

Pharmacognostical and Phyto-Chemical Evaluation of Shatyadichurna: An Effective Formulation for Bronchial Asthma (Tamakashwasa).

Kadek Dwi Muras Mei Permatasari¹, Virendra Kumar Kori², Dr. Harisha C. Rudrappa³

*Dr. Kadek Dwi Muras Mei Permatasari, 3rd year MD scholars ITRA Jamnagar-361008, Gujarat, India. :

*Dr. Virendra Kumar Kori, Asst. Professor, ITRA Jamnagar-361008, Gujarat, India.

*Dr. Harisha C. Rudrappa, Head Pharmacognosy Lab, ITRA Jamnagar, Gujarat, India

Submitted: 01-11-2023

Accepted: 12-11-2023

ABSTRACT:

In Ayurveda, the success of Chikitsa depends totally upon four important factors they are termed as Chikitsapada. Among these four-fold factors of treatment; Aushadha (drugs) has been placed in the second position. 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 Doshainvolved in manifestation of disease. Here, has been made pharmacognostical and pharmaceutical along with HPTLC one of the poly-herbal named Shatyadi Churna, mentioned in Bha. Bhaisajya Ratnakara Vol. 5 1/22 for treatment of Bronchial Asthma (Tamaka Shwasa). **Aim and objective:** To evaluate & establish the pharmacognostical and physico-chemical parameters of Shatyadi Churna. **Material & Methods:** Pre-authenticated raw drugs were procured and prepared at pharmacy, ITRA, Jamnagar. Organoleptic parameters and microscopic analysis of Churna were done at pharmacognosy laboratory, ITRA, Jamnagar. Physico-chemical analysis of Churna and HPTLC were done at pharmaceutical laboratory, ITRA, Jamnagar. **Result:** Microscopic feature of Shatyadi Churna were cross checked with API standards of individual ingredients and it was found all characteristics remain intact. In pharmaceutical parameters, pH value was 5.5, water soluble extract was 24.79 % w/w, alcohol soluble extract was 25.6% w/w, ash value was 9.7% w/w, loss on drying was 1.62% w/w. HPTLC at 254nm showed 8 spots and at 366nm showed 17 spots. **Conclusion:** This study generated preliminary data on pharmacognostical, physico-chemical parameters of Shatyadi Churna. These fingerprinting can be useful for future researchers to reproduce this formulation, as till date quality control parameters of Shatyadi Churna is not

available in API or not available in public domain.

KEY WORDS: Bronchial Asthma, HPTLC, Pharmaceutical, Pharmacognosy, Physico-chemical, Shatyadi Churna, Tamaka Shwasa

I. INTRODUCTION

Shatyadi 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 Asthma [2]. 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 cough [3]. Asthma effected an estimated 262 million people in 2019 and cause 461 thousand death [4]. Bronchial Asthma is one of the most common chronic respiratory disease, with a case burden of approximately 358.2 million in 2015 [5]. The prevalence of Bronchial Asthma has increased continuously and now affects an estimated 4 to 7% of the people worldwide [6]. 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 asthma [7]. In Indonesia according to Basic health research data 2018 (Riset Kesehatan Dasar 2018) around 1,017,290 people are affected by Asthma, which means 2.4% of all Indonesia population. In this data the specific aged mentioned, the aged of 5 – 14 years are get affected which is around 182,338 or 1.9% of Indonesia children are suffered from Asthma [8].

Our Acharya has given multiple formulations for management of Bronchial Asthma. Shatyadi Churna is one among that, containing Shathi (Hedychium spicatum Sm), Pushkaramoola (Inularacemose Hook.F.), Jivanti (Leptadeniareticulata W&R), Tvak

(Cinnamomumzeylanicum, Musta (CyperusrotundusLinn.),Puskaramoola (InularacemoseHook.f), Surasa(Ocimumsanctum), Tamalaki (Phyllanthus nirurisensu hook), Pippali (Piper longumLinn.), Aguru (AquillariaagallochaRoxb.), Balaka (PavoniaodoratawilldSp), Nagara (Zingiberofficinale), Sarkara(Sugar) 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 ShatyadiChurna.

II. MATERIAL & METHODS:

Drug material:

Procurement: Tvak, Musta, Pippali, Aguru, Shunthi, Guduchi was procured from the pharmacy of ITRA, Jamnagar & Shunthi, Pushkaramoola, Jivanti, Surasa, Tamalaki, Balaka, Sarkara, Kantakari and Nagara was purchased from Narayan pharmacy, Jamnagar.

