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PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF *SHUNTHI PUSHKARMOOLADI VATI*

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ABSTRACT

Bronchial Asthma is a non-communicable chronic lung disease characterized by the following: airway inflammation, airway obstruction mainly due to muscle spasm associated with mucosal edema and stagnation of the mucus, airway hyper-reactivity to aerobiological and irritants, airway remodeling in uncontrolled Asthma. This disease is more predominant in children and aged population. Ayurveda address it as "*Tamaka Shwasa.*" There are five kinds of *Shwasa*: *Kshudra, Tamaka, Chhinna, Maha* and *Urdhava. Tamaka Shwasa* is a type of *Shwasa Roga* affecting the *Pranavaha Srotas.* In *Astang Hridyam*, the group of four drugs is mentioned for the management of the *Shwasa Roga* named as *Shunthi Pushkarmooladi Vati* Palatability is a main issue in treatment of children so keep it mind the Vati form is prepared which is very easily palatable in children. Till date no published data is available regarding evaluation the effect of *Shunthi Pushkarmooladi Vati*. Final product was subjected to Phrmacognostical and physico-chemical analysis such as microscopic study, loss on drying, ash value, pH, hardness etc. - Phrmacognostical study showed the presence of contents such as;Stomata of *Kantkari*, Strach grain of *Shunth*i, Scleroids of *Pushkarmoola* etc.Preliminary physico-chemical analysis showed that the loss on drying value was found to be 8.35%, pH 5, Ash value-8.37%, Water soluble extract 18.5% etc. High Performance Thin Layer Chromatography (HPTLC) showed 15and 17 spots at 254nm and 366nm respectively. The present work was carried out to standardize the finished product *Shunthi Pushkarmoola* in terms of its identity,

quality and purity. Pharmacognostical and Physico-chemical observations revealed the specific characters of all active constituents used in the preparation.

KEYWORDS: HPTLC, Pharmacogonosy, *Shunthi Pushkarmoola*, pharmaceutical, *Tamaka Shwasa.*

INTRODUCTION

Bronchial Asthma is a non-communicable chronic lung disease characterized by the following: airway inflammation, airway obstruction mainly due to muscle spasm associated with mucosal edema and stagnation of the mucus, airway hyper-reactivity to aerobiological and irritants, airway recodeling in uncontrolled Asthma.[1] Ayurveda texts have described five types of *Shwasa Roga* and among them, *Tamaka Shwasa* is one which is a "*Swatantra Vyadhi"* i.e. independent disease entity having its own etiological factor, patho-physiology and management. It is mentioned as *Yapya Vyadhi* i.e. a disease of chronic nature Charaka Samhita, while Sushruta considered it as *Kruchchra Sadhya Vyadhi*. *Tamaka Shwasa* is basically a disorder of *Pranavaha Srotasa* while other *Srotasas* are also vitiated stated by W.H.O. 100–150 million of global population are suffering from Bronchial Asthma, out of which 1/10th are Indians and the prevalence of asthma is increasing everywhere. Although largely avoidable, asthma tends to occur in epidemics and affects young people; asthma attacks all age groups but often starts in childhood. In India, rough estimates indicate a prevalence of between 10% -15% in 5-11 year old children.[2] In *Astang Hridyam* of Chikitsa Sthan is mentioned *Shunthi Pushkarmooladi Vati,*[3] in Jwar chikitsa. In the present day practice, among these four drugs most of the drugs are being used in different combinations. But, no any research work or documentation is available about the use and efficacy of *Shunthi Pushkarmooladi Vati* as a whole in the management of the *Tamaka Shwasa* in children. It prevent the attack of asthma due to anti tussive, anti-inflammatory, mucolytic property etc. which is very useful to decrease the asthma prevelance. In the present study, the formulation is subjected to Pharmacognostical and pharmaceutical analysis. Preliminary organoleptic features and results of microscopy were verified and all the ingredients were proved to be authentic.

