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STANDARDIZATION OF *HARITAKI-SUNTHI CHURNA* THROUGH PHARMACOGNOSTICAL & PHYSICOCHEMICAL ANALYSIS

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ABSTRACT

Ayurveda has given much importance to the *Agni* i.e. digestive power. *Agnimandhya* (indigestion) is one of most common pathological condition giving rise to appearance of many symptoms like *Udara Gaurava* (heaviness in abdomen), *Alasya* (laziness) etc. and also is a root cause of many diseases. The present study deals with the standardization of *Haritaki-Sunthi Churna* through the pharmacognostical and pharmaceutical standards. The trial drug *Haritaki-Sunthi Churna* was subjected to authentication by subjecting it to above analysis as per standard procedures and the observations were systematically recorded. Pharmacognostical findings like Pitched scleride, Starch grains, Mesocarp cell, Stone cell, Epicarp cell, Lignifide pited stone cell, lignified pited schel scleride of *Haritaki* and Simple starch grains, oleo resins, pericarp cells, fragment of group of vessels, simple fibre, iodine stained simple starch gain of *Sunthi*. Organoleptic features of coarse powder were harmonized with API. The water-soluble extract was 38.78% w/w, alcohol soluble extract 30%, ash value 3.64%, Ph value 5 and particle consistency above 60 mesh 49.42 % w/w, between 60-85 mesh 24.42 % w/w, between 85-120 mesh 13.48 % w/w & below 120 mesh 7.09 % w/w. HPTLC is the preliminary quantitative analysis which shows 8 prominent spots at Rf. 0.01, 0.09, 0.17, 0.28, 0.38, 0.53, 0.79. 0.94 in UV 254 nm and 3 prominent spots at Rf. 0.01, 0.16, 0.98 in UV 366 nm. After the analysis of the various pharmacognostical and pharmaceutical analysis of *Haritaki-Sunthi Churna*, it was concluded that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level.

KEYWORDS: *Agnimandya*, *Haritaki-Sunthi Churna*.

INTRODUCTION

Medicinal plants having universal importance as they are the main constituents of many drugs of Indian system of medicine[1]. Natural products play a vital role in drug development in the pharmaceutical industry[2]. Nature has been a huge source of medicinal plants and several modern medicines have been isolated from natural sources, particularly from herbal plants. A variety of medicinal plants have been used in daily routine to treat diseases all over the world years ago, there has been a significant increasing digestion problem in 21st century due to

changing dietary habits and faulty Lifestyle. It is a root cause for manifestation of many diseases[3]. *Vata Dosha* along with *Pitta Dosha* are the main factor which is responsible for normal functioning of the *Jatharagni*[4]. When *Pachaka Pitta* is vitiated its hampers the normal process of digestion and *Jatharagni* also. This condition called as *Agnimandhya* (indigestion) in *Ayurveda*.

For this condition- *Agnimandhya* (indigestion), *Haritaki-Sunthi Churna* has been selected because *Haritaki-Sunthi* having *Kashaya, Katu Rasa, Ladhu Ruksha Guna, Ushana Virya* and *Anulomana* and properties like *Dipana(*appetizing*), Pachana*(digestive)etc. The first explanation of its therapeutic use has been documented in *Charaka Samhita* for the treatment of *Grahani*, a gastro-intestinal disorder[5]. This formulation exhibits *Dipana* (appetizing) and *Pachana* (digestive) activities by virtue of *Vayu* and *Agni Mahabhuta* in its *Panchmahabhuatika* configuration. It has been also recommended in *Grahani Chikitsa* by different *Ayurvedic Acharya*[6]. This formulation specifically works in various types of gastric disorders including anorexia, indigestion, nausea etc. In this regard, present work was carried out to evaluate and standardize the pharmacognostical as well as pharmaceutical properties of *Haritaki-Sunthi Churna.*

MATERIALS AND METHODS

Collection of Raw Drugs

The raw drugs for the study were procured from the Pharmacy of Gujarat Ayurved University, Jamnagar. The final product i.e. *Haritaki-Sunthi Churna* was prepared in the Pharmacy of Gujarat Ayurved University, Jamnagar. The ingredients and parts used in the formation of *Haritaki-Sunthi Churna* are listed in Table 1.

TABLE 1: Composition of *Haritaki-Sunthi Churna*

Sr.	Drug	Latin Name	Family	Part used
1.	*Haritaki*	*Terminalia chebula* Retz	Combrataceae	fruit
2.	*Shunthi*	*Zingiber officinale Roxb.*	Zingiberaceae	Rhizome

PHARMACOGNOSTICAL EVALUATION

Dry Powder of the *Prayojyaanga* of drugs which was being used in preparation of *Haritaki-Sunthi Churna* had been used for this study. The root and powder characters were identified with the help of Pharmacognosy laboratory, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India.

