

Pharmacognostical and phyto-chemical evaluation of Shunthi Pushakramooladi Churna: A effective formulation for Bronchial Asthma (Tamaka Shwasa)

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Abstract

The selection of a proper drug in the management of disease is very important because proper drug couldn't deceive the physician in the path of success. The selected drug should act on Dosha involved in manifestation of disease. The present study focussed on pharmacognostical and pharmaceutical along with HPTLC on the poly-herbal formulation named Shunthi Pushkaramooladi Churna, mentioned in A.H.Chi.1/66 for treatment of Bronchial Asthma (Tamaka Shwasa).

The pharmacognostical and physico – chemical parameters of Shunthi Pushkaramooladi Churna was fully evaluated.

Organoleptic parameters and microscopic analysis as well as physico-chemical analysis of Churna and HPTLC were done at pharmaceutical laboratory, ITRA, Jamnagar.

Microscopic feature of Shunthi Pushkaramooladi Churna were cross checked with API standards of individual ingredients and it was found all characteristics remain intact. In pharmaceutical parameters, pH value was 6, water soluble extract was 24.5 % w/w, alcohol soluble extract was 19.47 % w/w, ash value was 9.6 % w/w, loss on drying was 4.1 % w/w. HPTLC at 254nm showed 4 spots and at 366nm showed 13 spots.

This study generated preliminary data on pharmacognostical, physico-chemical parameters of Shunthi Pushkaramooladi Churna. These fingerprinting data can be useful for future researchers to reproduce this formulation, and also to incorporate in API or other formulations.

Keywords

Bronchial Asthma, HPTLC, Pharmaceutical, Pharmacognosy, Physico - chemical. Tamaka Swasa.

Introduction

Shunthi Pushkaramooladi Churna is classical poly herbal formulation indicated in management of Bronchial Asthma (Tamaka Shwasa)¹. In modern science Tamaka Shwasa can be correlated as Bronchial Asthma². Bronchial Asthma is a disease characterized by

an increased responsiveness of the airways to various stimuli. It manifests by widespread narrowing of the airways causing paroxysmal dyspnea, wheezing or cough³. Asthma effected an estimated 262 million people in 2019 and cause 461 thousand death⁴. Bronchial Asthma is one of the most common chronic respiratory disease, with a case burden of approximately 358.2 million in 2015⁵. The prevalence of Bronchial Asthma has increased continuously and now affects an estimated 4 to 7% of the people worldwide⁶. In India the prevalence of Asthma has been found to be around 1.3 billion people, about 6% of children and 2% of adult has asthma⁷.

Our Acharya has given multiple formulations for management of Bronchial Asthma. Shunthi Pushkaramooladi Churna is one among that, containing Shunthi (Zingiber officinale Roscoe), Pushkaramoola (Inula racemosa Hook. F.), Kantakari (Solanum surattense Burm.f) and Guduchi (Tinospora cardifolia (Willd) Miers) are profusely available and are well celebrated for their therapeutic applicability. However, pharmacognostical and physicochemical profile of this formulation has not been evaluation till date. Thus, this study was aimed to evaluate and establish the pharmacognostical and physico – chemical parameters of Shunthi Pushkaramooladi Churna.

Material & Methods

Drug material

Procurement: Shunthi, Guduchi was

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procured from the pharmacy of ITRA, Jamnagar & Pushkaramoola, Kantakari was purchased from Narayan pharmacy, Jamnagar, India. The drug which procured from Narayana pharmacy was

authenticated at Pharmacognosy laboratory, ITRA Jamnagar. The ingredients and the part used are given in Table no.1

Table No. 1 Drug Ingredients of Shunthi Pushkaramooladi Churna: (A.H.1/66)

No	Drug Name	Latin Name	Part Uses	Proportion
1.	Shunthi	Zingiber officinale	Dry Root	1 Part
2.	Pushkaramoola	Inula racemose Hook.f	Dry Root	1 Part
3.	Kantakari	Solanum surattense Burm.f	Whole Part	1 Part
4.	Guduchi	Tinospora cordifolia	Dry Stem	1 Part

Method of preparation

Pushkaramoola and Kantakari were cleaned, dried, powdered and passed through sieve number 85 at Narayan Pharmacy, Jamnagar. Shunthi and Guduchi were taken, cleaned, dried, powdered and procured from the pharmacy of ITRA, Jamnagar. All this ingredient was mixed together as compound drug.