MATERIALS AND METHODS

Collection, Identification and Authentication of raw drugs

The raw materials were collected from the pharmacy of Gujarat Ayurved University, Jamnagar. All the raw drugs were identified and authenticated in the Pharmacogonosy

Department, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar.

Preparation of the drug- *Shunthi, Pushkarmool, Kantkari, Gudhuchi* were taken in given proportion and made into fine powder and sieved in mesh no. 80. The powders were mixed well in mass mixing machine until a homogenous mixture was obtained. Out of total amount of drugs, 10% of the crude drugs were used for the preparation of decoction. Thereafter, the above-mentioned powders were mixed with decoction and *Vati* of 500 mg each was prepared.

Pharmacognostical study

The Pharmacognostical study comprises of organoleptic study and microscopic study of finished product.

Organoleptic Study

The Organoleptic characters of *Ayurvedic* drugs are very important and give the general idea regarding the genuinity of the sample. Organoleptic parameters like Taste, Colour, odour and Touch were scientifically studied in Pharmacognosy laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.[4]

Microscopic Study

Shunthi Pushkarmooladi Vati was dissolved with water and microscopy of the sample was done without stain and after staining with Phloroglucinol + HCl. Microphotographs of *Shunthi Pushkarmooladi Vati* was also taken under Corl-zeiss trinocular microscope.[5]

Physico-chemical analysis

Physico-chemical studies were carried out as per WHO guidelines,[6] Ayurvedic Pharmacopoeia,[7] and Indian Pharmacopoeia[8] for Standardization of Shunthi Pushkarmooladi *Vati*.

High Performance Thin Layer Chromatography (HPTLC)

HPTLC was performed as per the guideline provided by API. Ethanolic 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 Rf.

RESULTS AND DISCUSSION

Standardization tests performed for *Shunthi Pushkarmooladi Vati were* as per AYUSH testing protocol for *Vati*. *Shunthi Pushkarmooladi Vati* were found to be grayish brown in color with characteristic with aromatic in odor and bitter astringent piercing in nature in taste respectively. pH of *Shunthi Pushkarmooladi Vati* was found to be 5 that is in the acidic range. Most drugs are either weak acids or weak bases. Weak electrolytes, in addition to lipid solubility, depend upon its degree of ionization which is influenced by pH of the area. Weak acids become less ionized (charged) in an acidic medium and weak bases become less ionized in an alkaline medium. Basic drug will absorb more from intestine because it becomes unionized in basic medium. In acidic medium basic drug will become more ionized and thus no absorption will takes place. As both drugs are lightly acidic it will be absorbed properly. Variation in the weight were found to be within normal limit. Weight is mainly affected by factors such as tooling of the compression machine, head pressure, machine speed and flow properties of the powder. Inconsistent powder or granulate density and particle size distribution are common sources of weight variation during compression. Variation between *Vati* with respect to dose and weight must be reduced to a minimum. Uniformity of weight is an in process test parameter which ensures consistency of dosage units during compression. The *Shunthi Pushkarmooladi Vati* was found to be hard 2.5 kg/cm^2 which is also well within the normal limit. The testing of a *Vati's* hardness (or more correctly breaking force) plays a vital role in both product development and subsequent quality control. High hardness values may indicate increased disintegration times and reduced dissolution values. On the other hand, if hardness is too low then friability and hence % defective may well be too high. By exploiting the correlation between hardness, disintegration, dissolution, friability, percentage defective and weight variation, the various parameters can be manipulated to produce a dosage form with optimum characteristics. The *Shunthi Pushkarmooladi Vati* disintegration time is 35 min. which is also a good property of a tablet for easy dissemination of active constituents. An orally administered drug must disintegrate to attain good absorption of its active substance. The first step toward dissolution is usually the break-up of the tablet; a process described as disintegration. The disintegration test results in a time necessary to disintegrate a group of tablets into small particles under standard conditions. The disintegration test is a valuable tool in quality control environments. However, it is not a bioavailability indicator. The uniformity of active ingredient and content will make sure the dosage supplied to the patients is correct and preventing from overdose cases and so on. Photo documentation of ethanolic extract of *Shunthi Pushkarmooladi Vati* showed 15 and 17

spots under 254 and 366 respectively (Plate 2, Table 4). HPTLC is an important tool in standardization and quality control of polyherbal formulation. As there are more than one ingredient qualitative HPTLC fingerprinting can be used for development of quality standards for polyherbal formulation.[9,10] Diagnostic characters of *Shunthi Pushkarmooladi Vati* under the microscope showed stomata of *kantkari* , starch grain of *Gudhuchi*, , scleroids of *pushkarmoola* etc. All these are showed in **Plate no 1.**

