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A Pharmaceutical and Pharmacognostical Study of - *Shool Prashamana Dashemani Churna*

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ABSTRACT

Background: Since ages, Ayurvedic formulations are used as a colic and spasmodic pain relieving medications. *Shool Prashaman Dashemani* is a group of ten spasmodic pain relieving group of herbs described in *Charaka Samhita*. *Shool Prashaman Dashemani Churna* is constituted of Piper longum (dried fruits) (Dried roots), *Piper* retrofractum (Dried roots), *Plumbago zeylanica* (Dried roots), *Zingiber officinalis* (Dried rhizomes), *Piper Nigrum* (Dried fruits), *Carum carvii* (Dried fruits), *Cymium cuminii* (Dried fruits), *Cleome viscose* (Dried seeds), and *Coleus forskohili*(Dried roots).Standardization of herbal formulation is essential in order to assess the authenticity, quality and purity of herbal preparation. The present paper reports standardization of this polyherbal preparation which can be a potential anti-spasmodic preparation. **Aim:** To develop the pharmacognostical and pharmaceutical profile of *Shool Prashaman Dashemani Churna*. **Materials and Methods:** *Shool Prashaman Dashemani Churna* was prepared as per the classical methods and subjected to pharmacognostical, organo-leptic, physico-chemical analysis and HPTLC examination by optimizing the solvent system. **Results and Conclusions:** Pharmacognostical profile of *Shool Prashaman Dashemani Churna* was established by observing the characteristic pharmacognosical markers of the authentic drug sources in powder microscopy of the finished product. Physico-chemical standards were found to be within the permissible limits of a *churna* preparation as per the standards prescribed by the Ayurvedic Pharmacopeia of India. HPTLC fingerprinting profile demonstrated 15 spots at 254 nm and 5 spots at 366nm.

KEYWORDS

Herbal antispasmodic Churna, Shool Prashman Dashemani, Pharmacognostical standards and Physico-chemical analysis

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INTRODUCTION

According to *Ayurveda*, drug is the chief instrument of disrupting the pathogenetic process and establishing the state of homeostasis. In its rich treasure of pharmacopeia, *Ayurveda* has a great number of herbo-mineral and animal based medicines which can be rationally used singly or in combination to mitigate various diseases. Pharmaceutical sector of present era also look forward to natural products as a source of the novel drug formulations and new chemical entities due to redundancy in synthetic biochemical medicines and long drug discovery process which requires massive funding. Currently 80% of anti-microbial, cardiovascular, immunosuppressive and anti-cancer drugs are of the plant origin[1]. 50% of the conventional drugs used today are either derivatives of the natural products or were first identified and isolated from the natural products[2]. With the increasing emphasis on the plant based medicines in public health care, worldwide, it is of paramount importance to identify the crude drug scientifically along with their various chemical constituents to establish authenticity of the source and comply with the pharmacopeial and pharmaceutical standards set by the drug regulatory agencies. In order to ensure the clinical efficacy and safety of the drug candidate, it is essential to evaluate the same on various quality assurance parameters like determination of adulterants, pesticides residue, microbes and microbial products etc[3]. Drug standardization is also important for the new entities to make standard assays for new entities.

Pain is usually the first manifestation of an underlying disorder. Common masses have been using natural and plant based pain reliving agents since time immemorial. Charaka Samhita, a codified compendium of treatment principles and natural remedies of various disorders grouped plants and plant parts (10 in each group) into fifty classes depending upon their therapeutic applications. One such group of colic and spasm relieving agents is called Shool Prashamana Dashemani[4]. This is an important group of drugs which may find application in pain predominant disorders of various systems of the body. Despite having a potent spam relieving properties, there is a dearth of pharmacognostical and pharmaceutical study on this group of the Mahakshaya.

AIM

This study is designed to lay down the various pharmacognostic and phytochemical standards which will be

helpful to ensure the purity, safety, and efficacy of this *Mahakshaya*.

MATERIALS AND METHODS

Collection, Identification and Authentication of raw drugs

Raw materials for *Shool Prashmana Dashemani Churna* were collected from the pharmacy of Gujarat Ayurved University, Jamnagar, except two *Ajgandha Beeja* (*Cleome viscosa* seeds) and *Gandeera moola* (*Coleus forskohili* roots), which were procured from the local market. All the crude dry drugs were identified and authenticated before processing in the Pharmacogonosy Department, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar.

Method of preparation of Drug

After collection, identification and authentication of the crude drugs, all ingredients in equal quantity were ground into a fine powder in a grinder packed into dried sterile jars.

