Research Article

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PHARMACOGNOSTIC AND ANALYTICAL STUDY OF CHANDRODAYA VARTI: AN AYURVEDIC FORMULATION

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ABSTRACT

Chandrodaya varti is a herbomineral compound indicated for ophthalmic diseases. Its ingredients consist of specific properties so that they can be used in managing Garbhasya grivagata vrana (Cervical Erosion). Chandrodaya Varti constitutes 9 ingredients, of which 6 are herbal drugs, 1 mineral, 1 sea and 1 animal origin. The pharmacognostic and analytical study revealed the specific characteristics of all active constituents used in preparation. The present work was carried out to standardize the finished product of Chandrodaya varti to confirm its identity, quality and purity. The presence of oil globules, starch grains, stone cells, macro sclereids stone cells, rhizome and prismatic crystal were the microscopic features of the powder of the prepared drug. Physiochemical analysis of Chandrodaya varti showed a loss on drying value of 8.9%, a water-soluble extractive value of 36.1%, alcohol soluble extractive of 26.9%, total ash of 10.9%, acid insoluble ash of 10.8%, pH 5.85 and the physicochemical analysis of Chandrodaya varti ash showed the loss on drying 0.01%, water-soluble extractive 34.4%, alcohol soluble extractive 9.8% and pH 13.37. HPTLC of Chandrodaya varti is the preliminary quantitative analysis which shows 11 spots at Rf value 0.11, 0.15, 0.21, 0.28, 0.31, 0.38, 0.47, 0.54, 0.62, 0.68, 0.79 in UV 254 nm and 11 spots at Rf value 0.15, 0.21, 0.31, 0.38, 0.42, 0.50, 0.54, 0.62, 0.79, 0.82, 0.89 in UV 366 nm and 7 spots at Rf value 0.15, 0.31, 0.42, 0.50, 0.54, 0.62, 0.79 in UV 540 nm.

Keywords: Cervical Erosion, Chandrodaya Varti, Pharmacognosy, Physiochemical analysis, HPTLC.

INTRODUCTION

Ayurveda is India's traditional natural system of medicine that has been practised for more than 5000 years and is often called the "Mother of all healing". Ayurveda was the system of health care conceived and developed by the rishis and natural scientists through centuries of observations, experiments, discussions and meditations. Cervical erosion is common in routine pelvic examinations during women's fertile years. It is a condition where the squamous epithelium of the ectocervix is replaced by columnar epithelium, which is continuous with the endocervix. The prevalence reported for ectopy more than 50%[1]. A study was conducted on Chandrodaya varti, described by Acharya Sharangdhar[2]. Most of the ingredients of Chandrodaya Varti have katu, tikta, kashaya ras, laghu, ruksha, tikshana guna and lekhaniya properties. Agnikarma by Chandrodaya varti gives the best effect in lekhana and shodhana karma. So Agnikarma and lekhana karma of Chandrodaya varti will generate a healthy base for healing cervical erosion (Garbhasya griva gata vrana). As a part of the study, there was a need to ascertain and establish the effectiveness of Chandrodaya varti in treating cervical erosion (Garbhasya griva gata vrana). Before starting the clinical trials, there was the need to predetermine the fact that there was no adulteration and to ensure that the active constituents were used in the drug preparation. A systemic study was conducted to standardize the finished product Chandrodaya varti.

MATERIALS AND METHODS

Collection of raw drugs

Chandrodaya varti comprises Maricha**,** Pipalli, Haritaki**,** Vacha, Kustha, Bibhitaki, Shankhnabi, and Manashila[2]. Raw herbal drugs were procured from the Anamika pharmacy Sidcul Haridwar and were identified based on their macroscopic characteristics in the Department of Dravyaguna in the Rishikul campus Haridwar. Shodith Manashila was purchased from Hans Pharmacy Sidcul Haridwar, and shodith shankh nabi powder was bought from Anamika Pharmacy Sidcul Haridwar, India.

Pharmacognostic Evaluation

It includes two parameters organoleptic and microscopic evaluation of the powdered drug.

Organoleptic Evaluation

The organoleptic characteristics of Ayurvedic drugs are evaluating the qualities of preparation by colour, touch, taste, odour etc. organoleptic parameters of Chandrodaya varti and Chandrodaya varti ash are mentioned in Tables 2 and 3.

Microscopic Evaluation

Dry powder of the herbal drugs used in the preparation of Chandrodaya varti was used for this study. The powder characters were identified with the help of the Microbiology Department of Gurukul Kangri Haridwar, India. Powder microscopy of the sample was done without stain. Micro pictures were taken under the Uni Lab microscope.