These physico-chemical constants like pH, variation in weight, hardness, disintegration time, results of TLC photo documentation, the unique Rf values and densitogram obtained at different wavelengths can be used as fingerprint to check quality of drug. Pharmacognostical testing of a drug helps to establish the authenticity of the drug, based on its organoleptic and morphologic (macroscopic and microscopic) characters.

CONCLUSION

The purpose of standardization of medicinal plants is to ensure therapeutic efficacy since the active constituents may vary according to geographical source of the drug. Thus it may not be easy to standardize drug chemically and hence maintaining the quality of these plant products is an essential factor. The constituents of *Shunthi Pushkarmooladi Vati* such as *Shunthi* (*Zingiber officinale* Rosc.), *Pushkarmoola* (*Inula racemosa* Hook.F.), *Kantkari* (*Solanum surattense* Burm.F), *Guduchi* (*Tinospora cordifolia* Miers), are endowed with various biological properties and hence the *Shunthi Pushkarmooladi Vati* prepared from these ingredients will have combined goodness of all the individual herbs. The quality indicating tests for *Shunthi Pushkarmooladi Vati* reported from this study can be used as routine quality check parameter for this polyherbal preparation.

Table 1: Contents of *Shunthi Puskarmooladi Vati*.

Sr. No.	Drug name	Botanical name	Part Used	Ratio
1	*Shunthi*	*Zingiber officinale* Rosc.	*Shushka Kanda*	1
2	*Pushkarmoola*	*Inula racemosa* Hook.F.	*Shushka Moola*	1
3	*Kantkari*	*Solanum surattense* Burm.F.	*Shushka Panchanga*	1
4	*Guduchi*	*Tinospora cordifolia* Miers	*Shushka Kaand*	1

Table 2: Organoleptic parameters of *Shunthi Puskarmooladi Vati.*

Serial no.	Character	Observed
1	Colour	Grayish Brown
2	Odour	Aromatic
4	Taste	Bitter asterigent piercing in nature
5	Touch	Hard

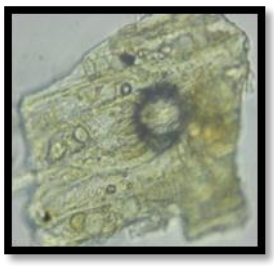
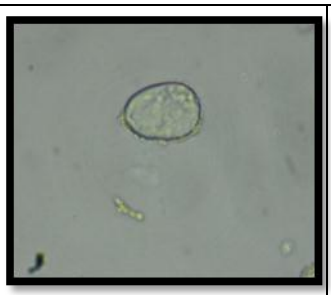
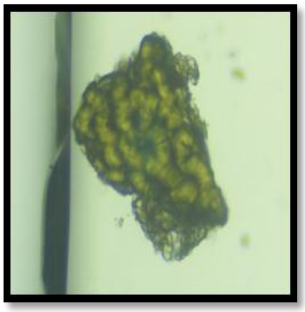
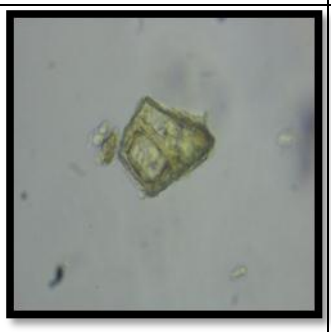
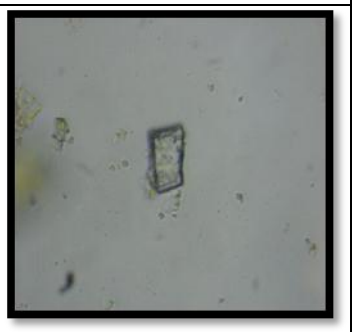
Table 3: Physico-chemical analysis of *Shunthi Puskarmooladi Vati*.

