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Pharmacognostical and Pharmaceutical Evaluation of Poly Herbal Formulation: *Agastyaharitaki Avaleha*

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ABSTRACT

In the era of increasing demand for indigenous medicines, maintaining quality standards is the need of the hour. *Agastyaharitaki Avaleha* is a poly herbal formulation used for the management of various diseases like *kasa, Shwasa, and urdvaroga* etc. It containing *Haritaki (Terminalia chebula* Retz.*),* 20 *kwatha dravya, Pippali, Guda, Tila taila, Go-ghrita, Madhu*. The nomenclature of *Agastyaharitaki Avaleha* is based on its one main ingredient is *Haritaki*. It has told by *Mahrishai Agastya*. Therefore the first time this is explained as *Agastyaharitaki Rasayana* in *Charaka samhita and Ashtangahridayama.* Hence, the present study was undertaken to standardize the compound Ayurvedic formulation through Pharmacognostical and pharmaceutical evaluation. The sample was subjected for various phytochemical parameters like water soluble extractive (66.4%w/w), alcohol soluble extractive (8.31 % w/w), ash value (30 % w/w), loss on drying (31.16 % w/w), pH (6.4), Total sugar (21.1%) and Reducing sugar (18.2%). The HPTLC, solvent system was showed the presence of 7 spots at 254 nm and 3 spots at 366 nm. Thus, the physiochemical and microscopic characters achieved may provide guidelines for standardization of *Agastyaharitaki Avaleha* formulation.

Keywords: *Agastyaharitaki Avaleha*, HPTLC, Pharmacognostical, Physiochemical Evaluation.

INTRODUCTION

Avalehas are semisolid dosage form basically used for internal administration. *Avaleha* is considered as an *upakalpana* of *kwatha* since *Acharya Sharangadhara* has given almost importance to *kwatha* in the definition [1]. *Avaleha*, is synonymous with dosage forms like *Rasakriya, Phanita, Avaleha, Khanda, Ghana* [2], It can be consumed along with specified *anupana*. *Avaleha* is widely used as rejuvenator (*Rasayana*) in *Samhitas* but it is most frequently quoted in diseases like *Kasa*, *Shwasa* and *Shotha*.

Agastyaharitaki Avaleha is a poly herbal formulation used for the management of various diseases like *kasa, Shwasa, and urdvaroga* etc. It is described by *Acharya Charaka* in *kasa Rogadhikara* [3] and explained as *Rasayana* in *Astanga Hraidya* [4] in *kasa rogadhikara*. The nomenclature of *Agastyaharitaki Avaleha* is based on its one main ingredient is *Haritaki.* Therefore the first time this is explained as *Agastyaharitaki Rasayana* in *Charaka samhita and Ashtangahridayama.*

Present study is focus on first attempt to develop quality parameters of *Agastyaharitaki Avaleha* on the basis of pharmacognostical, physicochemical parameters and chromatographic evaluation. Hence, there is need to scientific proof for standardization of quality parameters. The pharmacognostic and physico-chemical parameters can be used for checking the adulteration and purity of drug. Therefore, the present study was designed to evaluate the physicochemical, pharmacognostical parameters and develop the TLC fingerprint profiles of *Agastyaharitaki Avaleha*.

Objective of Study

Present study, is aimed to look out on herbal drugs used in the preparation of *Agastyaharitaki Avaleha* and Standardization of Pharmacognostical, Physicochemical parameters and HPTLC evaluation. The purpose of Standardization of raw drugs and final product is to ensure therapeutic efficacy. Therefore, maintaining the quality of this product is an essential factor.

