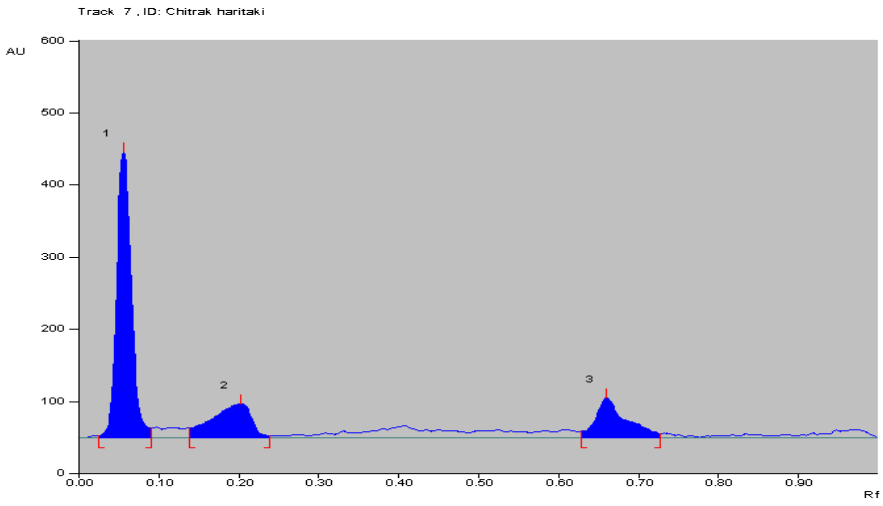


Fig2: Peak display at 366 nm

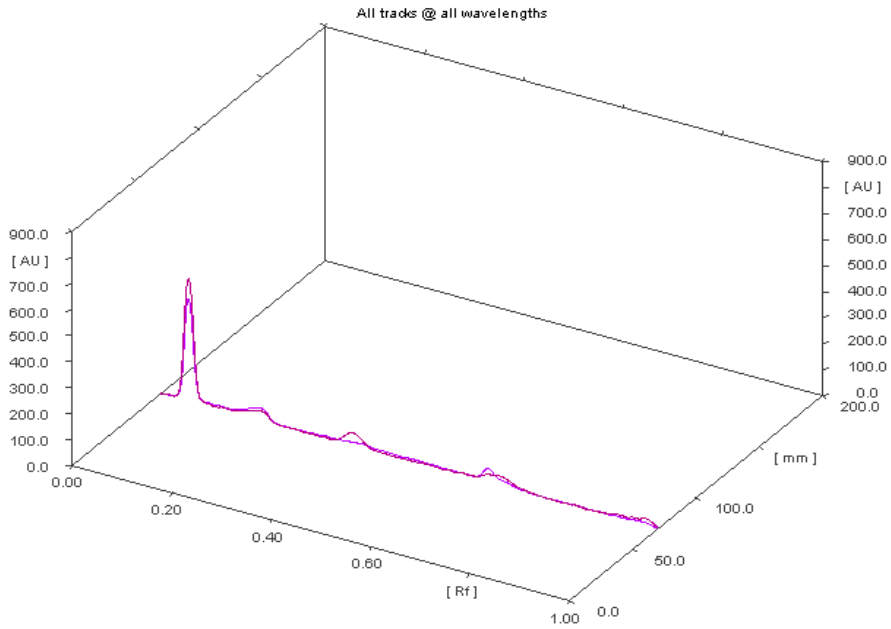


Fig. 3: 3D Graph.

DISCUSSION

Microscopic identification of the botanical ingredients is a standard for statutory purposes in several solid and semisolid compound formulations. In the present investigation, pharmacognostical and physico-chemical studies were conducted on *Chitraka Haritaki Avaleha* as per API guidelines. These studies revealed the presence of various important bioactive compounds and proved that these all are medicinally important too. The finished product proved all the ingredients were present in formulation. This showed genuinity and quality of *Avaleha*. Sclereids found in *Haritaki*, *Amalaki* and *Guduchi* help to prevent collapse of softer tissues at times of water stress. Fibers found in *Amalaki*, *Shyonak* and *Chitraka* has high load-bearing capacity. Parenchyma generally constitutes the "filler" tissue in soft parts of plants. They allow the cells to store and regulate ions, waste products, and water. Tissue specialized for food storage is commonly formed of parenchyma cells. Sclereids, parenchyma and fibers are used to protect other cells.[6] Main ingredient of *Chitraka Haritaki Avaleha* is *Haritaki* which contains tannin. Tannins belong to the phenolic class of secondary metabolites.[7] Tannins such as chebulagic acid, chebulinic acid, tannic acid and gallic acid belong the hydrolysable group and are extensively used for medicinal purposes.[8,9] Terminalia chebula Retz. contains hydrolysable type of tannins. Tannic acid is the principle ingredient in anti-allergen sprays.[10] Orally, tannic acid applied directly can treat sore throat and tonsils and fever blisters. When consumed, tannic acid can medicate bleeding, persistent coughs, cancer etc.[11] A systematic review by Chung et al. (1998)[12]