Powder microscopy of the sample was done without stain and after staining with Phloroglucinol + HCl. Microphotographs were taken under Carl Zeus microscope attached with camera.

PHYTO-CHEMICAL ANALYSIS OF DRUG

Haritaki-Sunthi Churna was analysed by using qualitative and quantitative parameters at Pharmaceutical Chemistry Laboratory, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India. The following tests were carried out.

Loss on Drying (LOD) [7]

This test was conducted to find out the moisture content in the samples.

Procedure: About 1gm, accurately weighed, sample was taken in a previously dried and weighed dish and heated in a hot air oven at 1100 C till constant weight. It was cooled and the weight was noted. Difference between the weight was calculated and taken as the loss on drying. The loss on drying of the sample was expressed as % w/w.

Ash Value (AV) [8]

This test was carried out to evaluate the ash content of the samples.

Procedure: About 2 gm, accurately weighed, sample was taken in a previously weighed and dried crucible. It was then subjected to incineration in a muffle furnace without placing the lid on the crucible, allowed to cool and again weighed. From the obtained residue, the percentage of total ash content in the sample was calculated.

Water Soluble Extractive (WSE) [9]

This test was carried out to evaluate the water soluble principles of the samples.

Procedure: 2.5 gm of sample was weighed accurately; 50 ml of distilled water was added to it and it was kept overnight. Next day, it was filtered. 20 ml of the filtrate was transferred to a dried and weighed evaporating dish. The solvent was evaporated on a water bath, dried till constant weight, cooled and weighed immediately. From the weight of the residue, the percentage of water soluble extractive was calculated and expressed as %w/w.

Methanol Soluble Extractive (MSE) [10]

This test was carried out to evaluate the methanol soluble principles of the samples.

Procedure: Methanol soluble extractive was determined by following the same method as mentioned in WSE, but methanol instead of distilled water.

Particle consistency

This test was carried out to evaluate the consistency of the sample which is in powder form.

Procedure: Sample was passed through sieves having different size of mesh.

pH[11]**:**

This test was carried out to find out the acidity or alkalinity of the samples.

Procedure: To 2.5 gm of the sample, 50 ml of distilled water was added, stirred for 2 hours, filtered, and the pH of the filtrate was noted with the help of the pH paper.

High Performance Thin Layer Chromatography (HPTLC)

High performance thin layer chromatography (HPTLC) is an invaluable quality assessment tool for the evaluation of botanical materials. It allows the analysis of a broad number of compounds both efficiently and cost effectively. Additionally, numerous samples can be run in a single analysis thereby dramatically reducing analytical time. With HPTLC, the same analysis can be viewed using different wavelengths of light thereby providing a more complete profile of the plant than is typically observed with more specific types of analyses.

RESULTS AND DISCUSSION

Organoleptic Parameters The organoleptic characters of Ayurvedic drugs are evaluating the qualities of preparation by colour, touch, fineness, taste, odor, etc. were noted through Jyanendriya (sense organs) and it is providing the idea about the quality of different formulations without using chemical tests.

The present drug is having the Light-Yellow colour, astringent taste and pungent odour. The final product was made of fine powder form. Organoleptic Parameters of the formulation are mentioned in Table 2.

Table 2: Organoleptic Properties of *Haritaki-Sunthi Churna*

Sr. No.	Characters	Results
1	Colour	Light Yellow
2	Odour	Pungent
3	Taste	Astringent
4	Touch	Very fine

These characters correspond to the all active ingredients among which most of have *Katu-kashaya Rasa*.

PHARMACOGNOSTICAL EVALUATION

Diagnostic characters of finished product under the microscope were seen and presence of all ingredients showed their different characters.

- Pitched scleride, Starch grains, Mesocarp cell, Stone cell, Epicarp cell, Lignifide pited stone cell, Lignified pited schel scleride were seen. Which are suggestive of *Haritaki* shown in figures.
- Simple starch grains, oleo resins, pericarp cells, fragment of group of vessels, simple fibre, iodine stained simple starch gain were observed in the sample which are suggestive of *Shunthi* shown in figures.

PHYSICO-CHEMICAL PARAMETERS

Haritaki-Sunthi Churna was evaluated for various physico-chemical parameters. The results are shown in table 3.

