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A PHARMACOGNOSTICAL AND PHYSICOCHEMICAL EVALUTION OF *TRIPHALADI KASHAYA GHANAVATI VATI*

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ABSTRACT

Background: Since the past decades, there has been increasing acceptance and public interest in herbal products and therapies in both developing and developed countries. So, it is necessary to ensure the quality of products for better results or efficacy. *Triphaladi Kashaya* mentioned in Charak *Samhita* is transformed into *Ghanavati* form in present study. The pharmacognostical and physico-chemical data is not published on *Triphaladi Kashaya Ghanvati* till date. Hence the present study was planned. **Aims:** To evaluate pharmacognostical and physicochemical characters of *Triphaladi Kashaya Ghanavati*. **Materials & Methods:** Prepared drug was collected from pharmacy and authenticated in respective Laboratory of the institute. Standard procedures were followed to undertake the pharmacognostical and physico-chemical analysis. **Results & Conclusion:** Phrmacognostical results of *Triphaladi Kashaya Ghanavati* showed Lignified Prismatic crystals of *Nimba* and *Kutaja*, Starch grains of *Musta*, Stone cells of *Nimba*, *Bibhitaka* and *Saptaparna* etc. Physicochmical analysis of *Triphaladi kashaya ghanvati* showed that average weight 533mg, hardness 6.1kg/cm^2 etc. Pharmaceutical evaluation showed PH 5.5, loss on drying 15.163% water soluble extract 37.74% and methanol soluble extract 30.67%. Results of the present study will be helpful as reference guidance for future scientific evaluations of the drug.

KEYWORDS: *Triphaladi Kashaya Ghanavati*, Physicochemical analysis, HPTLC, Obesity, *Sthaulya*.

INTRODUCTION

In present era most of the non-communicable diseases have higher prevalence, obesity is one of them. There is no satisfactory treatment available in conventional system, thus the global population is looking toward effective natural remedies. In 2016 according to W.H.O. more than 1.9 billion adults aged 18 years and older were overweight. Out of these over 650 million adults were obese. In 2016, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight. Over all 13% of world's adult population were obese in 2016.[1]

Acharya Charaka has mentioned *Sthaulya* as *Santarpanajanya vyadhi*.[2] *Acharya* had also mentioned many formulations for treatment of *Santarpanajanya vyadhi*. *Triphaladi Kashaya* is also one of these formulations.[3] In present study we transform *Kashaya* into *Ghanavati*, due to easy palatability of *Ghanavati* and to specify or fix dose and for making it easy to store for long term. Standardization of drug means confirmation of its identity and determination of its quality and purity to justify their acceptability in modern system of medicines.

MATERIALS AND METHODS

Collection of Raw drugs and authentication

Musta (*Cyperus rotundus* Linn) and *Patha(Cissampelos pareira* Linn) were collected from local market of Jamnagar. Rest drugs were obtained from the pharmacy department of the institute. Ingredients of *Triphaladi Kashaya Ghanavati*[4] are shown in table 1.

Table 1: Ingredients of *Triphaladi Kashaya Ghanavati.*[4]

No.	Name of Drug	Botanical name	Part used	Proportion
1	*Aamalaki*	*Emblica officinalis* Gaertn.	*Fruit*	*1 Part*
2	*Haritaki*	*Terminalia chebula* Retz.	*Fruit*	*1 Part*
3	*Bibhitak*	*Terminalia bellirica* Roxb	*Fruit*	*1 Part*
4	*Aargvadha*	*Cassia fistula* Linn	*Fruit pulp*	*1 Part*
5	*Patha*	*Cissampelos pareira* Linn	*Root*	*1 Part*
6	*Saptaparna*	*Alstonia scholaris*	*Bark*	*1 Part*
7	*Vatsaka*	*Holarrhena antidysenterica* Linn	*Stem Bark*	*1 Part*
8	*Musta*	*Cyperus rotundus* Linn	*Rhizome*	*1 Part*
9	*Madanphala*	*Randia spinosa* Poir.	*Fruit*	*1 Part*
10	*Nimba*	*Azadirachta indicia* A. Juss	*Stem bark*	*1 Part*

Preparation of the *Triphaladi Kashaya Ghanavati*

Firstly, coarse powder of all the ingredients of *Triphaladi Kashaya* was made. Each of above ingredients were taken in equal proportion as mentioned in Table-1 and *Kwatha* was prepared. After filtration, the *Kwatha* was boiled further and then *Ghanavati* were prepared.