MATERIALS AND METHODS

Collection, identification, authentication of raw drugs

Collection of raw materials The raw drugs *Dashamoola*, *Atmagupta* (Mucuna pruriens Bek.), *Shankhapushpi* (Convolvuluspluricaulis), *Bala* (*Sida cardifolia* L.), *Gajapippali* (*Scindapsus officinalis* Schott.), *Apamarga* (*Achyranthus aspera* Linn.), *Pippalimoola* (*Piper longum* Linn.), *Shati* (*Kaempferia galngal* L.), *Chitraka* (*Plumbago zeylanica*), *Bharangi* (*Clerodandrum serratum*), *Pushkarmoola* (*Inula racemosa* Hook. F.) of Indian brand were procured from the Pharmacy**,** GAU and Jamnagar. Sample of *Haritaki* fruit to make AHA, *Gajapippali* (*Scindapsus Officinalis*), *Sarkara* (Sugar candy), *Yava* (*Hordeum vulgare* Linn.) and *Guda (Jaggery)* were purchased from local market Jamnagar. All the herbal drugs were authenticated in Pharmacognosy Laboratory of IPGT & RA, Jamnagar.

Pharmaceutical study

The dosage from was prepared in the department of *Rasashastra* and *Bhaishajya Kalpana*, I.P.G.T & R.A, Jamnagar. The pharmaceutical study was carried out as mentioned below-

Table 1: Formulation composition of *Agastyaharitaki avleha* (AHA)

Sr.no.	Ingredient	Botanical name/English name	Parts used	Quantity
Kwatha Dravyas				
1.	*Bilva*	*Aegle marmelos* Corr.	Stem bark	1 part
2.	*Agnimantha*	*Premna integrifolia* Roxb.2	Stem bark	1 part
3.	*Shyonaka*	*Oroxylumindicum* Vent.	Stem bark	1 part
4.	*Patala*	*Stereospermum suaveolens* DC	Stem bark	1 part
5.	*Kashmari*	*Gmelina arborea* Linn.	Stem bark	1 part
6.	*Kantakari*	*Solanum xanthocarpum* Schrad. & Wendl.	Plant	1 part
7.	*Brihati*	*Solanum indicum* Linn.	Plant	1 part
8.	*Gokshura*	*Tribulus terrestris* Linn.	Seed	1 part
9.	*Shalaparni*	*Pseudarthia viscida* W&C	Dry root	1 part
10.	*Prasniparni*	*Uraria picta* Desv.	Dry root	1 part
11.	*Atmagupta*	*Mucuna pruriens* Bek.	Seed	1 part
12.	*Shankhapushpi*	*Clitoria ternatea* L.	Whole plant	1 part
13.	*Shati*	*Kaempferia galngal* L.	Rhizome	1 part
14.	*Bala*	*Sida cardifolia* L.	Dry root	1 part
15.	*Gajapippali*	*Scindapsus Officinalis* (Schoott.)	Fruit	1 part
16.	*Apamarga*	*Achyranthus aspera* Linn.	Plant	1 part
17.	*Pippalimoola*	*Piper Longum* Linn.	Dry stem	1 part
18.	*Chitraka (Rakta)*	*Plumbago indica* L.	Dry root	1 part
19.	*Bharangi*	*Clerodendrum serratum*	Dry root	1 part
20.	*Pushkaramoola*	*Inula racemosa* Hook.F.	Dry root	1 part
21.	*Yava*	*Hordeum vulgare* Linn.	Seed	32 parts
22.	*Haritaki*	*Terminalia chebula* Retz.	Dry Fruit pulp	12.5 parts (100 no.)
23.	*Guda*	*Jaggery*		50 parts
Prakeshpa Dravya				
24.	*Pippali Churna*	*Piper longum* Linn.	Fruit	2 parts
25.	*Ghrita*	Ghee		2 parts
26.	*Taila*	*Sesamum indicum*	Seed oil	2 parts
27.	*Madhu*	Honey		2 parts

Preparation of *Agastyaharitaki Avaleha* (AHA) in *Bhaishajya Kalpana* Laboratory of IPGT & RA. Coarse powder of all *kwatha dravyas was* transferred into a stainless steel container added 8 times of potable water and allowed to soak overnight. *Pottali* of 12.5 time *haritaki* fruit and 32 time *Yava* was prepared, each *pottali* were seperated and suspended in this liquid along with *kwatha dravya*. Next day morning, the contents were subjected to mild flame and stirred continuously throughout the process till the volume reduced to ¼ part. *Haritaki Pottali* was removed and decoction was filtered through a clean muslin cloth. Throughout the procedure of *kwatha* (boiling), the temperature was maintained in between 90-95°C under observation and approximately, it took 9 hours to prepare the *kwatha*. After completion of process of making *kwatha* which cotton cloth and added 50 part jaggery in equal amount. In another stainless steel vessel, *Haritaki* pulp was made form boiled *Haritaki* fruit without seed by using grinder then after in another vessel *Haritaki* pulp was fried with *Tila taila* and *Go-ghrita*. *Haritaki* pulp was fried till its color was changed light brown into dark brown and stirred sugar syrup consistency was one thread then