Serial no.	Test	Result
1	Loss on drying	8.32%w/w
2	Ash value	8.37%w/w
3	Water soluble extract	18.5%w/w
4	Alcohol soluble extract	8.28%w/w
5	pH	5
6	Average Wt.	370mg
7	Hardness	2.5kg/cm
8	Disintegration time	35 min.

Table 4: HPTLC Study of *Shunthi Pushkarmooladi Vati*

Wave Length	Number of spots	Rf values
254nm	15	0.04,0.08,0.18,0.23,0.27,0.33,0.35,0.44,0.59,0.63,0.67,0.72,0.83, 0.89,0.95
366nm	17	0.04,0.08,0.18,0.23,0.27,0.37,0.44,0.49,0.57,0.63, 0.67,0.73,0.76,0.83,0.86,0.91,0.95

Plate 1:

			
Stomata of *Kantkari*	**Strach grain of *Shunthi***	**Strach grain of *Gudhuchi***	**Strach grain of *Pushkarmoola***
			
Epicarp cells of Kantkari	**Werty Trichoma of Kantkari**	**Cholenchyma cell of Gudhuchi**	**Prismatic crystal of Pushkarmoola**

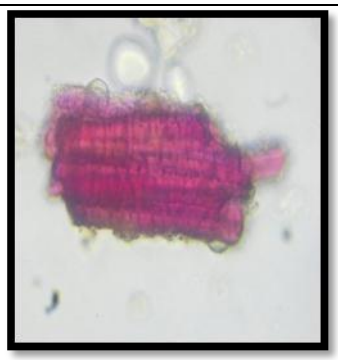
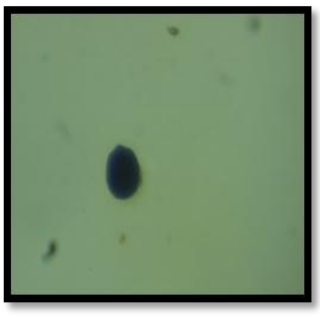
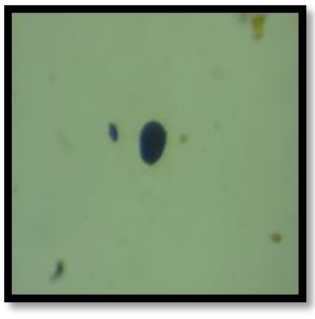
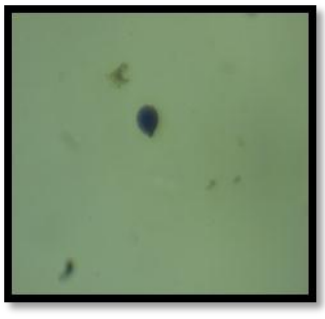
			
Lignified pitted vessel of Gudhuchi	**Lignified Colenchyma of Gudhuchi**	**Group of simple fibre of Shunthi**	**Scleroids of Pushkarmool**
			
Iodine stained strach grain of Shunthi	**Iodine stained strach grain of Gudhuchi**	**Iodine stained strach grain of Pushkarmoola**	