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

TableNo.1DrugIngredientsofShatyadiCurna:(Bha.BhaisajyaRatnakaraVol.51/22)

No	DrugName	LatinName /English Name	Partused	Proportion
1.	Shathi	HedychiumspicatumSm.	ShushkaKanda	1Part
2.	Pushkaramoola	Inularacemose Hook.F.	ShushkaMoola	2Part
3.	Jivanti	LeptadeniareticulataW&R	ShushkaMoola	1Part
4.	Tvak	Cinnamomumzeylanicum	ShushkaTwak	1Part
5.	Musta	CyperusrotundusLinn.	ShushkaKanda	1Part
7.	Surasa	Ocimumsanctum	ShushkaPatra	1Part
8.	Tamalaki	PhyllanthusniruriSensu Hook	ShushkaMoola	1Part
9.	Pippali	PiperLongumLinn.	ShushkaPhala	1Part
10.	Aguru	AquillariaagallochaRoxb.	ShushkaKashtha	1Part
11.	Balaka	PavoniaodoratawilldSp	Shushka Moola	1Part
12.	Nagara	Zingiberofficinale	Shushkakanda	1Part
13	Sarkara	Sugar		24Part

Method of preparation:

Shathi, Pushkaramoola, Jivanti, Surasa, Tamalaki, Balaka, Sarkara, Kantakari and Nagara were cleaned, dried, powdered and passed through sieve number 85 at Narayan Pharmacy, Jamnagar. And Tvak, Musta, Pippali, Aguru, Shunthi, 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 ShatyadiChurna was carried out at the Pharmacognosy of laboratory of ITRA, Jamnagar. The Churnaof Shatyadi was evaluated by organoleptic characteristic like taste, odour, colour

and touch by researchers^[9]. For microscopic analysis, small quantity of ShatyadiChurna 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 Shathi, Pushkaramoola, Jivanti, Tvak, Musta, Pushkaramoola, Surasa, Tamalaki, Aguru, Balaka, Nagara. The micro-photographs were taken with a camera attached to a Carl Zeiss Trinocular microscope^[10]. Microscopic standards mentioned in API for individual drugs were taken as a reference for authentication.

Physico- chemical Analysis.

pharmaceutical parameters like loss on drying at 100°C^[11], ash value^[12], water soluble extractive^[13], methanol soluble extractive^[14] and pH value^[15], 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 Jamnagar^[16]. It was carried out with methanolic extract of ShatyadiChurna 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 CamagLinomat V sample applicator fitted with a 100µL 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-

ShatyadiChurna was subjected to 1.1.463. Rf = Distance travelled by solute/ Distance travelled by solvent was used to calculate the retention factor.

III. RESULTS

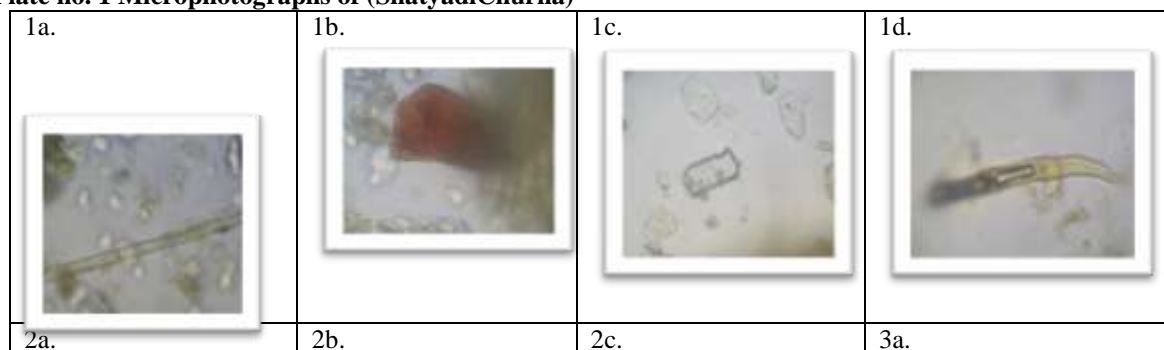
Pharmacognostical evaluation:




















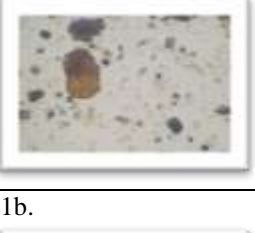




Organoleptic features are tabulated in Table no. 2 and microscopic characters of ShatyadiChurna are shown in Figure no.1. Microscopic analysis reveals; presence of fibres, Olioeresin, Prismatic crystal, Trichome of Shati; Stone, Starch grains and crystals of Pushkaramoola; Border pitted vessel, Lignified pitted parenchyma, Prismatic crystal of Jeevanti; Cork cells in surface, Oil glands with fibres, Stone cells in group of Twak; Cork, Parenchyma cells with starch grains of Musta; Starch grains of Pushkaramoola; Epidemis cells, Oil Globule of Sarshapa; Pitted vessels, Stomata, Trichoma of Bhumiamalaki; Oil globule, Prismatic crystals & Epidermal cells of pippali; Crystal, Tannin of Aguru; Fragment of Spiral vessel, fragment of spongy parancyma of Balaka; Sculari form vessel, and Starch & oileresin of Shunthi. (Plate No. 1)