found that tannins have also been reported to exert many physiological effects, such as to accelerate blood clotting, reduce blood pressure, decrease the serum lipid level and modulate immune responses. Starch present in many drugs of *Avaleha* is the main form by which plants store carbohydrate and is a major photosynthetic product in many species16. Pollen in *Nagakesara* contains within itself sperm cells, complete with cell walls and plasma membranes. Function of pollen- Biotic and abiotic pollinator preference and fluid dynamics.[13] Calcium oxalate crystals found in Ela (cluster crystal), Gokshura, Patala, Shalaparni (prismatic crystal) and Twak (acicular crystals). Oxalic acid (ethanedioic acid), and its salts occur as an end product of metabolism in a number of plants. Oxalate is associated with metabolic disorders and infectious diseases.[14] The crystals are especially common in the cells bounding the air chamber of stomata which certainly require some mechanical support. Perisperm cells and Endosperm cells are identical cells of Trikatu.[15]

CONCLUSION

The ingredients were identified and authenticated phamacognostically and were used for the preparation of *Chitraka haritaki avaleha*. The formulation was subjected to pharmacognostical and physico-chemical studies. It is inferred that the formulation meets all the standards as reported in the API and useful for further documentation.

Table 1: *Chitraka Haritaki Avaleha: (Chakradutta- Nasaroga Chikitsa 58/28-30).*

No.	Sanskrit Name	Latin Name	Part Used	Part
1	*Chitraka Mula*	*Plumbago zeylanica* Linn.	Root	1
2	*Amalaki*	*Emblica officinalis* Geartn.	Fruit	1
3	*Guduchi*	*Tinospora cordifolia* Miere.	Stem	1
4	*Dashamula*			1
	a) Bilwa	*Aegle marmelos* Linn.	Stem bark	-
	b) Gambhari	*Gmelina arborea* Roxb.	Stem bark	-
	c) Agnimantha	*Premna mucronata* Roxb.	Stem bark	-
	d) Shonyaka	*Oroxylum indicum* Vent.	Stem bark	-
	e) Patala	*Stereospermum suaveolencs* DC.	Stem bark	-
	f) Brihati	*Solanum indicum* Linn.	Whole plant	-
	g) Kantkari	*Solanum surrattense* Burm.	Whole plant	-
	h) Gokshura	*Tribulus terrestris* Linn.	Whole plant	-
	i) Shalparni	*Desmodium gangeticum* DC.	Whole plant	-
	j) Prishnaparni	*Uraria picta* Desv.	Whole plant	-
5	*Haritaki*	*Terminalia chebula* Rertz.	Fruit	1/29
6	*Guda*	*Saccharum officinarum* Linn.	-	1
7	*Yavakshara*	*Hordeum vulgare* Linn.	Water soluble ash	1/200
8	*Madhu*	*Appis indica.*	-	1/12.5
PRAKSHEPA DRAVYA:-				

9	*Shunthi*	*Zingiber officinalale* Roxb.	Rhizome	1/50
10	*Pippali*	*Piper longum* Linn.	Fruit	1/50
11	*Maricha*	*Piper nigrum* Linn.	Fruit	1/50
12	*Dalchini*	*Cinnamomum zeylanicum* Blume.	Stem bark	1/50
13	*Ela*	*Elettaria cardamomum* Linn.	Seed	1/50
14	*Tejpatra*	*Cinnamomum tamala* Nees & Eberm.	Leaf	1/50

Table 2: Organoleptic characters of *Chitraka Haritaki Avaleha.*

Sr. No	Parameters	Sample –*Avaleha*
1.	Colour	Dark Brown
2.	Touch	Soft
3.	Odour	Pleasant
4.	Taste	Astringent, pungent

Table 3: Analytical Parameters of *Chitraka Haritaki Avaleha.*

S.NO.	Analytical Parameters	*Chitraka Haritaki Avaleha*
1.	Loss On Drying	30.28% w/w
2.	Ash Value	2.52% w/w
3.	Water Soluble Extract	88.31%w/w
4.	Methanol Soluble Extract	55.66%w/w
5.	pH (By pH Paper)	6.5
6.	Total sugar	57.98%
7.	Reducing sugar	48.44%
8.	Non reducing sugar	9.54%

Table 4: HPTLC result of *Chitraka Haritaki Avaleha.*

Sr. No.	Samples	Conditions	No. Of Spots	Rf
1	*Chitraka Haritaki Avaleha*	Short UV–254 nm	5	0.06,0.21,0.38,0.68,0.93
		Long UV–366 nm	3	0.06,0.20,0.66

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