Pharmacognostical evaluation

The pharmacognostical study of Shunthi Pushkaramooladi Churna was carried out at the Pharmacognosy of laboratory of ITRA, Jamnagar. The Churna of Shunthi Pushkaramooladi was evaluated by organoleptic characteristic like taste, odour, colour and touch by researchers⁸. For microscopic analysis, small quantity of Shunthi Pushkaramooladi Churna dissolved in distilled water and filtered through filter paper then filtered is dried and placed on slide, first observed in plain water and then stained with Phloroglucinol and concentrated HCL to study for identification of Lignified elements of Shunthi, Pushkaramoola, Kantakari, and Guduchi. The micro-photographs were taken with a camera attached to a Carl Zeiss Trinocular microscope⁹. Microscopic standards mentioned in API for individual drugs were taken as a reference for authentication.

Physico - chemical Analysis

Shunthi Pushkaramooladi Churna was subjected to pharmaceutical parameters like loss on drying at 100°C¹⁰, ash value¹¹, water soluble extractive¹², methanol soluble extractive¹³ and pH value¹⁴, of finished product were studied in the pharmaceutical chemistry Laboratory of ITRA, Jamnagar, as per guidelines prescribed by API for prepare an analytical profile of formulation.

High performance thin layer chromatography (HPTLC)

HPTLC was carried out as per mentioned in API at the

pharmaceutical chemistry Laboratory ITRA Jamnagar¹⁵. It was carried out with methanolic extract of Shunthi Pushkaramooladi Churna on precoated silica gel GF-254 aluminum plate as 5 mm bands, 5mm apart and 1cm from the edge of the plates, by means of a Camag Linomat V sample applicator fitted with a 100L Hamilton syringe. The mobile phase used was Toluene: Ethyl acetate (9:1 V/V). The plates were developed in Camag twin in through chamber (20 X 10 cm) and spot were detected in short U.V (254 nm), Long U.V (366nm) followed by photo documentation and the images were transformed to densitogram using RStudio-1.1.463. Rf = Distance travelled by solute/ Distance travelled by solvent was used to calculate the retention factor.