Plate 2: Densitogram of *Shunthi Pushkarmooladi Vati at* 254 nm and 366 nm

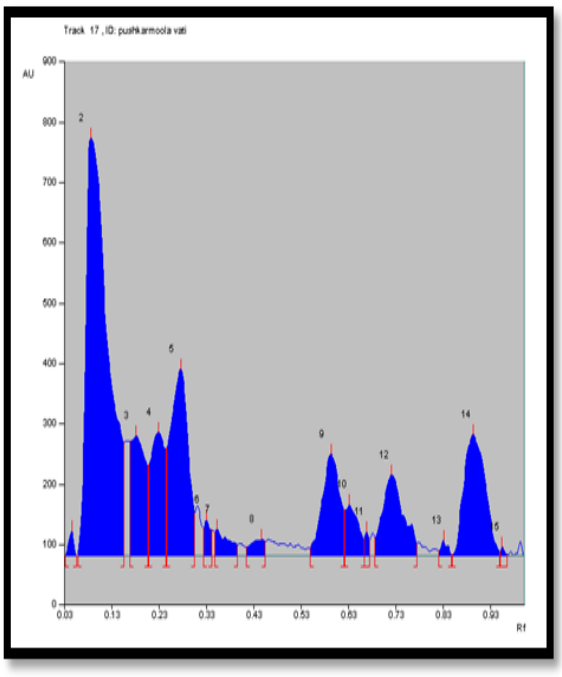
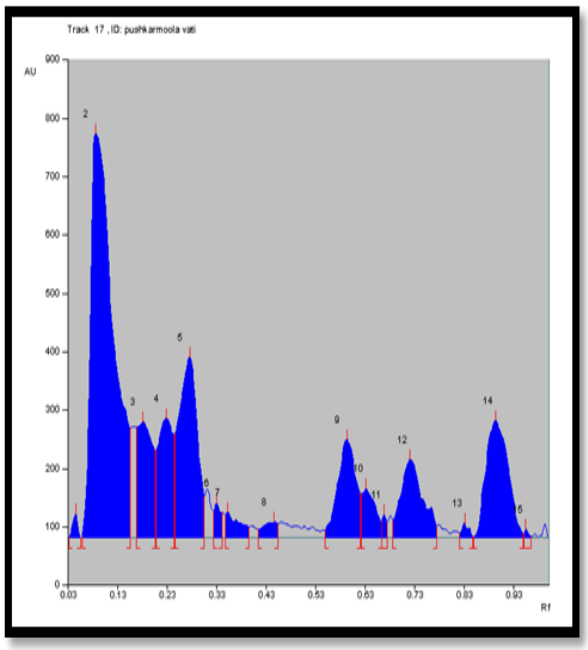
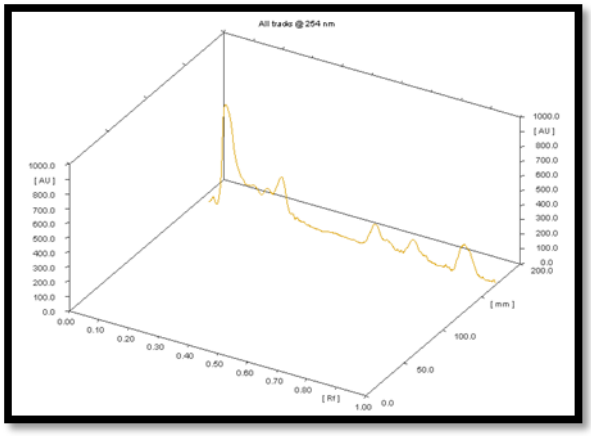
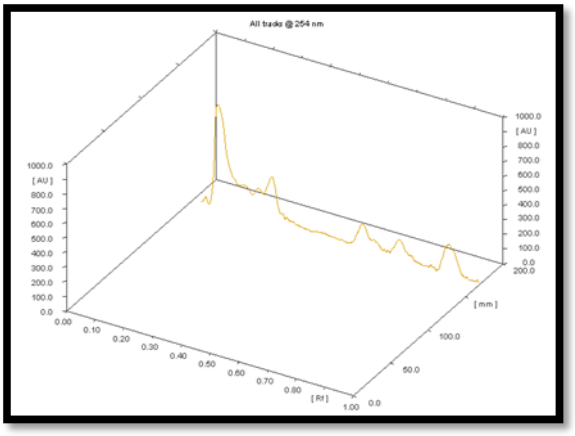
	
Peak display at 254nm	**Peak display at 366 nm**

Plate 3: Three dimensional HPTLC (3D) Densitgram.

	
254nm	366nm

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