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PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF *TRIPHALADI KWATHA GANDUSHA*

B.S.M.M. Sooriyaarachchi*[1], Rajaguru R.M.C.D[2], D. B. Vaghela[3] and Harisha C. R.[4]

[1]P.G. Scholar, Department of Shalakya Tantra, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India.

[2]Medical Officer, Department of Ayurveda, Sri Lanka.

[3]Associate Professor & HOD, Department of Shalakya Tantra, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India.

[4]Head, Pharmacognosy, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India.

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***Corresponding Author**
Dr. B.S.M.M. Sooriyaarachchi
P.G. Scholar, Department of Shalakya Tantra, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India.

ABSTRACT

Introduction- Gingivitis is a reversible oral disease that refers to gingival inflammation, occurs widely in mouth affecting both children and adults. According to the ancient Ayurvedic texts, this disease can be correlated with *Shitada* which is under the heading of *Dantamulagataroga* which are 15 in number mentioned by *Acharya Susruta*. Spontaneous bleeding from gums which are foul-smell, blackish, moistened, softened, and succumbed to necrosis and suppurated, one after the other would be the signs and symptoms of *Shitada*. *Triphaladi Kwatha* is one of the drugs which were mentioned by *Acharya Sushruta* for *Gandusha* in *Shitada*. Till date no published data is available regarding evaluation of *Triphaladi Kwatha*. **Methods-** Final product was subjected to Pharmacognostical and physico-chemical analysis such as microscopic study, loss on drying, ash value and pH etc. **Results and Discussion-** Pharmacognostical study showed the presence of contents such as; Epicarp cells of *Haritaki*, Lignified Stone cells of *Haritaki*, Trichomes of *Bhibhitaka*, Rosette cells of *Bhibhitaka*, Lignified Scleroids of *Amalaki*, Scalariform vessels and Oleoresin content of *Shunthi*, Lignified Epicarp cells of *Sarshapa*, Starch grains of *Musta*, Lignified Fibres and Scleroids of *Rasanjana* etc. Preliminary physico-chemical analysis showed that the loss on drying value was found to be 7.38% w/w, pH 3.5, Ash value

7.26% w/w, Water soluble extract 34.11% w/w and, Methanol Soluble Extract 29.16%w/w. High Performance Thin Layer Chromatography (HPTLC) showed 6 spots at 254nm and 1 spots at 366nm. **Conclusion**-The present work was carried out to standardize the finished product of *Triphaladi Kwatha* 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, Pharmaceutical.

INTRODUCTION

Shitada is one of *Mukha Rogas* mentioned under the classification of *Dantamulagata Roga* in *Sushruta Samhita.* According to *Acharya Sushruta*, sixty five diseases of mouth in the locations of lips, gums, teeth, tongue, palate, throat and entire mouth.[1] In *Ayurvedic* text, Periodontium is described as *Dantamula* and their disorders as *Dantamulagata Roga*. *Dantamulagata Roga* are simulated with the periodontal diseases.[2] *Shitada* can be considered as early stage of periodontal diseases which occurs due to negligence of oral hygiene, changing life style, habits and addictions.[3] Periodontal diseases are regarded as the second most common oral disease worldwide after dental decay.[4] A Survey conducted among children in 26 states of United States in 1,438,318 children of 6-14 years' age group and 3.5% – 8.6% was with gingivitis. The epidemiological studies conducted by American Academy of Periodontology shows that gingivitis of varying severities is nearly universal and it is estimated that over 80% of the worlds' population suffers from gingivitis. Among children and adolescents; the incidence rate is 52.03%.[5] A range of local treatment procedures are advised in the management of *Shitada*, among them *Gandusha* (Holding medicated liquid) is one of them.