Pharmacognostical study

The finished product, *Shool Prashamana Dashemani Churna* was subjected to the Pharmacognostical study for its organoleptic and microscopic features. The organoleptic study was conducted on the dried sample and for powder microscopy, sample was dissolved in small quantity of water. The microscopy of the sample was done without stain and after staining with Phloroglucinol + HCl. Microphotographs of *Shool Prashamana Dashemani Churna* was also taken under Carl-Zeiss trinocular microscope[5].

Analytical Study: The finished product *Shool Prashamana Dashemani Churna* Table 1 **{Plate no.1}** was analyzed by employing various analytical parameters.

Plate 1 Shool Prashmana Dashemani finished product

Table 1. Constituents of ***Shool Prashamana Dashemani Churna***

Drug Name/ Local Name	Botanical Name	Ratio	Part Used
Pippali	*Piper longum* Linn.	1 Part	*Dried Fruit*
Pippali Mool	*Piper longum Linn.*	1 Part	*Dried Root*
Chavya	*Piper retrofractum* Vahl.	1 Part	*Dried Root*
Chitrak	*Plumbago zeylanica* Linn.	1 Part	*Dried Root*
Shrungver	*Zingiber officinalis* (Willd.) Rosc	1 Part	*Dried Rhizome*
Marica	*Piper Nigrum* Linn.	1 Part	*Dried Fruit*
Ajmoda	*Carum carvii* Linn.	1 Part	*Dried Fruit*
Ajaji	*Cymium cuminii* Linn.	1 Part	*Dried Fruit*
Ajgandha	*Cleome viscosa* Linn.	1 Part	*Dried Seeds*
Gandeer	*Coleus forskohili* (Wild). Briq.	1 Part	*Dried Roots*

The Organoleptic characteristics (Table 2) i.e., color, odor, taste and touch were scientifically studied following standard references described for the study of powder drug. Physico-chemical analysis such as loss on during at 1100C, pH value, ash value, water soluble extract and alcohol soluble extracts were carried out as per the pharmacopeial standard practices[6].

Table 2 Organoleptic Characters of *Shool Prashamana Dashemani Churna*

S.no	Characters	Results
1	Taste	Pungent followed by Bitter and lastly astringent *(Katu Tikta Kashaya)*
2	Color	Coffee Brown
3	Odor	Pungent Aromatic
4	Texture	Fine powder

High Performance Thin Layer Chromatography (HPTLC)

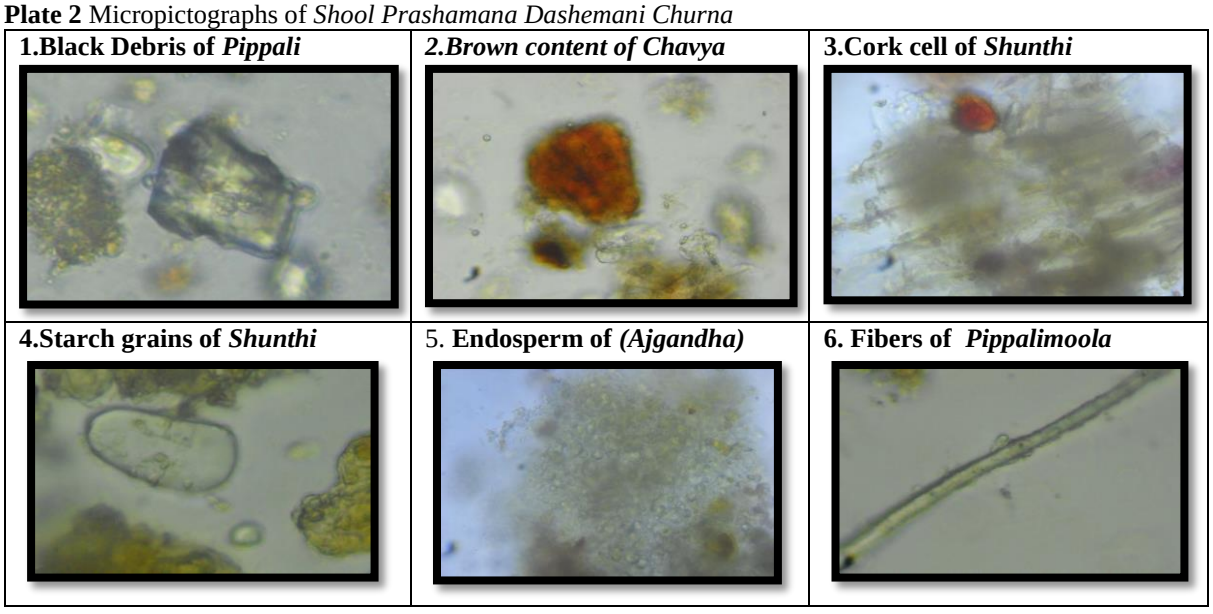
HPTLC was performed as per the guideline provided by the Ayurvedic Pharmacopoeia of India on the CAMAG chormatogram with winCATS software to process the chromatography data and Linomat 5 sample applicator. Methanolic extract of drug sample was used for the spotting. HPTLC was performed using Toluene +Ethylacetate + Acetic acid (7:2:1) solvent system and observed under visible light. The colour and R_f values of resolved spots were noted[7]