added fried *haritaki* pulp in it stirring processed was continued till sugar syrup concistency was 2 thread consistency after completion of this process let it be self-cool then *prakeshpa dravyas* (*Pippali*) was added at approx. 60℃. Lastly honey was added after complete cooling.

Pharmacognostical Study

Agastyaharitaki Avaleha is herbal drugs used in Intermediate product sample was identified and authenticated by pharmacognosy department, IPGT & RA**,** Gujarat Ayurved University, and Jamnagar. The identification was carried out on the basis of organoleptic features, morphological features as per standard references [5].

Pharmaceutical Evaluation

Physicochemical Parameters: *Agastyaharitaki Avaleha* was analyzed by using qualitative and quantitative parameters at Pharmaceutical Laboratory, IPGT & RA**,** Gujarat Ayurved University, and Jamnagar. The common parameters mentioned in Ayurvedic Pharmacopeia of India [6] and CCRAS guidelines [7] i.e. pH [8], Loss on drying [9], acid soluble extractive [10], water soluble extractive [11], total sugar [12], Redusing sugar [13] were taken.

High Performance Thin Layer Chromatography (HPTLC)

Sample preparation: - 0.1 g of *Avaleha* was take and 1 ml of hexane was added. The Solution was prepared used for chromatography. Thereafter pre chromatographic derivatization was done. Alcoholic KOH (base) and there by heated for 10-15 minutes in CAMAG TLC plate heater. Sample application was done using CAMAG linomat 5.

HPTLC of *Agastyaharitaki Avaleha was* carried out using the solvent system petroleum Ether: Diaethyl ether: Aceitic Acid (9:1:0.1v/v). HPTLC study was performed for the normal phase separation of components of product. Post chromatographic derivatization was done with vanillin sulphuric acid spray reagents [14].

OBSERVATIONS AND RESULTS

Pharmacognostical evaluation

Microscopic observation

Diagnostic characters of Acicular crystals of *Pippali,* Annular vessels of *Shankapushpi*, Annular vesses of *Pippalimoola*, Black debrris of *Pippali*, Bottle neck shaped stone cells of *Pippali*, Bottle neck shaped stone cells of *Pippali*, Bottle neck shaped stone cell of *pippali*, Cigar shaped crystals of *Gambhari*, Cork cells of *Chitraka*, Crystal of *Pushkarmoola*, Fiber after Staining of *bilwa*, Fibre of *Apamarga*,, Fibres and slereids-*Haritaki*, Fibres of *Kapikacchu*,, *Gokshur*a Epidermal Cells, Group of stone cells of *Gokshura*, Oil globule of *Shati*, Pismatic crystal of *Bala*, Pismatic crystal of *Bala*, Pitted stone cell of *Bilwa*, Pitted stone cell of *Bilwa*, Pollen grains of Honey, Lignified cork of *Shyonaka*, Prismatic crystal of *Apamarga*, simple unicellular trichome of *Prishnaparniaparni*, Rosette crystal of *Bharangi*, Spiral vessels of *Salaparni*, Stone cells of *Agnimantha*, Stone cells in group of *Kantakari*, wavy walled epidermal parenchyma cells of *Yava.* Observed under the microscope are Figure no.1.

Pharmaceutical Analysis

Organoleptic characters: Organoleptic characters like Texture is semisolid, Taste Sweet and astringent, Colour is Chocolate brown and odour is sweetish. Organoleptic characters like Texture, Taste, Colour and odour Touch were scientifically studied are as per detailed in Table 2.