The presence of oil globules, starch grains, macro sclereids stone cells, stone cells, prismatic crystal and rhizome were the characteristic features observed in the microscope[3-7].

Analytical Study

It includes the following parameters:
1. Physicochemical parameters
2. Chromatographic analysis

Physicochemical study

Chandrodaya varti and Chandrodaya varti ash were analyzed using qualitative and quantitative parameters at the Vasu research centre in Vadodara, Gujarat, India.

Physiochemical analysis of Chandrodaya varti and Chandrodaya varti ash showed in Tables 4 and 5.

Table 1: Ingredients of Chandrodaya varti

Drug	Latin name	Part used	Proportion
Maricha	*Piper nigrum*	Fruit	1 part
Pippali	*Piper longum*	Fruit	1 part
Kustha	*Saussurea lappa*	Root	1 part
Vacha	*Acorus calamus*	Rhizome	1 part
Haritaki	*Terminalia chebula*	Fruit	1 part
Bibhitaki	*Terminalia bellirica*	Endosperm	1 part
Manashila	Realgar	Mineral	1 part
Shankhnabi	Conch shell	Nabhi	1 part
Chagaksheera		Goat Milk	Q.S

RESULTS

Table 2: Organoleptic properties of Chandrodaya varti

Rupa (colour)	Brown coloured wick shaped
Rasa (taste)	Pungent
Gandha (odour)	Characteristic
Sparsha (consistency in touch)	Solid and smooth

Table 3: Organoleptic properties of Chandrodaya varti ash

Rupa (colour)	Grey coloured powder
Rasa (taste)	Tasteless
Gandha (odour)	Characteristic
Sparsha (consistency in touch)	Soft

Table 4: Physicochemical parameters of Chandrodaya varti

Test	Result
Loss on drying	8.9%
Water soluble extractive	36.1%
Alcohol soluble extractive	26.9%
Total ash	10.9%
Acid insoluble ash	10.8%
pH	5.85

Table 5: Physicochemical parameters of Chandrodaya varti ash

Test	Result
Loss on drying	0.01%
Water soluble extractive	34.4%
Alcohol soluble extractive	9.8%
pH	13.37

Table 6: Heavy metal analysis of Chandrodaya varti

Lead	1.200 ppm
Cadmium	0.024 ppm
Mercury	0.847 ppm
Arsenic	2.987 ppm

Table 7: Microbiological analysis of Chandrodaya varti

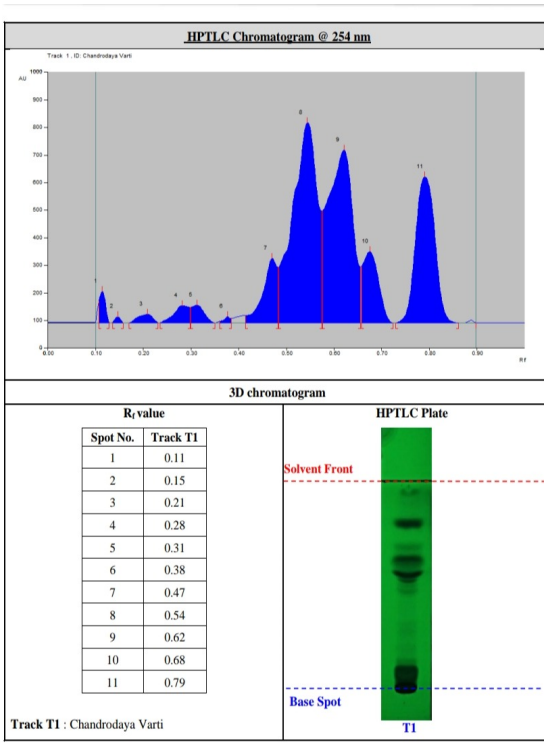
Total microbial plate count (TPC)	712 cfu/g
Total yeast and Molds count (TYMC)	7 cfu/g
Staphylococcus	Absent
Salmonella sp.	Absent
Pseudomonas aeruginosa	Absent
Escherichia coli	Absent

High-Performance Thin-Layer Chromatography (HPTLC)