Result

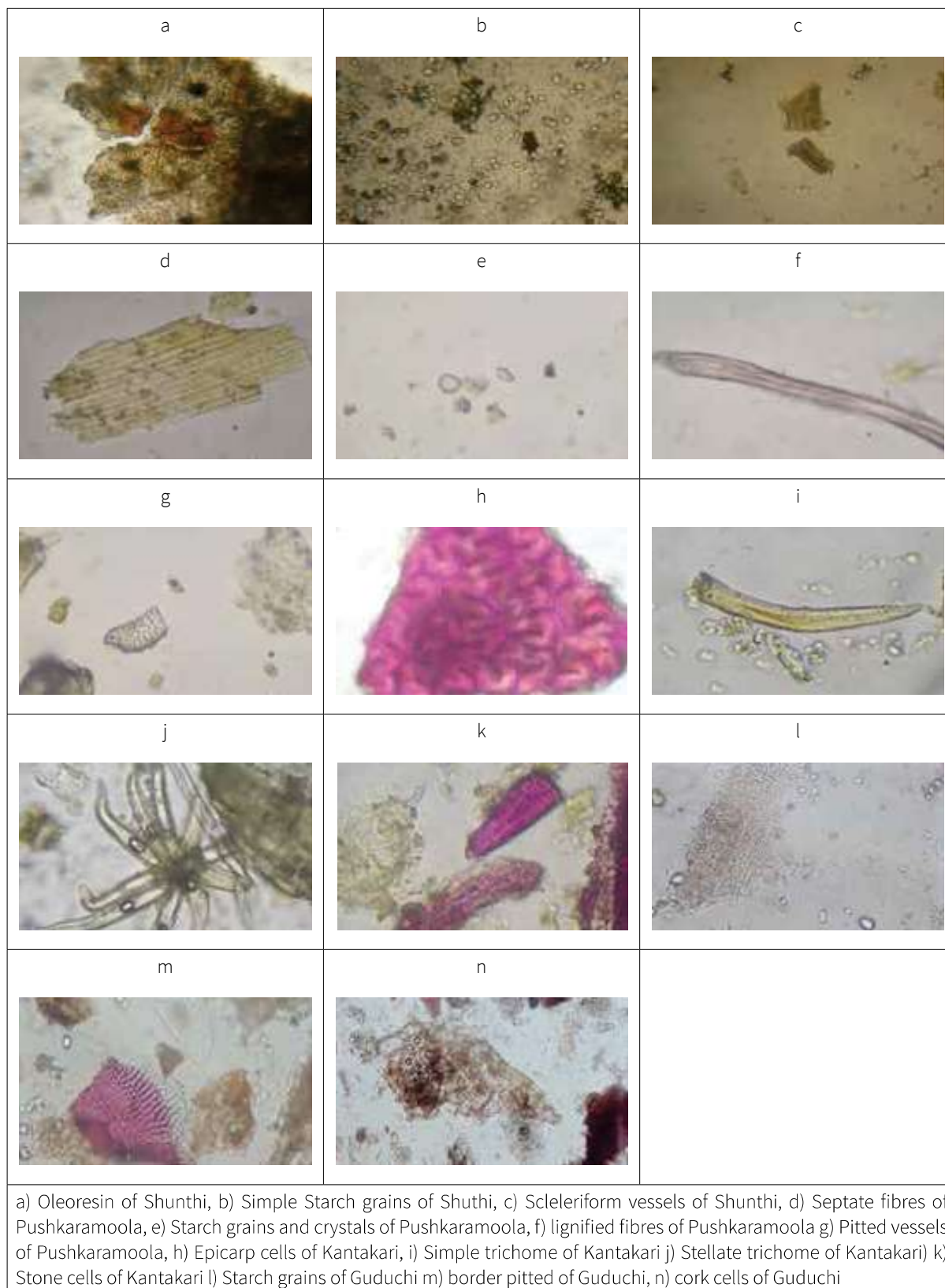
Pharmacognostical evaluation:

Organoleptic features are tabulated in Table no. 2 and microscopic characters of Shunthi Pushkaramooladi Churna are shown in Figure no.1. Microscopic analysis reveals; presence of Oleiresin, Simple starch grains and Scleriform vessels of Sunthi, Septate fibres, Starch grains and crystals, Lignified fibres and pitted vessels of Pushkaramoola, Epicarb cells, Simple trichoma, Stellate trichome and Stone cells of Kantakari, Starch grains, Border pitted, Cork cells of Guduchi.

Table 2: Organoleptic characters of both the drugs

Sl. No.	Parameter	(Shunthi Pushkaramooladi Churna)
1.	Color	Light Yellowish brown to ash color
2.	Odour	Slightly irritant
3.	Taste	Bitter astringent
4.	Touch	Fine

Figure no. 1 Microphotographs of (Shunthi Pushkaramooladi Churna)



Physico – chemical Analysis

The observations are presented in Table no.3

Tablet no. 3 Physico – chemical parameters, of Sunthi Pushkaramoola Churna.

Sr. no.	Test name	Results
1.	Loss on drying	4.1 %w/w
2.	Water soluble extracts	24.5 %w/w
3.	Alcohol soluble extracts	19.47 %w/w
4.	Ash value	9.6 %w/w
5.	pH value	6

High performance thin layer chromatography:

The results of HPTLC are reported in the Table no. 4, Densitogram of the same is shown in the Figures 2(A) and 2(B).