PHARMACOGNOSTICAL EVALUATION[5]

Organoleptic Study

*T*riphaladi *Kashaya Ghanavati* was evaluated for organoleptic characters like taste, odour and colour, touch.[7]

Microscopic Study

The ingredients were identified and authenticated by the Pharmacognosy laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar. The identification of ingredients were carried out on the basis of organoleptic characters and powder microscopy of prepared drug. *Ghanavati* were broken and fine powder was dissolved in the distilled water then placed on slide adding with small quantity of water and examined under microscope without staining for the observation of cellular materials, then stained with Phloroglucinal and conc. Hcl[6] for the lignified characters. The microphotographs of diagnostic characters were taken by using Carl Zeiss trinocular microscope attached with camera.[8]

Physico-Chemical Analysis

Physico-chemical Parameters of *Triphaladi Kashaya Ghanvati* like uniformity, Hardness, Loss on drying, Ash value, Acid insoluble ash, water soluble extract, Alcohol soluble extract, and pH were determined as per the API guidelines.[9]

HPTLC

Methanol extracts of drugs were spotted on pre-coated silica gel GF 60254 aluminum plates as 6mm bands, 6mm apart and 1cm from the edge of the plates, using a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (9 ml) and Ethyl acetate (1 ml) were used as the mobile phase. After development, Densitometric scanning was performed with a Camag T.L.C. scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (V1.2.1 Camag).[10] The slit dimensions were 6 mm x 0.45 mm, and the scanning speed was 20 mm s-1.

OBSERVATIONS AND RESULTS

Pharmacognostical Evaluation

Organoleptic features of *Triphaladi Kashaya Ghanavati* are shown in table no.2.

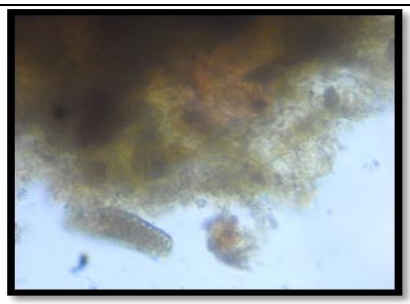
Table 2: Organoleptic features of *Triphaladi Kashaya Ghanavati.*

Parameter	Results
Color	Dark brownish black
Odour	Slightly aromatic
Taste	Astringent
Touch	Hard, solid

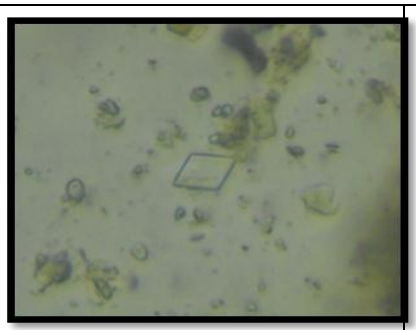
Microscopic Study of *Triphaladi Kashaya Ghanvati*

The diagnostic microscopical characters of sample showed Prismatic crystals of *Nimba,* starch grains of *Musta,* Prismatic crystals of *Kutaja,* Silica deposition of *Amalaki,* Rhomboidal crystals of *Saptaparan,* Stone cells of *Nimba,* Epicarp cells of *Madanphala,* Scleroid cells of *Amalaki,* Stone cells of *Bibhitak,* Epicarp cells of *Haritaki,* Trichomes of *Bibhitak,* Lignified scleroid of *Haritaki,* Lignified crystal fibers of *Kutaja,* Stone cells of *Saptaparan,* Scleriform vesicles of *Musta,* Group of lignified stone cells of *Nimba,* Simple fibers of *Amalaki,* Brown content of *Bibhitak,* Lignified pitted vesicles of *Patha,* Brown content of *Araghwadha,* Parenchyma cells of *Araghwadha.* (Plate-1, Figure 1–21).