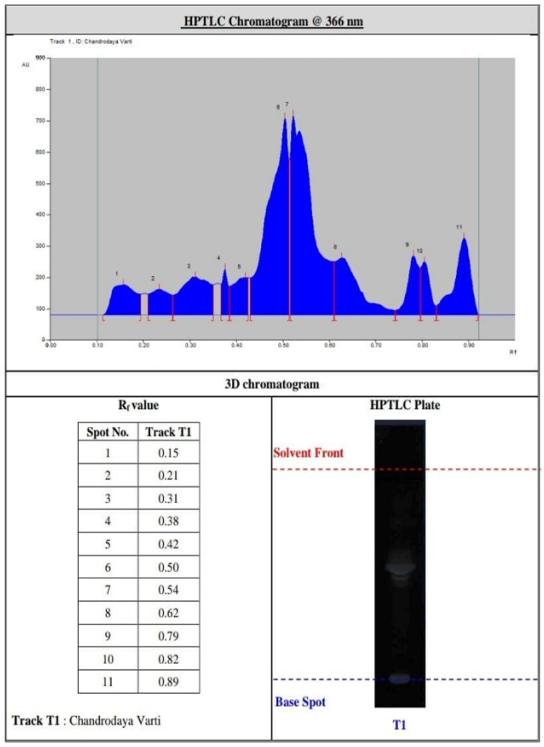
Thin-layer chromatography is the most common chromatographic method used by Ayurvedic research workers to detect the number of compounds in a product. It also helps to determine the purity of the sample[9]. The results are shown in Table 8. Chromatogram showed 11 spots at Rf value 0.11, 0.15, 0.21, 0.28, 0.31, 0.38, 0.47, 0.54, 0.62, 0.68, 0.79 in UV 254 nm and 11 spots at Rf value 0.15, 0.21, 0.31, 0.38, 0.42, 0.50, 0.54, 0.62, 0.79, 0.82, 0.89 in UV 366 nm and 7 spots at Rf value 0.15, 0.31, 0.42, 0.50, 0.54, 0.62, 0.79 in UV 540 nm.

Table 8: HPTLC of Chandrodaya varti

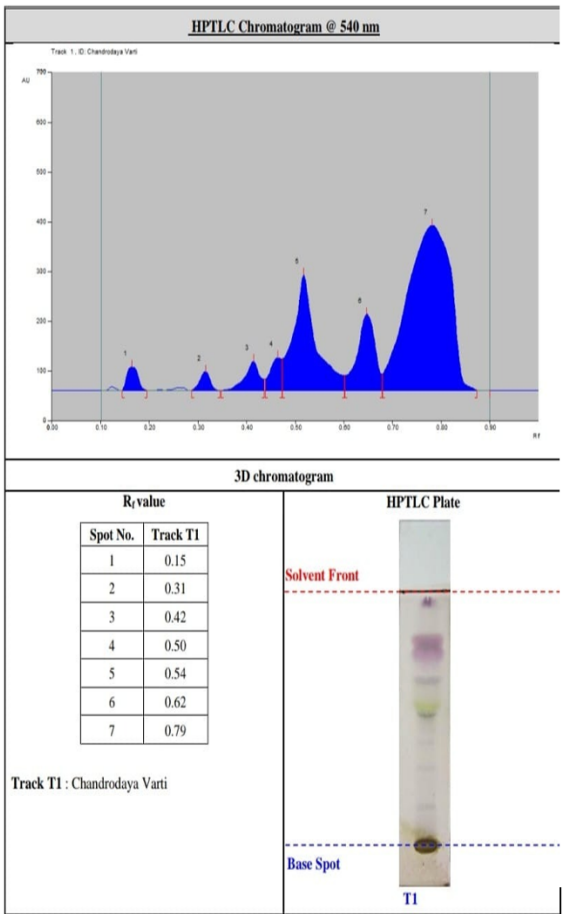
Wavelength	Number of spots	Rf value
UV 254nm	11	0.11, 0.15, 0.21, 0.28, 0.31, 0.38, 0.47, 0.54, 0.62, 0.68, 0.79
UV 366nm	11	0.15, 0.21, 0.31, 0.38, 0.42, 0.50, 0.54, 0.62, 0.79, 0.82, 0.89
UV 540nm	7	0.15, 0.31, 0.42, 0.50, 0.54, 0.62, 0.79