Acharya Sushruta has mentioned the contents of *Triphaladi Kwatha Gandusha* which is in the form of decoction are *Shunthi*, *Sarshapa*, *Triphala*, *Musta* and *Rasanjana.*[6] These drugs mainly have anti-microbial, haemostatic, immunity enhancing and anti-inflammatory properties. To maintain the therapeutic effectiveness of the drug, it is essential to maintain standardization. Until the current time there is no reference regarding evaluation on *Triphaladi Kwatha Gandusha*. Therefore this study aimed to analyse *Triphaladi Kwatha Gandusha* both pharmacognosticaly and Pharmaceuticaly. 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**

All the components of *Triphaladi Kwatha* in dry form were taken equal amount of weight and coarsely powdered separately. Then they were mixed thoroughly to prepare a homogenous dry coarse powder. Powdered drugs of *Triphaladi Kwatha* were kept in air tight plastic bags and stored in a dry, clean place to protect from contaminations. This powdered drugs were boiled with 16 parts of water in an earthen pot, over a mild fire till the liquid is reduced to 1/8 of quantity at the consuming time. Finally the liquid was strained through cloth.[7] The powder of above drugs was manufactured by pharmacy of Gujarat Ayurved University, Jamnagar. Physico-chemical and qualitative analysis of the final product was carried out in the pharmaceutical chemistry laboratory of IPGT & RA, Gujarat Ayurved University, Jamnagar under expert guidance.

- **Pharmacognostical study**

Pharmacognostical study consists of organoleptic study and microscopic study of finished product.

- **Organoleptic Study**

The Organoleptic characters of Ayurvedic drugs are very imperative and give the general idea regarding its unadulterated state 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.

- **Microscopic Study**

The sample drugs of *Triphaladi Kwatha* was powdered and dissolved in distilled water and microscopy of the sample was done with or without stain and after staining with Phloroglucinol + HCL. By powder microscopy, the characters were observed and the chemical nature of the cell wall along with the form and chemical nature of the cell contents

was identified. Thereafter, Microphotographs were taken under Carl-Zeiss trinocular microscope that was attached with the camera.

- **Physico-chemical analysis**

Triphaladi Kwatha was analyzed using various standard physico-chemical parameters such as loss on drying, water soluble extract and Methonol soluble extract.

- **High Performance Thin Layer Chromatography (HPTLC)**

HPTLC was performed in accordance with the guidelines provided by API. 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 Rf values of resolved spots were noted.[8]

RESULTS AND DISCUSSION

Table 1: Ingredients of *Triphaladi Kwatha Gandusha*-(Su/Chi/22/11).

SrNo	Sanskrit Name	Latin Name	Part Used	Part
1	*Haritaki*[9]	*Terminalia chebula* Retz.	Fruits	1 Part
2	*Bhibhitaka*[10]	*Terminalia bellerica* Roxb.	Fruits	1 Part
3	*Amalaki*[11]	*Emblica officinalis* Gaertn.	Fruits	1Part
4	*Shunthi*[12]	*Zingiber officinalis* Rosc	Rhizome	1Part
5	*Sarshapa*[13]	*Brassica campestris* Linn.	Seeds	1Part
6	*Musta*[14]	*Cyperus rotundus* Linn.	Tuber	1 Part
7	*Rasanjana*[15]	*Berberis aristata* Roxb. ex. DC.	Extract	1 Part

- **ORGANOLEPTIC CHARACTERS OF *TRIPHALADI KWATHA***

Organoleptic characters contents of *Triphaladi Kwatha* like colour, taste, touch, Odour are shown in Table-2.

Table 2 -Organoleptic Charcters *Triphaladi Kwatha.*

Sr. No	Parameters	Results
1	Colour	Brown
2	Touch	Rough
3	Odour	Pungent
4	Taste	Astringent

- **MICROSCOPIC STUDY**

Identified characters of *Triphaladi Kwatha* under the microscope are mentioned below Table 03.

Table 3 – Microscopic Characters Of *Triphaladi Kwatha Gandusha*-(Su/Chi/22/11).

