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Phamacognostical and Pharmaceutical Evaluation of *Chandrashakaladi Vataka* - A herbal formulation

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ABSTRACT

Background: Quality control and the standardization of herbal medicines involve steps like standard source and quality of raw materials, good manufacturing practices and adequate analytical screening. These practices play a vital role in guaranting the quality and stability of herbal preparations. *Chandrashakaladi Vataka* is an *Ayurvedic* herbal formulation mentioned to be beneficial in *Kushtha*. Till date no published data is available on its analytical profile. **Aim:** To develop the Pharmacognostical and Phyto-chemical profile of *Chandrashakaladi Vataka.* **Material and Methods:** *Chandrashakaladi Vataka* was prepared as per classical method and analytical findings were recorded. Samples were subjected to organoleptic analysis, physico-chemical analysis and HPTLC examination by optimizing the solvent systems. **Results and Conclusions:** Pharmacognostical profile of *Chandrashakaladi Vataka* was established. Loss on drying, Ash value, Acid insoluble extract, Methanol soluble extract, *Chandrashakaladi Vataka* was found within prescribed limits. HPTLC profile of *Chandrashakaladi Vataka* revealed 12 spots at 254 nm and 13 spots at 366 nm.

Key words: *Chandrashakaladi Vataka*, Pharmacognosy, Pharmaceutical analysis, *Kushtha*.

INTRODUCTION

Ayurveda, the traditional Vedic Indian medicine is gaining popularity worldwide. The demand of herbs for therapeutic purpose is increasing day by day. In order to make sure the safe use of these medicines, as a first step it is necessary to establish the standards of authentication and quality. Herbal drugs, singularly and in combinations, contain numerous compounds in complex forms in which no single active constituent is responsible for the overall efficacy. Therefore, proper identification of raw materials at the basic level with the help of microscopic and morphological characteristics is essential to maintain the 'quality control' of multi-ingredient formulations.

Along with developing pharmacognostic standards, adequate analytical methods are essential to ensure the quality and standardize the prepared medicine.

Chandrashakaladi Vataka[1] was prepared according to the reference taken from *Ashtanga Hridaya Kushtha Chikitsa* which contains *Bakuchi, Chitraka, Rajani, Vidanga, Tuvaraka, Bhallataka, Haritaki, Aamalaki* and *Gudam.* This *Yoga* is *Kapha-Vatashamaka* by *Katu, Tikshana*, and *Ushna-Virya* property of its content.

Till date, no work has been done to standardize the *Chandrashakaladi Vataka* through Pharmacognostical and Physico-chemical parameters, hence in the present study *Chandrashakadi Vataka* was subjected to pharmacognostical and pharmaceutical analysis and to establish its authenticity.

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Material and Methods

Collection of the drug

Chandrashakalsaadi Vataka ingredients have been collected from the Pharmacy, G.A.U., Jamnagar. The ingredients and the part used are given in Table - 1.

Table 1: Ingredients of *Chandrashakaladi Vataka*

Drug Name	Botanical Name	Ratio	Part Used
Bakuchi	*Psoralia corilifolia* Linn	1 part	Seed
Chitraka	*Plumbago zeylanica* Linn.	1 part	Bark
Rajni	*Curcuma longa* Linn	1 part	Rhizome
Vidanga	*Embeliaribes* Burm.f.	1 part	Fruit
Tuvaraka	*Hydnocarpous laurifolia* Linn.	1 part	Seed
Bhallataka	*Semicarpusanacardium* Linn.f.	1 part	Seed
Amalaki	*Embelica officinalis* Gaertn.	1 part	Fruit
Haritaki	*Terminalia chebula* Retz.	1 part	Fruit
Bibhitaki	*Terminalia belerica*(Breyn.ex Gaertn.	1 part	Fruit
Gudam	Jaggery	1 part	-

Pharmacognostical Evaluation

As per Ayurvedic Pharmacopoea of India (API)[2] raw drugs were identified and authenticated by the Pharmacognosy Laboratory. The identification was carried out based on the organoleptic features and powder microscopy of the individual drugs. Later, pharmacognostical evaluation of *Chandrashakaladi Vataka* was carried out. It was studied under the Carl Zeiss Trinocular microscope attached with camera, with stain and without stain. The microphotographs were also taken under the microscope.