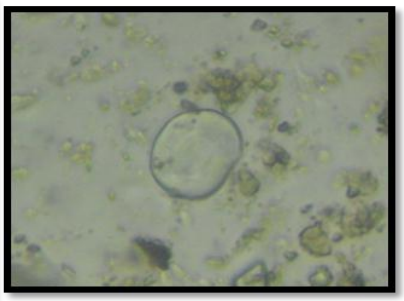
Plate 1: Micrographs of *Triphaladi kashaya ghanvati* (Figure 1-21).



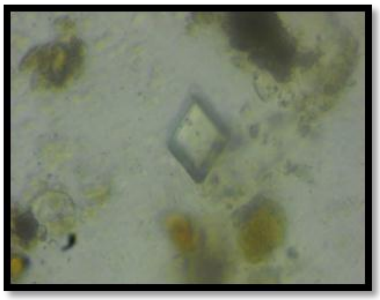
Parenchyma cells of *Araghwadha*



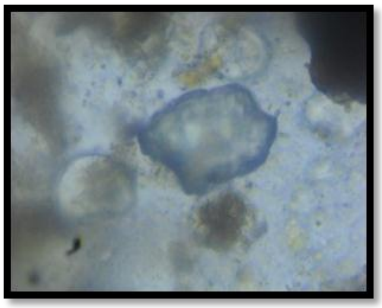
Prismatic crystals of *Nimba*



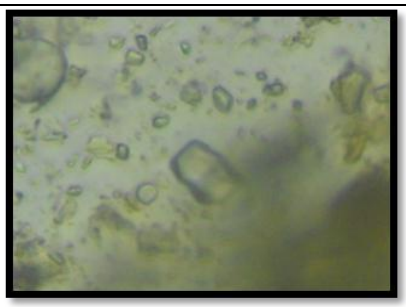
Starch grains of *Musta*



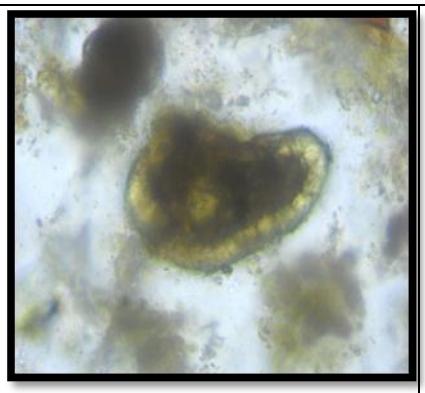
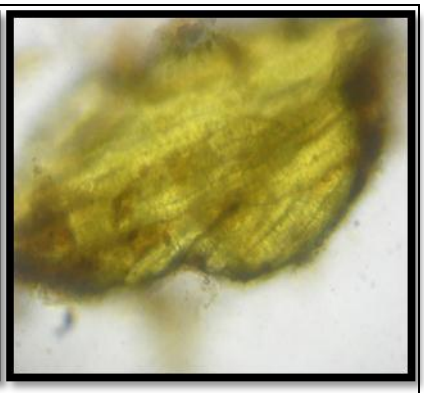
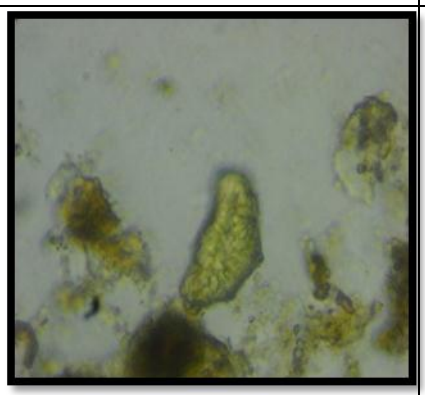
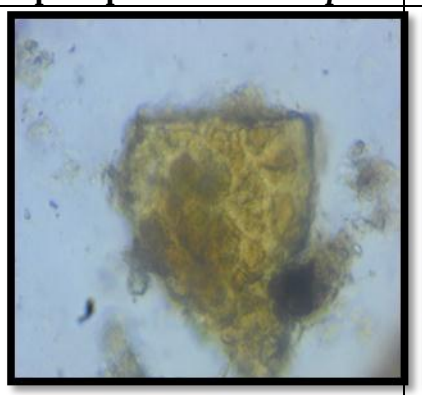