Sr. No	Ingredient	Characters of Microscopic Analysis
1.	*Haritaki*	Epicarp cells, Tannin content, Lignified Stone cells and Lignified Scleroids.
2.	*Bhibhitaka*	Trichomes, Rosette cells
3.	*Amalaki*	Group of lignified Scleroids.
4.	*Shunthi*	Starch grains, Scalariform vessels and Oleoresin content.
5.	*Sarshapa*	Lignified Epicarp cells.
6.	*Musta*	Starch grains.
7.	*Rasanjana*	Lignified Fibres and Scleroids.

- **PHARMACEUTICAL EVALUATION**

❖ **Physico-chemical analysis**

Physico-chemical analysis of *Triphaladi Kwatha* is mentioned in table below.

Table 4: Physico-Chemical Analysis Of *Triphaladi Kwatha.*

Serial Number	Analytical Parameters	Result
1.	**Loss on Drying**	7.38% w/w
2.	**Ash Value**	7.26% w/w
3.	**Water Soluble Extract**	34.11%w/w
4.	**Methanol Soluble Extract**	29.16%w/w
5.	**pH (using pH paper)**	3.5

❖ **HPTLC Study**

The chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. It showed 7 spots at 254 nm and 4spots at 366 nm with Rf values were recorded which may be responsible for expression of its pharmacological and clinical actions. Plate 2, Table –4.

Table 5: HPTLC of *Triphaladi Kwatha.*

Sr. No.	Samples	Conditions	No. of Spots	Rf
1.	*Triphaladi Kwatha Gandusha*	Short UV–254 nm	6	0.02, 0.04, 0.10, 0.23, 0.34, 0.91
		Long UV–366 nm	1	0.03

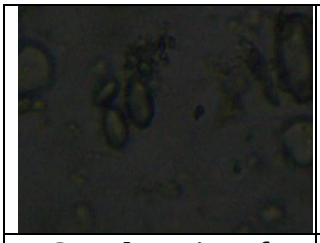
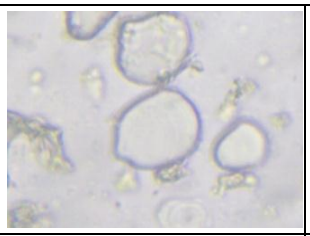
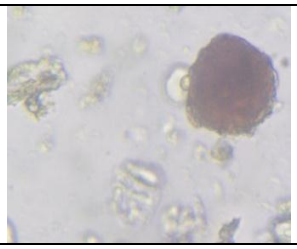
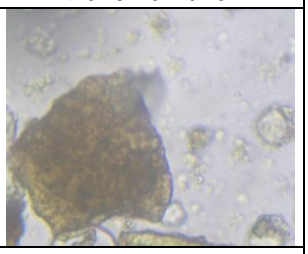
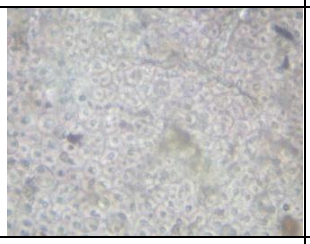
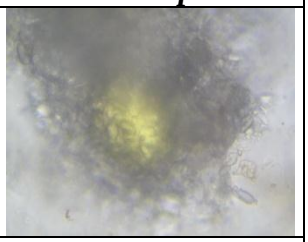
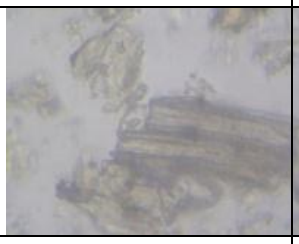
			
Starch grains of *Shunthi*	**Starch grains of *Musta***	**Trichomes of *Bhibhitaka***	**Fibres of *Daruharidra***
			
Scleroids of *Amalaki*	**Tannin content of *Haritaki***	**Scleroids of *Daruharidra***	**Epicarp cells *Sarshapa***
			
Epicarp cells of *Haritaki*	**Lignified Epicarp cells *Sarshapa***	**Scalariform vessels of *Shunthi***	**Oleoresin content *Shunthi***
			
Lignified Scleroids of *Haritaki*	**Lignified Stone cells of *Haritaki***	**Sapen cells of *Bhibhitaka***	**Group of lignified Scleroids of *Daruharidra***

Plate 1: Microscopic Photos of *Triphaladi Kwatha Gandusha*.