Preparation of *Chandrashakaladi Vataka*

Chandrashakaladi Vataka was prepared in the Pharmacy, GAU, Jamnagar. For this, in the beginning, raw materials of ingredients were taken in equal proportion as given in *Ashtanga Hridaya* and *Vataka* (pill) each of 500 mg. were made.

Physico-chemical evaluation

Chandrashakaladi Vataka was analysed using various standard physicochemical parameters such as Loss on drying, pH, water soluble extract, methanol soluble extract, etc. as per API at the pharmaceutical chemistry laboratory, IPGT&RA, Jamnagar.

HPTLC STUDY[3]

High performance thin layer chromatography (HPTLC) is a sophisticated and automated form of TLC. HPTLC is quality assessment tool for the evaluation of botanical materials. It allows for 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 wave-lengths of light thereby providing a more complete profile of the plant than is typically observed with more specific types of analyses.

The details of HPTLC done on alcoholic extract of *Chandrashakaladi Vataka* are as follow;

Mobile phase: Toluene: Ethyl acetate : Acetic acid (7:2:1) v/v.

Chromatographic conditions

- **Application mode :** Camag Linomat V
- **Development Chamber :** Camag Twin trough Chamber.
- **Plates :** Precoated Silica Gel GF254 Plates.
- **Chamber Saturation :** 30 min.
- **Development Time :** 30 min.
- **Scanner :** Camag Scanner III.
- **Detection :** Deuterium lamp, Tungstan Lamp
- **Data System :** Win cats software.

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Methanolic extract of finished product was spotted on pre-coated silica gel GF 60254 aluminum plate by means of Camang Linomat V sample applicator fitted with a 100 µL Hamilton syringe. Toluene : Ethyl acetate : Acetic acid (7:2:1) was used as the mobile phase. After development, densitometric scan was performed with a Camag TLC scanner III in reflectance absorbance mode at UV detection as 254 nm and 366 nm under the control of Win CATS Software (V 1.2.1. Camag).[4]

Observation and Results

Pharmacognostical evaluation

Organoleptic characters

Organoleptic parameters like Taste, Colour, odour and touch were scientifically studied and results are as per depicted in Table 2.

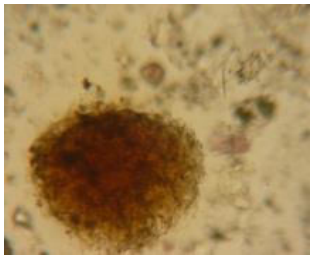
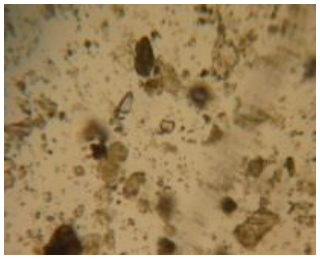
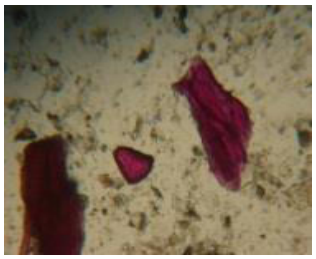
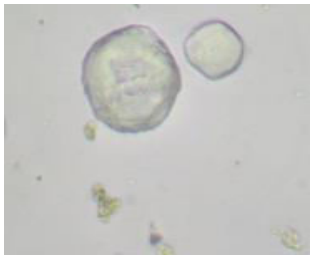
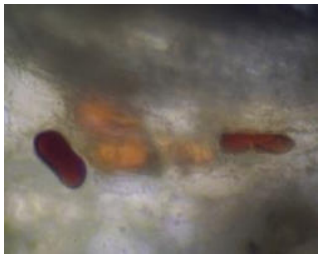
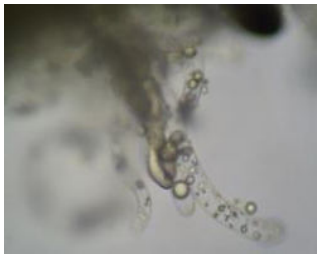
Table 2: Organoleptic Characteristics of *Chandrashakaladi Vataka*