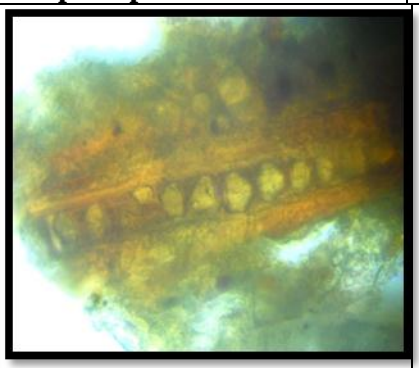
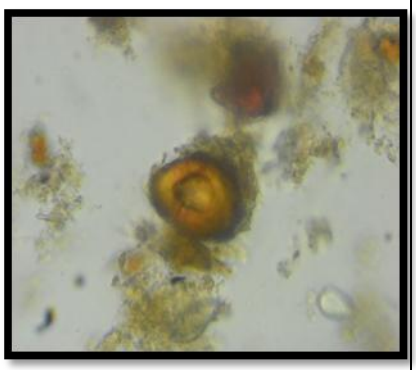
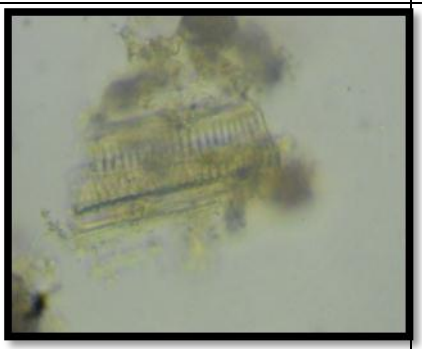
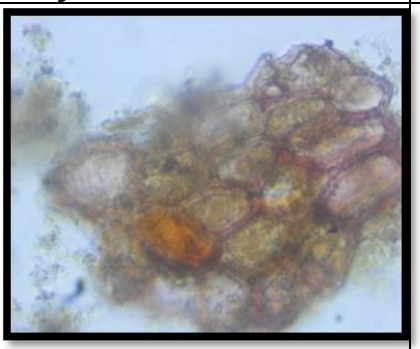
Prismatic crystals of *Kutaja*

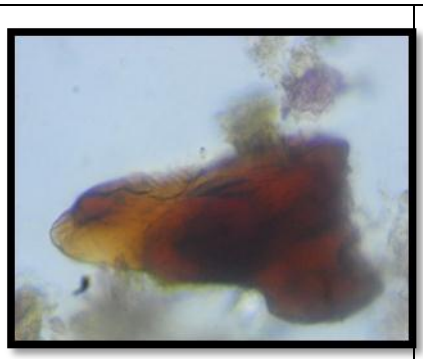
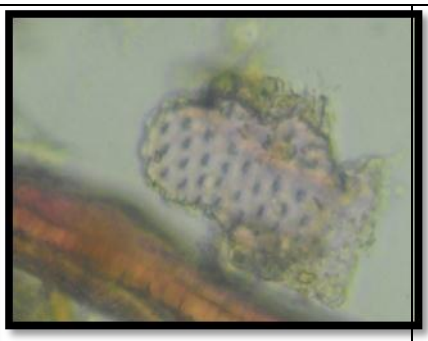
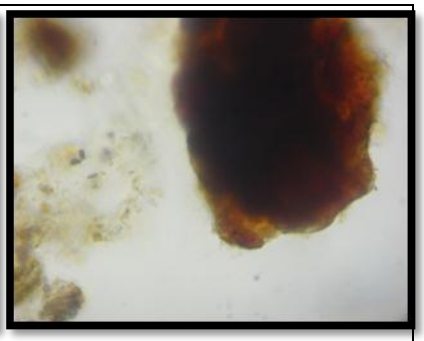


Silica deposition of *Amalaki*



Rhomboidal crystal of *Saptaparan*

		
Stone cells of *Nimba*	**Epicarp cells of *Madanphal***	**Scleroid cells of *Amalaki***
		