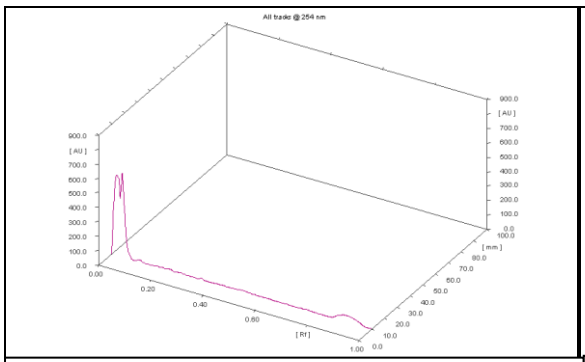
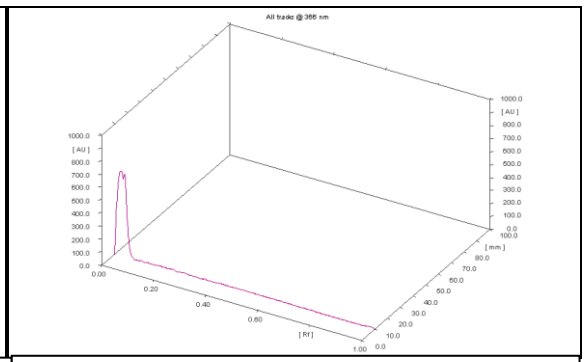
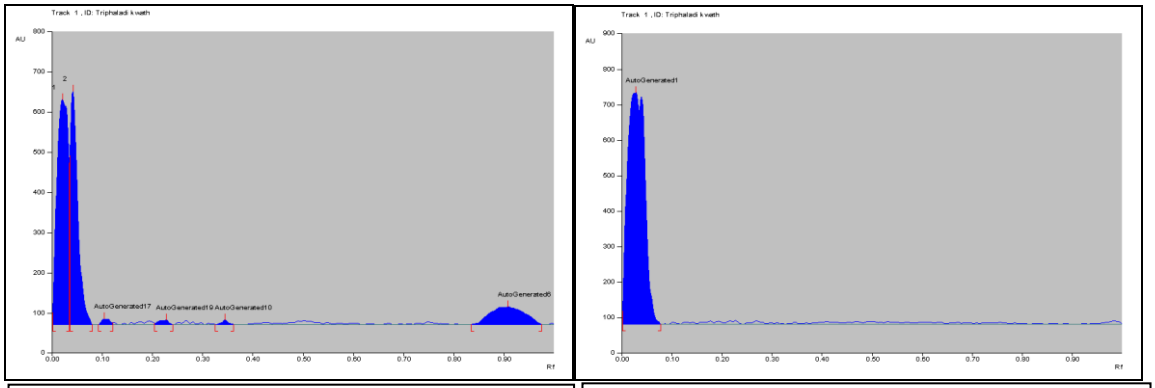
	
254 nm	**366 nm**

Plate 2: Three dimensional HPTLC (3D) Densitogram of *Triphaladi Kwatha Gandusha*.



254 nm	366 nm

Plate 3: Densitogram of *Triphaladi Kwatha Gandusha* at 254 nm and 366 nm.

CONCLUSION

The pharmacognostical and physico-chemical analysis of *Triphaladi Kwatha* confirmed the purity and authenticity of the drug. Further studies may be carried out on it on the basis of observation made and results of experimental studies. Since there is no publication available for pharmacognostical and physico-chemical profiles of this special form of *Triphaladi Kwatha Gandusha*, which is specifically indicated for *Shitada* by *Acharya Susruta*, this study may be favorable for future researchers and can be used as a reference standard in the further quality control researchers.

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