HPTLC of Chandrodaya varti on the wavelength of UV 254 nm



HPTLC of Chandrodaya varti on the wavelength of 366 nm



HPTLC of Chandrodaya varti on the wavelength of 540 nm

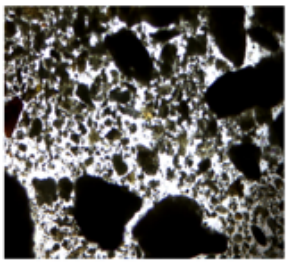


Figure 1: Oil globules of Pippali

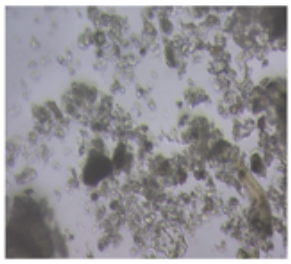


Figure 2: Starch grains of Maricha

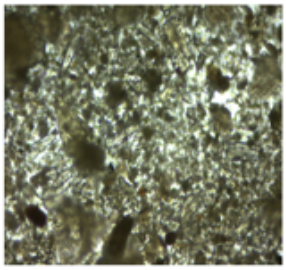


Figure 3: Stone cells and sclereids of Harad

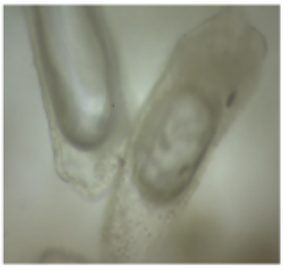
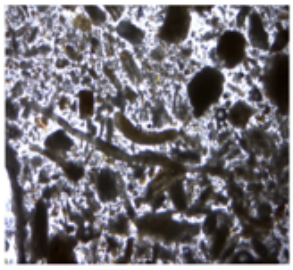


Figure 4: Macro sclereids stone cells of Baheda



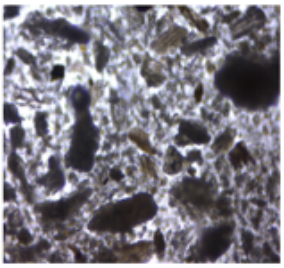


Figure 5: Vacha rhizome

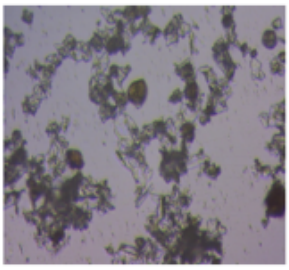


Figure 6: Prismatic crystal of Kustha

Pictures of microscopic features (Herbal Ingredients) of Chandrodaya varti

DISCUSSION

Any drug used medicinally requires detailed study before its use because therapeutic efficacy depends on the quality of the drug used. The pharmacognostic study is the first step to standardizing a drug[9]. If the drugs are adulterated, then the quality of preparation cannot give the desired result. This is the first time the analytical study of Chandrodaya varti is being conducted so that it could be helpful for further research in future.

The microscopic study reveals the presence of oil globules, starch grains, stone cells, macro sclereids stone cells, rhizome and prismatic crystals were the characteristic and specific features observed in the microscope.

The physiochemical parameter of Chandrodaya varti shows the loss on drying (the moisture of the drug), which was found to be 8.9%, whereas after burning the Chandrodaya varti, the loss on drying of Chandrodaya varti ash was 0.01%, total ash value depends upon the inorganic substances present in the particular drug; this parameter has importance in quality control and standardization of drugs. More the inorganic substance present in drugs higher will be the ash value. Here the ash value of Chandrodaya varti was 10.9%, The pH of Chandrodaya varti was 5.85, whereas the pH of Chandrodaya varti ash was 13.37, which suggests that the pH of Chandrodaya varti ash was alkaline.

Various components have their solubility in particular media. Here soluble principles of the samples were seen in water and alcohol; the water-soluble and alcohol extractive of Chandrodaya varti was 36.1% and 26.9%, whereas the water-soluble and

alcohol extractive of Chandrodaya varti ash was 34.4% and 9.8%. It indicates that after burning the Chandrodaya varti, water and alcohol, content get vaporized. So, the value of water and alcohol extractive of Chandrodaya varti ash was decreasing. Medicinal plant matter typically carries many bacteria and molds, often originating in soil. In the present formulation, the microbial count is within the permissible limits[10], which indicates the observation of proper hygiene norms followed during the preparation of formulation and packing.

Heavy metal analysis of Chandrodaya varti showing the presence of arsenic. HPTLC of Chandrodaya varti is the preliminary quantitative analysis which shows 11 spots at Rf value 0.11, 0.15, 0.21, 0.28, 0.31, 0.38, 0.47, 0.54, 0.62, 0.68, 0.79 in UV 254 nm and 11 spots at Rf value 0.15, 0.21, 0.31, 0.38, 0.42, 0.50, 0.54, 0.62, 0.79, 0.82, 0.89 in UV 366 nm and 7 spots at Rf value 0.15, 0.31, 0.42, 0.50, 0.54, 0.62, 0.79 in UV 540 nm.

CONCLUSION

The Pharmacognostic and analytical analysis of Chandrodaya varti reveals that the characteristics of the drugs used in Chandrodaya varti are similar per API references. Organoleptic parameters, physicochemical analysis, phytochemical analysis, heavy metal analysis, and microbiological analysis were carried out per the norms of WHO guidelines. HPTLC profile generated in this particular study can be considered as a preliminary tool ascertaining the authenticity of Chandrodaya varti.

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