Stone cells of *Bibhitak*	**Epicarp cells of *Haritaki***	**Trichomes of *Bibhitak***
		
Lignified scleroid of *Haritaki*	**Lignified crystals of fibers of *Kutaja***	**Stone cells of *Saptaparana***
		
Scleriform vesicles of *Musta*	**lignified stone cells of *Nimba***	**Simple fibers of *Amalaki***

		
Brown content of *Bibhitak*	**Lignified pitted vesicles of *Patha***	**Brown content of *Araghwadha***

Physicochemical results

Physicochemical analysis of *Triphaladi Kashaya Ghanvati* revealed the average weight 533mg, Tablet Hardness 6.1 kg/cm^2, loss on drying 15.163%, Ash value 12.84% , Acid insoluble ash 2.92%, water soluble extract was 37.74%, Alcohol (Methanol) soluble extract 30.67% and PH Value 5.5 (Table- 3).

Table No. 3: Physico-chemical evaluation of *Triphaladi Kashaya Ghanavati.*

Sr. No.	Parameter	Results
1	Average Weight	533 mg
2	Average Tablet Hardness	6.1 kg/cm^2
3	Loss on drying	15.163 % w/w
4	Ash value	12.84%
5	Acid insoluble ash	2.92%
6	Water soluble extract	37.74%
7	Alcohol soluble extract	30.67%
8	PH 5% aqueous	5.5

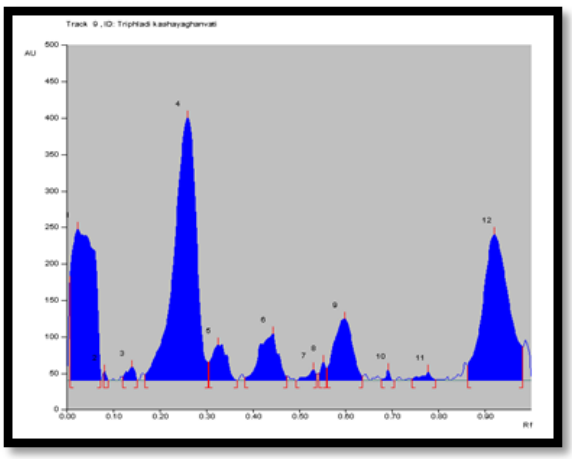
HPTLC study results

HPTLC was carried out after organizing an appropriate solvent system in which maximum 12 spots were distinguished at 254 nm and 9 spots at 366 nm. Results are depicted in Table 4, and Plate 2&3.

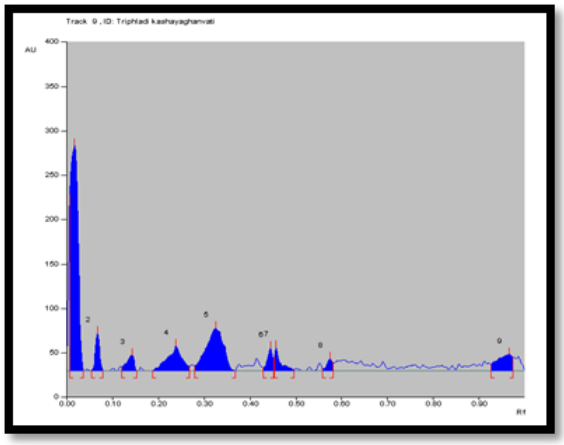
Table no. 4: HPTLC of *Triphaladi Kashaya Ghanavati.*

254 nm		366 nm	
No. of spots	**R_f**	**No. of spots**	**R_f**
12	0.02, 0.08, 0.14, 0.26, 0.33, 0.44, 0.53, 0.55, 0.60, 0.69, 0.78, 0.93	9	0.02, 0.07, 0.14, 0.24, 0.33, 0.44, 0.46, 0.57, 0.97