Table 3: Physico-Chemical Parameters of *Haritaki-Sunthi Churna*

Sr. No.	Test	Result
1	Loss on Drying	13.61 %w/w
2	Ash Value	3.646 %w/w
3	Water soluble Extract	38.78 %w/w
4	Methanol soluble Extract	30.00 %w/w
5	pH (5% solution)	5
6	Particles Consistency	
	a) Moderately coarse powder (Above 60 mesh)	49.42 %
	b) Moderately fine powder (Between 60-85 mesh)	24.42 %
	c) Fine powder (Between 85-120 mesh)	13.48 %
	d) Very fine powder (Below 120 mesh)	7.09 %

Loss on drying method is applied to determine the amount of water, all or a part of water for crystallization, or volatile matter in the sample. Loss on drying of test drug is 13.61 % w/w. Total ashes are designed to measure the total amount of material remaining after ignition. It includes both physiological (which is derived from the plant tissue itself) and non-physiological ash (residue of the extraneous matter etc. adhering to the plant substance) Ash value of powder is 3.64% w/w. Water soluble extract and alcohol soluble extract is 38.78% w/w & 30 % w/w respectively. Particle consistency is the test which defines fineness of powder. The results are shown in table. pH is the measure of acidity or basicity of a solution. In the present sample pH was detected by using pH indicator paper and Table 3 showing the acidic nature of the solution.

HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY (HPTLC) [12]

Thin layer chromatography is the most common form of chromatographic method used by Ayurvedic research workers to detect the number of compounds present in a product. It also helps to determine the purity of the sample. Identity of a compound is also possible by comparing it with the Rf value of a known compound.

Results are tabulated in Table-4. Chromatogram showed 8 prominent spots at Rf. 0.01, 0.09, 0.17, 0.28, 0.38, 0.53, 0.79. 0.94 in UV 254nm and 3 prominent spots at Rf. 0.01, 0.16, 0.98 in UV 366 nm. Densitometry at both wave length as well 3D view is also shown in pictures (figures 1, 2, 3, 4).