Table2: Organoleptic characters of both the drugs

No.	Parameter	(ShatyadiChurna)
1.	Color	Light brownish gray
2.	Odour	Slightly aromatic
3.	Taste	Sweetish follow by astringents
4.	Touch	Fine fibers

Plate no. 1 Microphotographs of (ShatyadiChurna)



			
3b.	3c.	4a.	4b.
			
3b.	3c.	4a.	4b.
			
4c.	5a.	5b.	6a.
			
6b.	7a.	7b.	7c.
			
8a.	8b.	9a.	9b.
			
10a.	10b.	11a.	11b.

1a)Fibres of Shati, 1b)Olioresin of Shati, 1c)Prismatic crystal of Shati, 2a)Stone of Pushkaramoola, 2b)Starch grains and crystals of Pushkaramoola, 2c)Starch grains of Pushkaramoola, 3a)Border pitted vessel of Jeevanti, 3b)Lignified pitted parenchyma of Jeevanti, 3c) Prismatic crystal of Jeevanti, 4a)Cork cells in surface ofTwak, 4b) Oil glands with fibres of Twak, 4c) Stone cells in group of Twak5a) Cork in surface view of Musta
5b) Parenchyma cells with starch grains of Musta, 6a) Epidermis cells of Sarshapa, 6b) Oil globule of Sarshapa, 7a)Pitted vessels of Bhumiamalaki, 7b) Stomata of Bhumiamalaki, 7c) Trichona of Bhumiamalaki, 8a) Oil globule of Pippali, 8b) Prismatic crystals & Epidermal cells of Pippali, 9a) Crystal of Aguru, 9b) Tannin of Aguru, 10a) Fragment of Spiral vessel of Balaka, 10b) Fragment of spongy paranchyma of Balaka, 11a)Scalari form Vessel of Shunthi, 11b) Starch & oileresin of Shunthi.

Physico – chemical Analysis:

The observations are presented in Table no.3

Tablet no. 3 Physico – chemical parameters, of ShatyadiChurna.

Sr.no.	Testname	Results
1.	Lossondrying	1.62% w/w
2.	Watersolubleextracts	24.79% w/w
3.	Alcoholsolubleextracts	25.6 %w/w
4.	Ashvalue	9.7% w/w
5.	pHvalue 5% hydroextract	5.5

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-violate radiation)

Name of drug	254nm		366nm	
	No. of spots	R _f	No. of spots	R _f
ShatyadiChurna	8	0.04,0.02, 0.1, 0.29, 0.42, 0.6,0.77, 0.97	17	0.06, 0.1, 0.19, 0.22, 0.31, 0.35, 0.45, 0.55, 0.61, 0.66, 0.69, 0.71, 0.77, 0.82, 0.87, 0.95