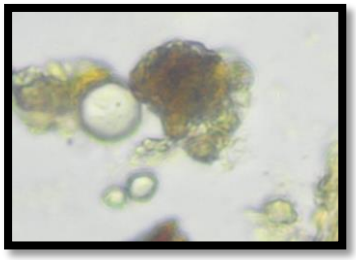
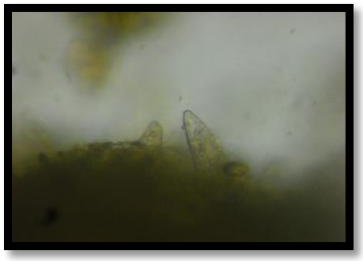
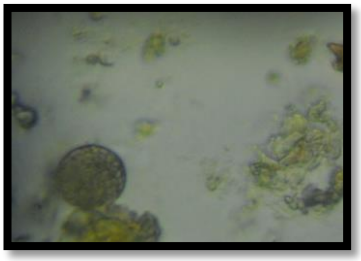
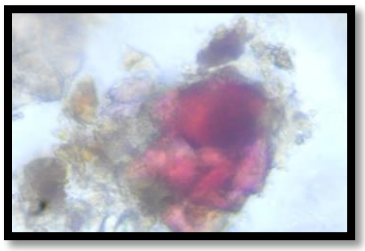
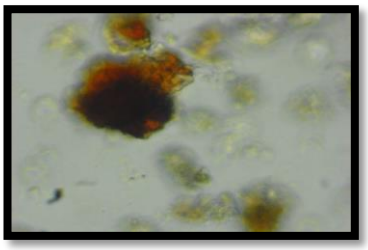
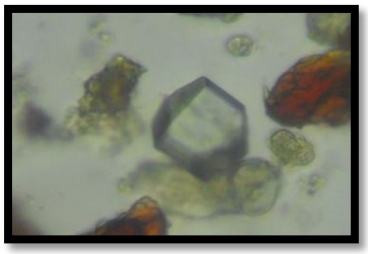
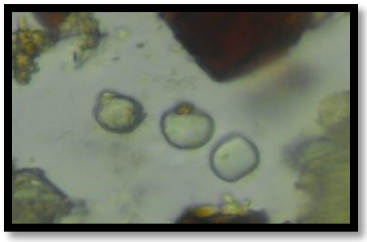
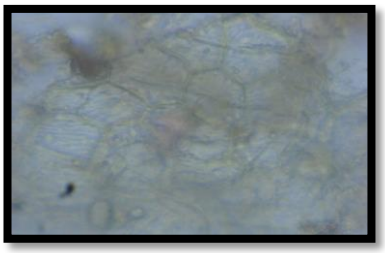
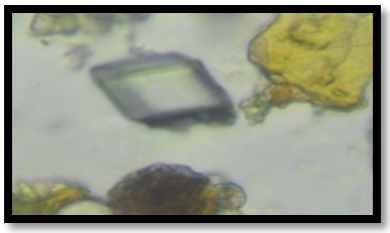
RESULTS AND DISCUSSION

Microscopic Characters:

Diagnostic characters ~~were~~ observed under the microscope were black debris of *Pippali*, Brown content of *Chavya*, Cork cells and starch grains of *Shunthi*, Endosperm of *Ajgandha*, fibres of *Pippalimoola*, Oil globules and trichomes of *Ajmoda*, Oil globules of *Jeeraka*, Oil globules and stone cells of *Maricha*, Tannin content of *Chitraka*, Rhomboidal crystals and starch grains of *Chitrakmula*, Parenchymal and prismatic crystals of *Gandira*, as depicted in the {**Plate no.2}.**