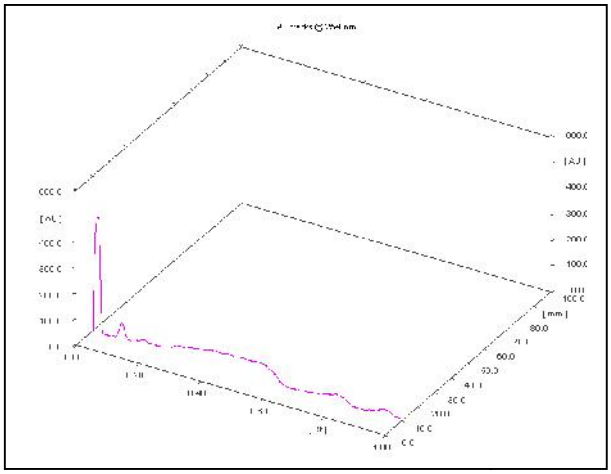


Fig 1: 254 nm 3d

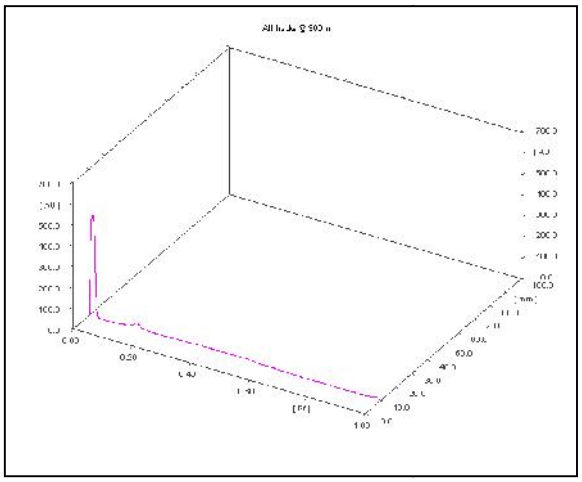


Fig 2: 366 nm 3d

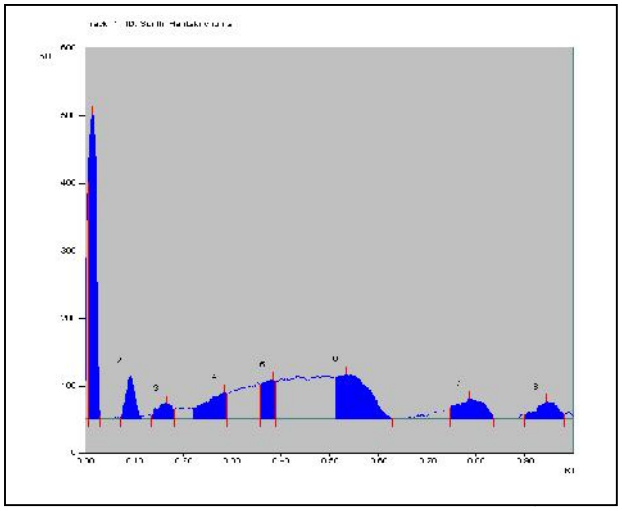


Fig 3: 254 nm peak display

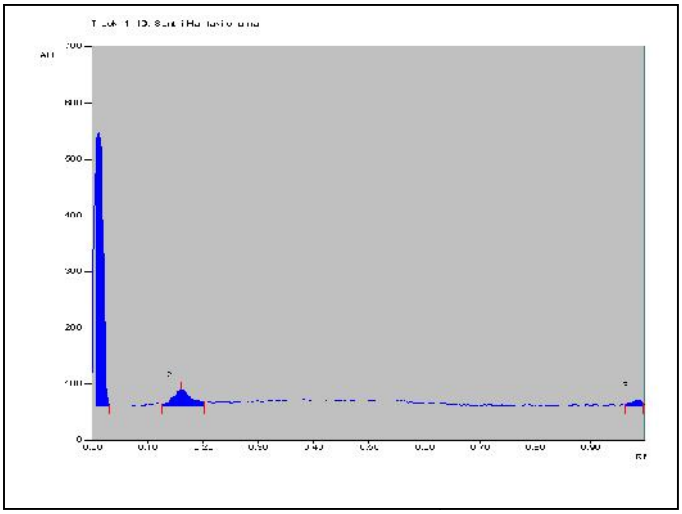
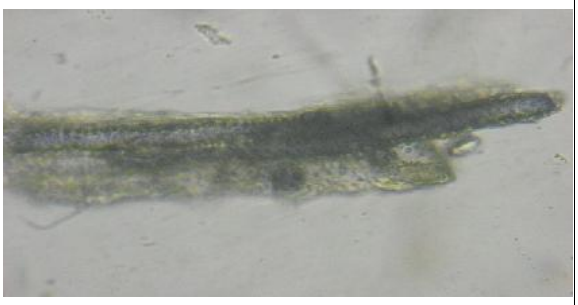
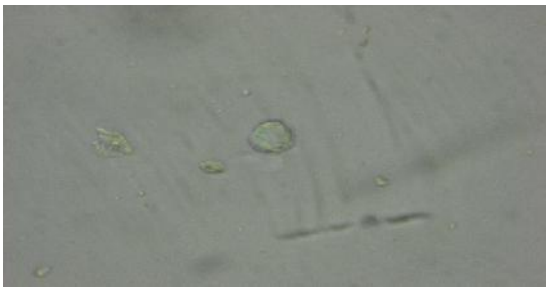
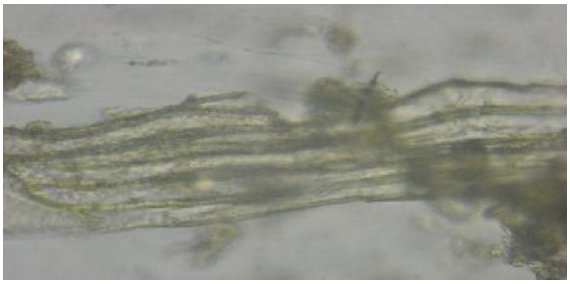
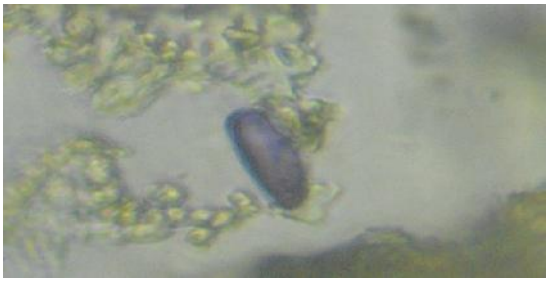
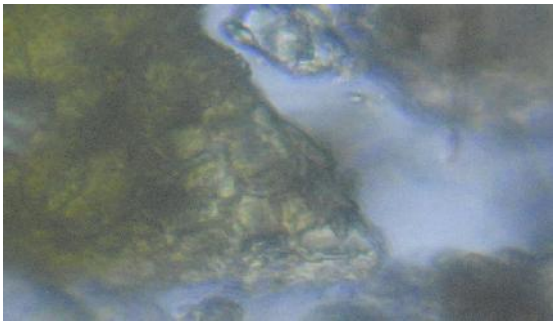