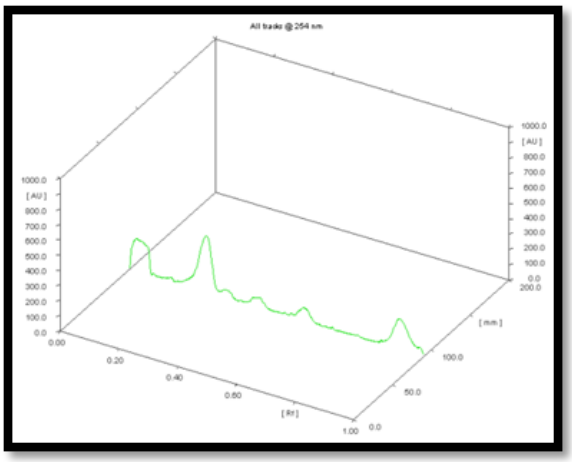
Plate 2 & 3 Densitogram of *Triphaladi Kashaya Ghanavati*



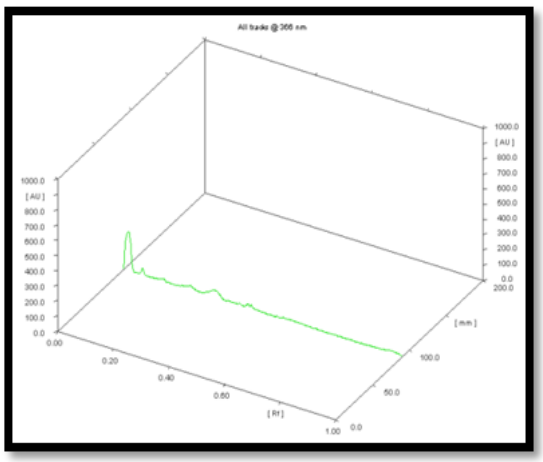
AT 254 nm



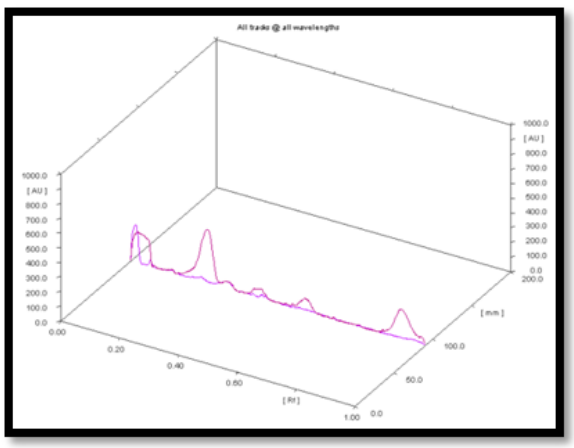
AT 366nm



At 254nm



At 366nm



Multi-wavelength graph

DISCUSSION

The pharmacognostic evaluation showed that organoleptic characters of the sample were dark brownish black in color, Slightly aromatic odor, astringent in taste, hard and solid in touch. In

microscopic study Lignified Prismatic crystals of *Nimba* and *Kutaja*, Starch grains of *Musta*, Stone cells of *Nimba*, *Bibhitaka* and *Saptaparna* etc show that the ingredients were present in the finished product and also proven that the purity of the finished product. The physicochemical parameters play an important role in the standardization of formulation. All the pharmaceutical parameters analyzed showed values permissible for the *Ghanavati*. Hardness of *Ghanavati* in present study is 6.1kg/cm^2 that may be due to *Ghana* used in preparation of *Ghanavati* or stickiness of ingredients like *Araghwadha phal majja.* Value of water soluble extract is more than the value of alcohol soluble extract that is due to all the ingredients of *Ghanavati* were herbal drugs. HPTLC is the most common form of Chromatographic method used by Ayurvedic researchers to identify the number of ingredients present in a formulation. It also helps to determine the purity of the sample.

CONCLUSION

From the present investigation, various standardization parameters such as Physicochemical standards, Pharmacognostical Evaluation were carried out; it can be concluded that the formulation of *Triphaladi Kashaya Ghanavati* contains all good characters of an ideal *Ghanavati* and it was found to be more effective and economic. The study shows that the content of formulation is of good quality and purity. The result of the present study will also serve as reference standards in the preparation of drug formulation and also helpful in further clinical researches.

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