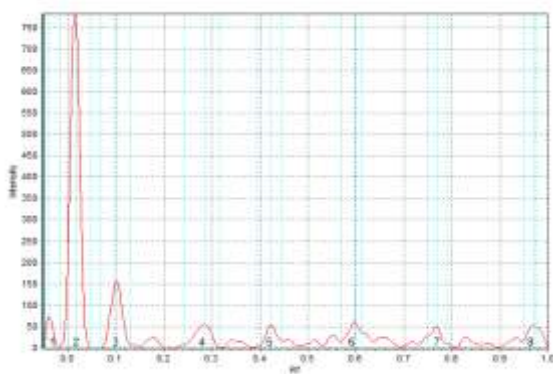


Fig 2(A): Densitogram of ShatyadiChurna with 254 nm

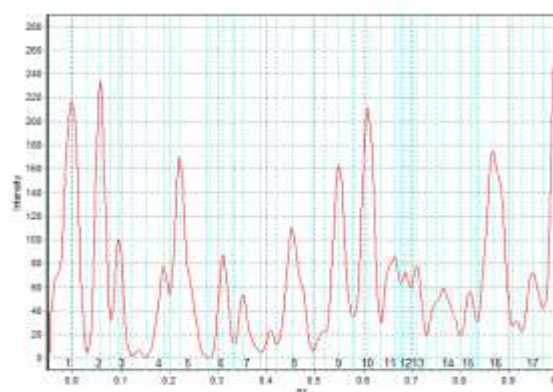


Fig 2 (B). Densitogram of ShatyadiChurna with 366 nm

IV. DISCUSSION:

Pharmacognostical study helps in authentication of ingredients present in formulation. Organoleptic characteristic like color, odor, taste, consistency are important parameter to determine product's quality. Color of Churna is light brownish gray probably due to presence of Jivanthi and Tamalaki (API); odor is slight aromatic due to presence of essential oils of pippali; taste is sweetish follow by astringents maybe due to presence of Madhura & Kashaya Rasa in the ingredient of Jivanthi, Tamalaki, & Balaka and texture is fine fibers due to churna form. Microscopic features of ShatyadiChurna were cross checked with API standards of individual ingredients^{[17],[18],[19],[20],[21],[22],[23],[24],[25],[26]} 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 importance to notice that, Churna and Kalka formulation is useful majorly 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 ingredients. 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 1.62% w/w. It means stability of ShatyadiChurna 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 value^[27]. Here, Ash value is 9.7% 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 extract^[28]. Here, water soluble extract is 24.79% w/w and alcohol soluble extract is 25.6 % w/w.

In present study, pH of ShatyadiChurna is 5.5. HPTLC profile confirms standard scanning of samples to generate the standardization parameters for quality control purpose. ShatyadiChurna analyzed on different wavelengths 254nm and having 8 spots and 366nm having 17 spots. Present article consider for future research study.

V. CONCLUSION :

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

Acknowledgment.

We thank to Pharmacognosy and Pharmaceutical laboratory of ITRA, Jamnagar, for providing invaluable support.

REFERENCES.

- [1]. (Bha.BhaisajyaRatnakaraVol.51/22
- [2]. <https://jaims.in/jaims/article/view/215>retri ve date:01/06/2023
- [3]. O P Ghai, Viond k Paul,Essential Textbook of Pediatrics,7thedition.Page no.358 CBC Publishers & Distributors.
- [4]. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396(10258):1204-22
- [5]. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6034365/>
- [6]. International study of Bronchial Asthma and allergies in childhood (ISAAC).worldwide variations in the prevalence of Bronchial Asthma symptoms,Eur Respir J 1998; 12:315-35
- [7]. <http://globalasthmareport.org/management/india.php>
- [8]. http://labdata.litbang.kemkes.go.id/images/download/laporan/RKD/2018/Laporan_Nasional_RKD2018_FINAL.pdf
- [9]. Khandelwal KR. Practical pharmacognosy, 19th ed. Pune: Niralprakashan; 2008. Pg.13.
- [10]. Trease and Evans, Pharmacognosy, 15th Ed., W.B. Saunders Company Ltd. 1996, Pg.569,570.
- [11]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VI, The controller of publications civil lines, Delhi, Appendix, 2008;2(2.10): 243.
- [12]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VI, The controller of publications civil lines, Delhi, Appendix, 2008;2(2.3): 242.
- [13]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VI, The controller of publications civil lines, Delhi, Appendix, 2008;2(2.8): 243.
- [14]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VI, The controller of publications civil lines, Delhi, Appendix, 2008;2(2.7): 243.
- [15]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VI, The controller of publications civil lines, Delhi, Appendix, 2008;3(1.3): 291.
- [16]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VIII, The controller of publications civil lines, Delhi, Appendix, 2010;3(5.1): 243.
- [17]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume I, The controller of publications civil lines, Delhi, Appendix, 2001;99
- [18]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume IV,The controller of publications civil lines, Delhi, Appendix, 2004:102
- [19]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VIII, The controller of publications civil lines, Delhi, Appendix, 2008:73.
- [20]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VIII, The controller of publications civil lines, Delhi, Appendix, 2001;113.
- [21]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VIII, The controller of publications civil lines, Delhi, Appendix, 2001:129
- [22]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume IV, The controller of publications civil lines, Delhi, Appendix, 2004:128.
- [23]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume VIII, The controller of publications civil lines, Delhi, Appendix, 2001;133
- [24]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume II, The controller of publications civil lines, Delhi, Appendix, 1999:133
- [25]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume IV, The controller of publications civil lines, Delhi, Appendix, 2004;4.
- [26]. Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume II, The controller of publications civil lines, Delhi, Appendix,



- 1999;12
- [27]. Rao, Bayya, A Study on Ash Value and Pharmacopoeial Assay Methods in Herbal Pharmaceuticals. JOUR. 2020/07/01
- [28]. R. K. Chaudhari and N. O. Girase, Determination of soluble extractives and physico-chemical studies of bark of *Sesbania sesban* (L) Merr. J. Chem. Pharm. Res., 2015, 7(8);657-660