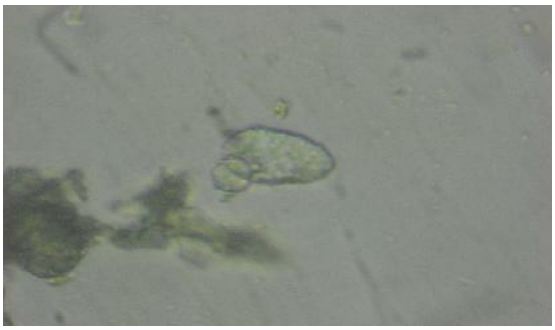
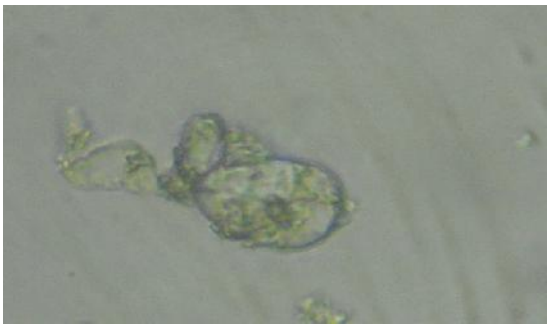
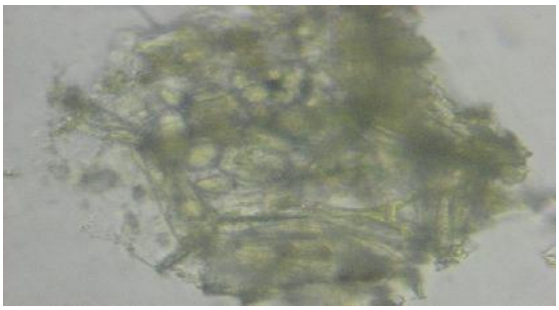
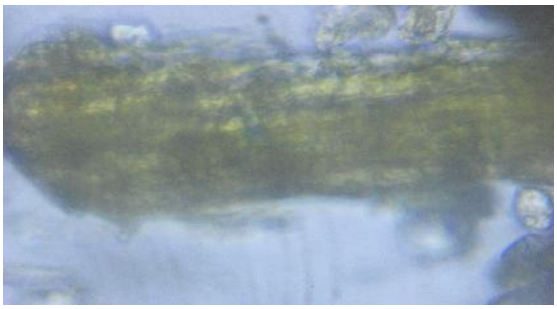
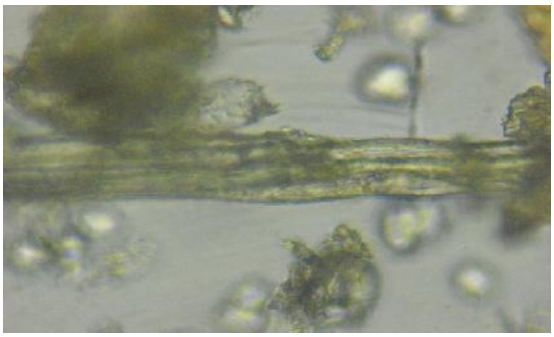
Fig 4: 366nm peak display

Table No.4: HPTLC of *Haritaki-Sunthi Churna*

	No. of Peaks (Spots)	Max Rf
Under 254 nm	8	0.01, 0.09, 0.17, 0.28, 0.38, 0.53, 0.79. 0.94
Under 366 nm	3	0.01, 0.16, 0.98

PHOTOGRAPHS OF MICROSCOPIC FEATURES INGREDIENTS OF *Haritaki-Sunthi Churna*

		
Group of pitted sclerides of *Haritaki*		Simple starch grain of *Haritaki*
		
Mesocarp cells of *Haritaki*		Iodine stained simple starch grain of *Haritaki*
		
Epicarp cells of *Haritaki*		Lignified stone cells of *Haritaki*

		
Simple starch grain of *Sunthi*		Oleo resin of *Sunthi*
		
Pericarp cells of *Sunthi*		Fragment of group of vessels of *Sunthi*
		
Group of simple fibre of *Sunthi*		Iodine stained simple starch grain of *Sunthi*

CONCLUSION

Pharmacognostical and phyto-chemical evaluation of *Haritaki-Sunthi Churna* illustrated the specific characters of ingredients which were used in the preparation. The pharmacognostical and phyto-chemical analysis of *Haritaki-Sunthi Churna* provides substantial information for the proper identification, authentication, and scientific evaluation of the final product/drug. On the

basis of observations made and results of studies, this study may be beneficial for future researchers and can be used as a reference standard in the further quality control researches.

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11. The Ayurvedic Pharmacopeia of India, 2007, 1st edition, Govt. of India, Part 2, Volume 1; appendix 2; 14
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