S N	Characteristics	Results
1	Colour	Brown
2	Odour	Lightly pungent
3	Taste	Sweet, bitter followed by strong pungent
4	Touch	Rough, round

Microscopic characters

Diagnostic characters were observed under the microscope which were crystals with tannins, fibres, starch grains, stone cells and sclerites of *Aamalaki*. Starch with hilum concentric lines, fragments of epidermal cells and brown contents of *Bakuchi*. Fixedoil, oil globule, stone cells of *Bhallataka*. Starch, pitted stone, rosett-crystals, sclerites, trichome and tannins of *Bibhitaki*, cork, prismatic crystals, rhomboid crystals, lignified fibres of *Chitrak*. Annular vessels, oleoresin and cork in *Haridra*. Simple starch grains, mesocarp cells, sclerides, lignified fibres, stone cells of *Haritaki*. Oilglobules, scleroids, stone cells of *Tuvaraka*, fibres and stone cells with brown contents of *Vidanga*. Details of all the drugs are depicted in plates 1 and in table 1.

Plate 1: Microphotographs of ingredients of *Chandrashakaladi Vataka*.

Aamalaki	
	
Mesocarp	Crystals
	
Sclerites	Stone cells
Bakuchi	
	
Starch with hilum concentric lines	Fragments of epidermal cells & Fibres
Bhallataka	
	
Fixed oil	Stone cells

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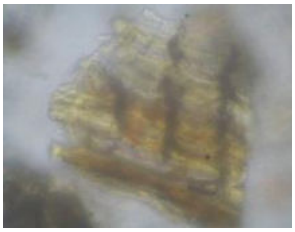
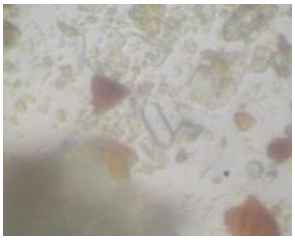
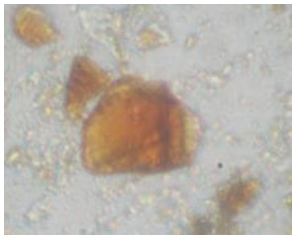
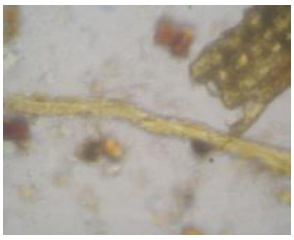
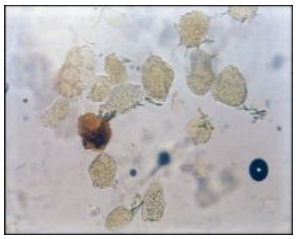
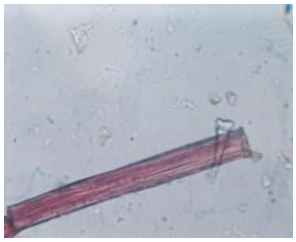
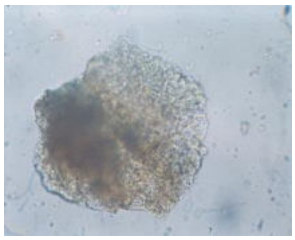
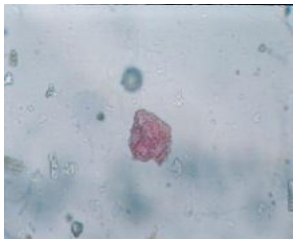
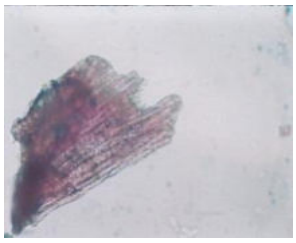
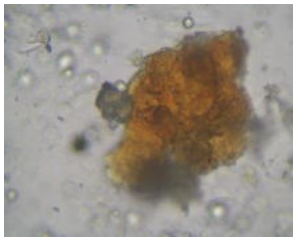
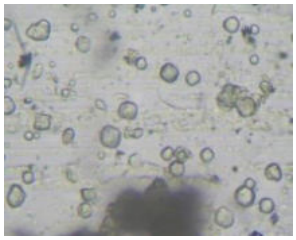
Bibhitaki	
	