Table 2: Organoleptic characters of raw herbal materials used in formulation

Parameters	AHA
Appearance	Semisolid material
Colour	Chocolate Brown
Odour	Sweetish
Touch	Smooth
Taste	Sweet & Astringent

Table 3: Physiochemical parameters of AHA formulation

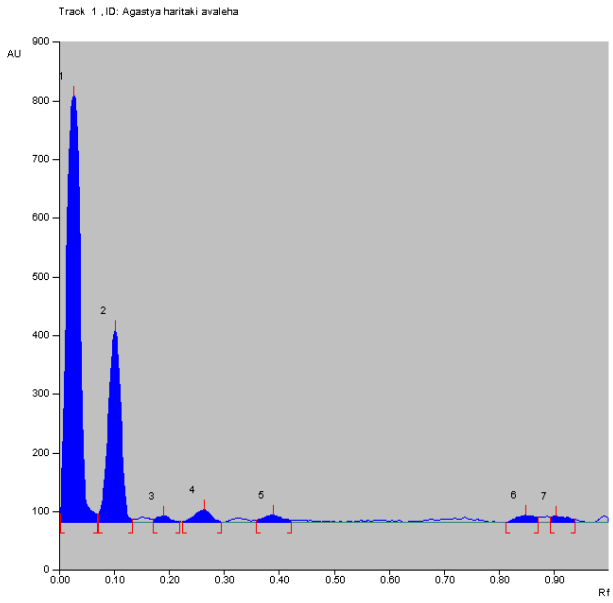
No.	Test	AHA
1.	Loss on drying	31.16 %
2.	Water soluble extractive	66.4% w/w
3.	Methanol soluble extractive	8.31 % w/w
4.	Ash value	0.30%
5.	Total Sugar (%)	21.1%
6.	pH value (5% N)	6.4

HPTLC Study

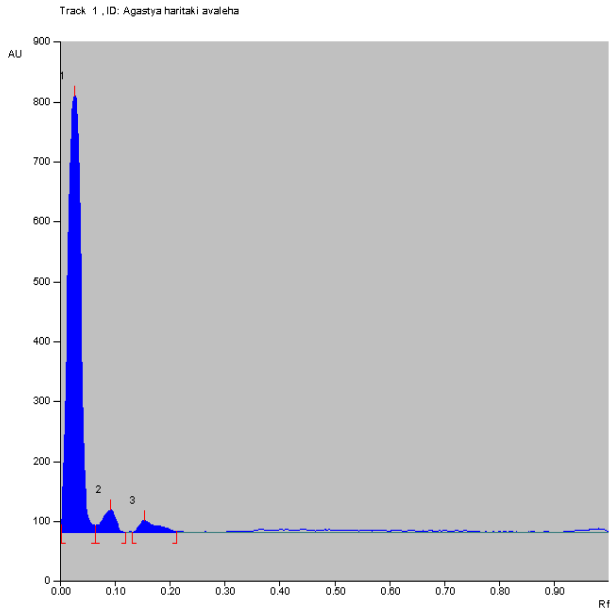
Chromatographic study (HPTLC) was carried out under 254nm and 366nm to establish fingerprinting profile. It showed spots at 254 nm, spots at 366 nm before spray and spots at 600 nm after spray.

Table 4: Results of *Agastyaharitaki Avaleha*

Before /After spray	Wavelengths	No of Spots	Rf value
Before spray	254 nm	7	0.03,0.11,0.19,0.26,0.39,0.85,0.90
	366 nm	3	0.03,0.09,0.15
After spray	600 nm	6	0.02,0.07,0.11,0.18,0.78,0.92



254 nm



366 nm

Plate 1: Densitogram of *Agastyaharitaki avaleha* (Before Spray)