Table no. 4: Results of HPTLC (observed under ultra-violet radiation)

Name of drug	254nm		366nm	
Shunthi Pushkaramooladi Churna	No. of spots	Rf	No. of spots	Rf
	4	-0.04, 0.02, 0.52, 0.76	13	0, 0.07, 0.1, 0.26, 0.36, 0.43, 0.46, 0.54, 0.57, 0.68, 0.89, 0.9, 0.97

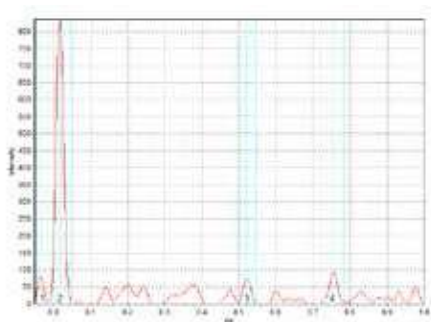


Fig 2(A): Densitogram of Shunthi Pushkaramooladi Churna with 254 nm

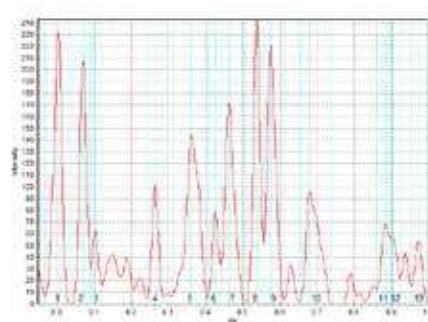


Fig 2 (B): Densitogram of Shunthi Pushkaramooladi Churna with 366 nm.

Discussion

Pharmacognostical study helps in authentication of ingredients present in formulation. Organoleptic characteristic like color, odor, taste, and consistency are important parameter to determine product's quality. Color of Churna is light yellowish brown to ash color probably due to presence of Shunthi and Pushkaramoola (API); odor is slight aromatic due to presence of Pushkaramoola and Shunthi (API); taste is bitter astringent due to the taste of Pushkaramoola, Kantakari and Guduchi and texture is fine fibers due to churna form. Microscopic features of Shunthi Pushkaramoola Churna were cross checked with API standards of individual ingredients,^{16, 17, 18, 19} and it was found that almost all characters remain intact due to involvement of simple and minimum

disruptive pharmaceutical procedure i.e. Churna Kalpana. It is also important to notice that, Churna and Kalka formulation is useful majority of time to incorporate all the active principles of all the drugs, while Kashaya, Avaleha, Phant formulations are to get water soluble active principles and Asava, Arista is to get alcohol soluble active principles. Presence of characteristics of all ingredient of the formulation also indicates its authenticity and absence of unusual features indicates there is no any adulteration. Loss on drying (LOD) is the water holding capacity of sample. Higher

moisture content denotes that it will have a decreased stability. Here, LOD is 4.1 %w/w. It means stability of Shunthi Pushkaramooladi Churna will be more.

Ash value helps in knowing presence of mineral matter as part of formulation or that is accidentally introduced from earth, sand, floor sweepings, presence of other parts of plant, adulterated and exhausted drug, and presence of materials that possess with stone cells, starch which modify the value²⁰. Here, Ash value is 9.6 %w/w. Water soluble extract and alcohol soluble extract gives an idea about the nature of the chemical constituents present in the crude drug. Useful for the estimation of constituents extracted with the solvent used for extraction²¹. Here, water soluble extract is 24.5 %w/w and alcohol soluble extract is 19.47 %w/w.

In present study, pH of Shunthi Pushkaramooladi Churna is 6 HPTLC profile confirms standard scanning of samples to generate the standardization parameters for quality control purpose. Shunthi Pushkaramooladi Churna analyzed on different wavelengths 254nm and having 4 spots and 366nm having 1 spots. But due to the absence of standards, any conclusion couldn't be drawn. It will help for future study.

Conclusion

This study generated preliminary data on pharmacognostical, and pharmaceutical parameters of Shunthi Pushkaramooladi Churna. These fingerprinting can be useful for future researchers to reproduce this formulation, as till date quality control parameters of Shunthi Pushkaramooladi Churna is not available in API or not available in public domain. The therapeutics efficacy of this Shunthi Pushkaramooladi Churna in the management of Bronchial Asthma (Tamaka Shwasa) should be evaluated through further clinical studies.

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