Pitted stone	Rosette-bibi
	
Scleride	Stone

Chitraka	
	
Border pitted vessel	Cork
	
Lignified fibres	Prismatic crystals
	
Tannin content	Simple fibres

Haridra	
	
Cork	Oleoresin
	
Starch and parenchyma	Cork

Haritaki	
	
Lignified fibres	Mesocarp cells
	
Stone cells	Simple pitted vessels

Tuvaraka	
	

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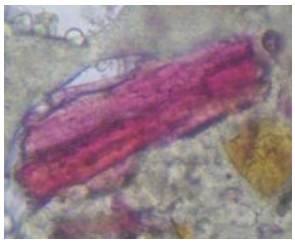
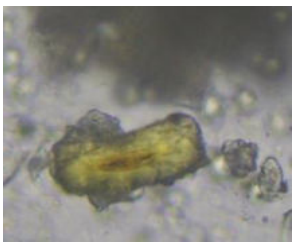
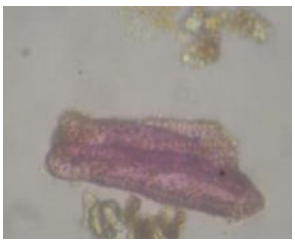
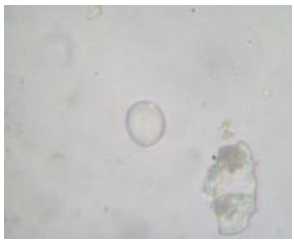
Brown content	Oil globules
	
Scleroids	Stone cells
Vidanga	
	
Fibre	Stone cells
	
Oil globule	Trichome

Preliminary Physico Chemical Parameters

Preliminary Physico-Chemical parameters i.e. weight, hardness, loss on drying etc. were properly studied and results are depicted in table 3.

Table 3 : Preliminary Physico-chemical Parameters of *Chandrashakaladi Vataka*.

S N	Parameters	Value
1	Loss on Drying	0.049 % w/w
2	Ash Value	13.15 % w/w
3	Acid Insoluble Ash	13.15 % w/w
4	Water Soluble Extract	29.5 % w/w
5	Methanol Soluble Extract	22.4 % w/w
6	pH	6.5

HPTLC Results

HPTLC Results of *Chandrashakaladi Vataka* showed that 12 spots at 254nm and 13 spots at 366nm. detailed results are depicted in table 4.

Table 4 : HPTLC Results of *Chandrashakaladi Vataka*.

Sample	Detection condition	No. of spots	Rf. value
Chandrashakaladi Vataka.	254 nm	12	0.03, 0.06, 0.17, 0.23, 0.26, 0.31, 0.40, 0.44, 0.51, 0.60, 0.79, 0.88.
	366nm	13	0.03, 0.07, 0.11, 0.16, 0.24, 0.28, 0.32, 0.45, 0.52, 0.60, 0.71, 0.79, 0.87.

DISCUSSION

Pharmacognostical evaluation showed that the formulation contains all the ingredients which were observed in the microscopical characters, this shows purity and quality of the product. Phytochemical analysis showed that material gains moisture during storage, which eventually may affect the quality of product. Here, average value of Loss on drying (LOD) was found within normal limits (0.049 % w/w), which indicates prompt care was taken during packaging and storage of product. The obtained values of these tests were found within normal limits in *Chandrashakaladi Vataka*, which indicate good quality of product. The pH value of the compound was found to be 6.5 and the acid insoluble ash constituted 13.15% w/w. The water soluble extract was found to be 29.5% w/w and methanol soluble extract was found 22.4% w/w.

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HPTLC results showed that the 12 spots at 254nm and 13 spots at 366nm.

CONCLUSION

Pharmacognostical and phyto-chemical evaluation of *Chandrashakaladi Vataka* illustrated the specific characters of ingredients which were used in the preparation. Physico-chemical profile is an essential parameter for quality assurance; in present work the obtained results were found within prescribed limits. For the first time, pharmaceutical and analytical profile of *Chandrashakaladi Vataka* was established. On the basis of observations and experimental results, this study may be used as reference standard in the further quality control researches.

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