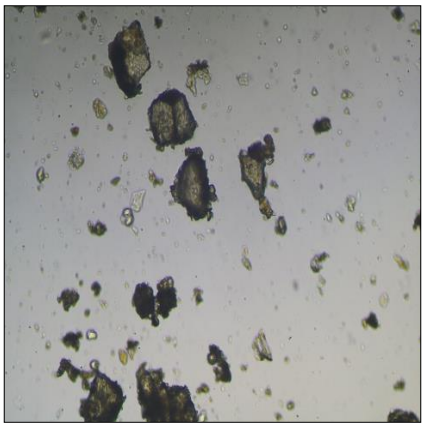
DISCUSSION

Agastyaharitaki Avaleha is a well-known Ayurvedic poly herbal formulation used for the management of various diseases like *kasa, Shwasa, and urdvaroga* etc. It is described by *Acharya Charaka* in *kasa Rogadhikara* [15] and explained as *Rasayana* in *Astanga Hraidya* [16] in *kasa rogadhikara*. The nomenclature of *Agastyaharitaki Avaleha* is based on its one main ingredient is *Haritak*i. Therefore the first time this is explained as *Agastyaharitaki Rasayana* in *Charaka samhita and Ashtangahridayama*. The organoleptic characters of *Agastyaharitaki Avaleha* like dark chocolate brownish colour was found almost similar. Touch and appearance of AHA was sticky & semisolid. Taste was sweet and astringent, odor was sweetish characteristic. Pharmacognostical results showed that the characters which are observed under the microscope are revels that the finished product consists all the ingredients. P^H of samples AHA is 6.4 due to acidic nature of decoction of *Haritaki* which is quantity wise major ingredient. The reason may be semisolid consistency of *Avaleha* that contains considerable portion of moisture. Total ash values of AHA is 0.30 %. Ash value depends upon the total inorganic substances present in the particular drug; more the inorganic substances present in drugs the ash value will be higher. Total sugar content value depends upon the heating process during preparation. HPTLC fingerprinting of sample was developed at initial level 7 spots in AHA was visible in short wave (uv 254 nm). In long wave (uv 366 nm) 3 spots in AHA was visible and after spraying 6 spots were visible in both samples.

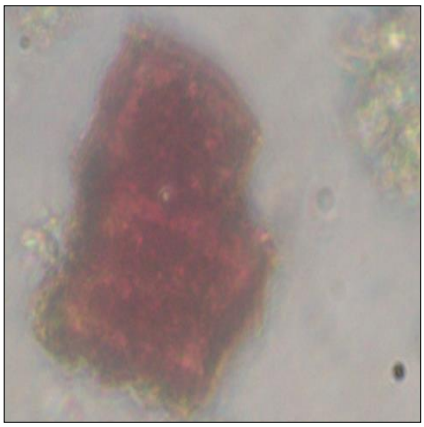
1.Acicular crystals of *Pippali*

2.Annular vessels of S*hankapushp*i

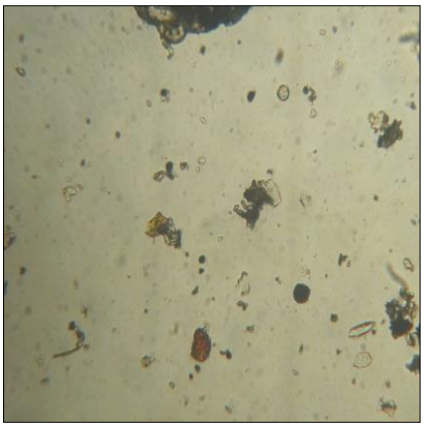
3.Annular vesses of *Pippali moola*



4.Black debrris of *Pippali*



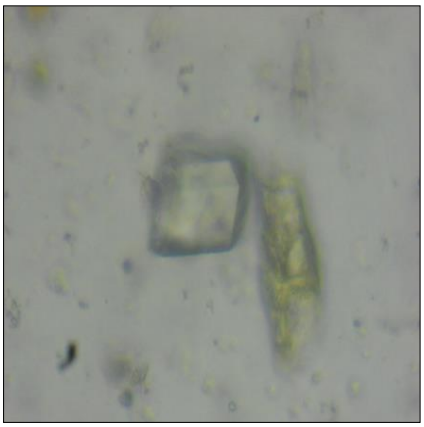
5.Bottle neck shaped stone cells of *Pippali*