Plate 2 Micropictographs of *Shool Prashamana Dashemani Churna*



7.Oil globules of *Ajmomad* 	**8.Trichomes *of Ajmoda*** 	**9. Oil globules of *Jeeraka*** 
10.Oil globules of *Maricha* 	**11. Stone cells of *Maricha*** 	**12.Tannin Content of *Chitraka*** 
13. Rhomboidal crystal of *Chitrakmula* 	**14. Starch grains of *Chitrakmula*** 	**15.Parenchyma cells of *Gandeera*** 
Prismatic cells of *Gandeera* 		

Physico-chemical analysis: Results of Physico-chemical analysis of *Shoola Prashamana Dashemani churna i.e.* Ash value, loss on drying, water and alcohol extractive values, pH detailed in **Table 3**.

HPTLC Study: Chromatographic study HPTLC was carried out under 254 and 366nm ultraviolet to establish fingerprinting profile and the results were depicted in **Table 4**. It showed 15 spots at 254 nm and 5 spots at 366 nm.**{Plate no. 3& 4}**

Table 3 Physico-Chemical assay of the *Shool Prashamana Dashemani Churna*

Sr. No	Parameters	Value
1	**Water Soluble Extractive**	16.12% w/w
2	**Methanol Soluble Extractive**	16.7 % w/w
3	**Loss on Drying**	4.06 % w/w
4	**Total Ash Value**	7.95% w/w
5	**pH 5% aqueous**	6.0

DISCUSSION

Pharmacognostical evaluation showed that this *churna* contains all the ingredients

which demonstrably showed all the microscopic characters of their source plant materials authenticating their purity and quality of the finished product.

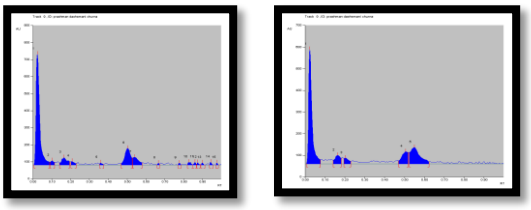
Table 4 The HPTLC profile of *Shool Prashamana Dashemani Churna*

Wavelengths	Spots	R_f Values
At 254 nm	**15**	**0.02, 0.10, 0.17, 0.21, 0.36, 0.50, 0.54,0.67,0.78, 0.83, 0.86, 0.88, 0.90, 0.94, 0.98**
At 366 nm	**5**	**0.02, 0.16, 0.20, 0.51, 0.55,**

Physico-chemical analysis showed that material gains moisture during storage which eventually may affect the quality of product. Here average value of loss on drying was found within normal limits (4.06% w/w), which indicates that the finished product is of good quality and effective. The pH value of the drug was slightly acidic (pH- 6.0). Total ash value 7.95% w/w is well within the permissible limits and vouch for the purity of the drug and free from any inorganic adulterants. The water extractive and alcohol extractive values are almost comparable 16.12% w/w and 16.70% w/w, respectively. HPTLC results showed 15 spots at 254 nm and 5 spots at 366 nm.

CONCLUSION

Pharmacognostical and physico-chemical evaluation of the *Shool Prashaman Dashemani Churna* illustrated the specific characters of ingredients which were used in the preparation. Physico-chemical parameters are found to be within the permissible limits of the pharmaceutical preparation i.e. Powder, as per the prescribed Ayurvedic Pharmacopeial standards indicating its safety, quality and efficacy. On the basis of the observations and experimental results, this study may be used as the reference standard in the further quality control research of this preparation.



Denistometry at 254 nm **Denistometry at 366 nm**

Plate 3 HPTLC Denistogram of *Shool Prashmana Dashemani Churna*

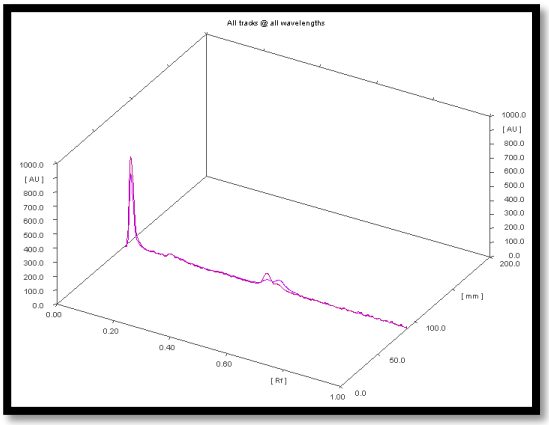


Plate4 3-Dimensional diagram of the HPTLC of *Shool Prashamana Dashemani Churna*

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