6.Bottle neck shaped stone cell of *Pippali*

7.Cigar shaped crystals of *Gambhari*

8.Cork cells of *Chitraka*



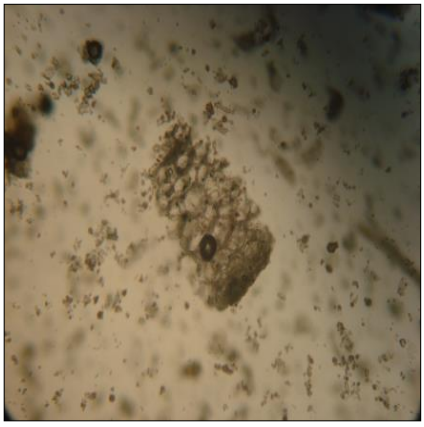
9.Crystal of *Pushkarmoola*

10.Fiber after Staining of *bilwa*

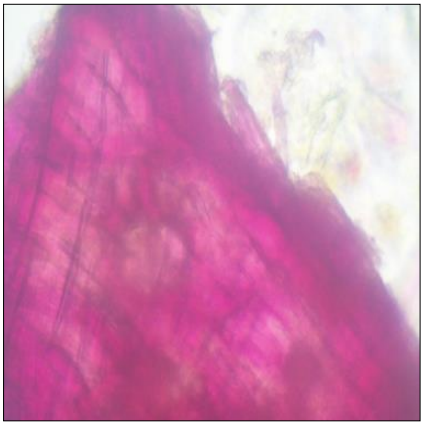
11.Fibre of *Apamarga*

12.Fibres and sclereids-*Haritaki*

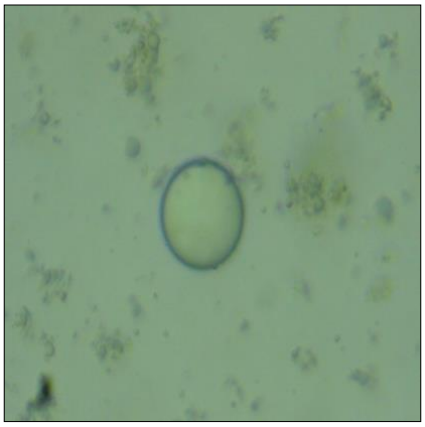
13.Fibres of *Kapikacchu*



14.*Gokshuar* Epidermal Cells

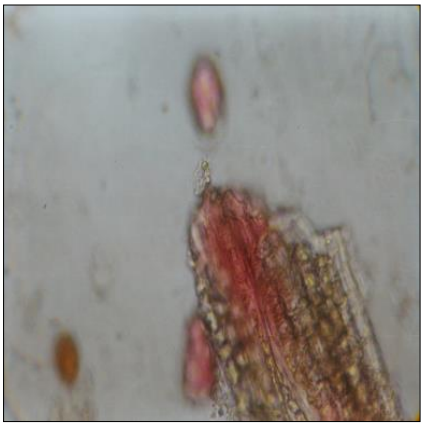


15.Group of stone cells of *Gokshura*

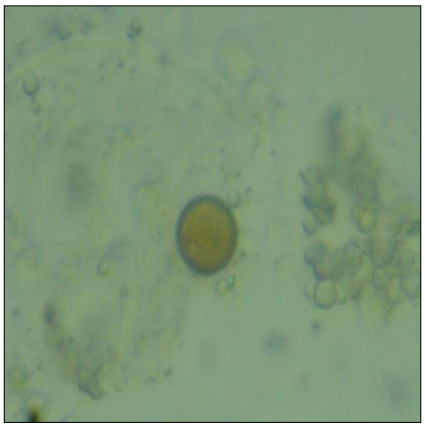


16.Oil globule of *Shati*

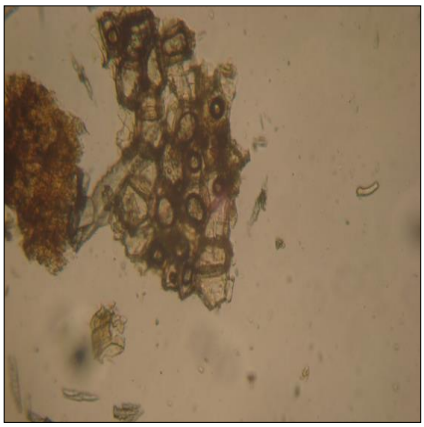
17.Pismatic crystal of *Bala*



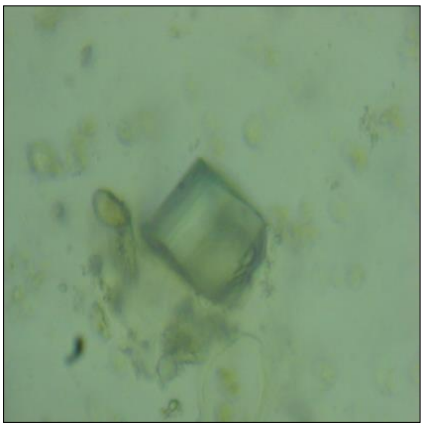
18.Pitted stone cell of *Bilwa*



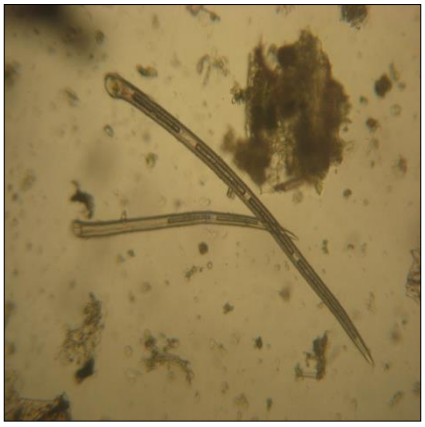
19.Pollen grains of Honey



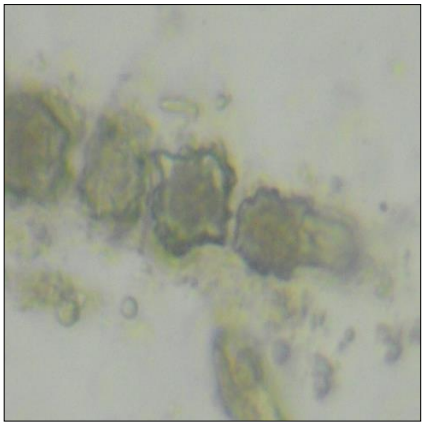
20. Lignified cork of *Shyonaka*



21.Prismatic crystal of *Apamarga*



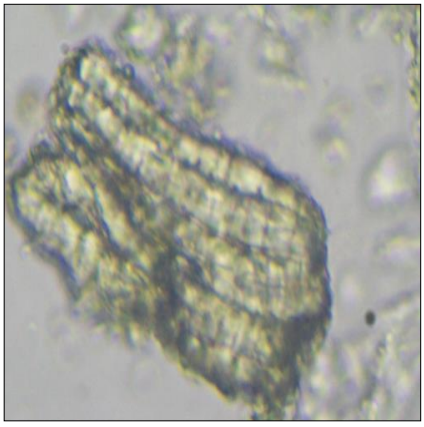
22.simple unicellular trichome of *Prishsnaparni*



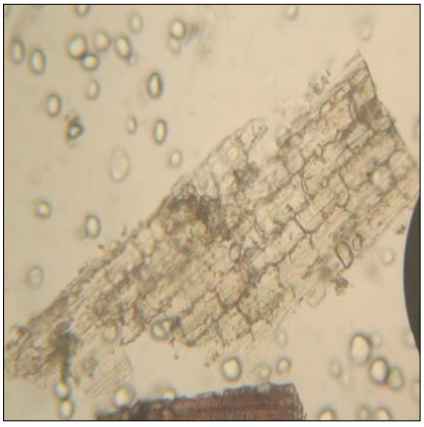
23.Rosette crystal of *Bharangi*

24.Spiral vessels of *Shalaparni*

25.Stone cells of *Agnimantha*



26. Stone cells in group of *Kantakari*



27.wavy walled epidermal parenchyma cells of *Yava*

Figure 1: Microphotographs of *Agastyaharitaki avaleha* (Plate-2)

CONCLUSION

Present study reveals that quality of *Agastyahariatki Avleha as* per pharmacognostical and physico chemical parameters, which helps in justifying the quality of formulation and meet the desired quality. In the present work, the obtained results were found within normal prescribed limits. For first time, this profile of *Agastyahariatki Avleha was* established. On the basis of observations and experimental result, the evaluation of research of *Agastyahariatki Avleha may* be used as standard reference for further quality control research works and clinical studies.

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