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Research Article

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PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF GUDUCHI-MUSTAADI KASHAYA – A HERBAL AYURVEDA FORMULATION FOR STHAULYA

Deepak Gangwar*, A. S. Baghel¹ and Harisha C. R.²

*PG Scholar of Basic Principle Department, Institute of Teaching and Research in Ayurveda (ITRA), Jamnagar, Gujarat.

¹Head and Professor of Basic Principle Department, Institute of Teaching and Research in Ayurveda (ITRA), Jamnagar, Gujarat.

²Head, Pharmacognosy Department ITRA, Jamnagar.

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*Corresponding Author Deepak Gangwar PG Scholar of Basic Principle Department, Institute of Teaching and Research in Ayurveda (ITRA), Jamnagar, Gujarat.

ABSTRACT

Introduction: *Guduchi-Mustaadi Kashaya* (GMK) is a poly herbal formulation which is indicated in *Sthualya* (Obesity) in Charaka Samhita.^[1] This formulation is mixture of five drugs and pharmacopeial standards of this formulation is not available till date. Earlier no any researchers had evaluated this formulation but to generate data of any drug is more important to reach to the final quality control (QC) parameters. Hence this study was **aimed** to evaluate GMK through pharmacognostical, physio-chemical parameters and HPTLC fingerprinting in the process of establishing QC data. **Methods:** Pre-authenticated raw drugs were procured and GMK was prepared at pharmacy, ITRA, Jamnagar. Organoleptic parameters and microscopic analysis of *Kashaya* was done at pharmacognosy

department, ITRA, Jamnagar. Physio-chemical analysis and HPTLC of GMK was done at pharmaceutical laboratory, ITRA, Jamnagar. **Result:** Microscopic features of *Guduchi-Mustaadi Kashaya* were cross checked with API standards of individual ingredients and it was found to have characteristics of all ingredients in it. In pharmaceutical parameters; pH value was 6.0, Water soluble extract was 2.92 %w/w, Methanol soluble extract was 30 %w/w, Ash value was 10.22 %w/w, Loss on drying was 5.505 %w/w. HPTLC at 254 nm and at 366 nm showed 15 and 4 spots respectively. **Conclusion:** This study has generated preliminary data on Pharmacognostical, pharmaceutical parameters and HPTLC. This

fingerprinting can be useful for future researchers to reproduce this formulation and to establish quality control parameter of *Guduchi-Mustaadi Kashaya*.

KEYWORDS: *Guduchi-Mustaadi Kashaya*, Pharmacognostical analysis, pharmaceutical analysis, physio-chemical parameter.

INTRODUCTION

Ayurveda, the Indian system of medicine is the first recorded medical science widely practiced in India since ancient times. In recent years there is global revolution worldwide towards acceptance of this holistic science owing to its effectiveness and safety. The increasing demand at the global level has created great need to standardize herbal medicines. The earliest references of drug standardizations are mentioned in Ayurveda classics under the speciality of *Bhaishajya Kalpana* and *Rasa Shastra* which exclusively deal with drug formulation and manufacturing. Most of the tests described in ancient literature appear to be based on observations to attain standard product. But these parameters being subjective, it is height time to develop standardization of each herbal drugs through various currently available objective parameters.

In Ayurveda, there are many formulations with wide range of effectiveness on different biology systems. From that, Chraka Samhita has mentioned *Guduchi-Mustaadi Kashaya* formulation for the treatment of *Sthaulya*. *Guduchi-Mustaadi Kashaya* Formulation Contains *Guduchi, Musta* and *Triphala*. Standard manufacturing process and quality parameters are not available in Govt. databases like AFI and API. Hence this study was **aimed** to evaluate *Guduchi-Mustaadi Kashaya* through pharmacognostical, physio-chemical parameters and HPTLC fingerprinting in the process of establishing QC data.

MATERIALS AND METHODS

Procurement, Identification and Authentication of raw drugs

Raw drugs *Bhibhitaki, Guduchi* and *Musta* was procured from the pharmacy, ITRA, Jamnagar. *Amalaki* and *Haritaki* was purchased from Narayan pharmacy, ITRA, Jamnagar. The ingredients and part used are given (Table 1). The raw drugs were identified and authenticated by the Department of Dravyaguna, ITRA, Jamnagar.

Sr.No	Ingredient	Botanical /English Name	Part Used	Ratio		
1 1.	Guduchi	<i>Tinospora cordifolia</i> Thunb.	Dried Stem	1 part		
22 2.	Musta	Cyperus rotundus Linn.	Dried Rhizome	1 part		
3.	Haritaki	Terminalia chebula Retz.	Dried Fruit	1/3 part		
4.	Bibhitaki	Terminalia bellirica Roxb.	Dried Fruit	1/3 part		
5.	Amalaki	Emblica officinalis Gaertn.	Dried Fruit	1/3part		

Table no. 1: Ingredients of Guduchi-Mustaadi Kashaya.

PREPARATION OF GMK

The ingredients enlisted from 1-5 are made into fine coarse powders separately. Each one of them (coarse powder) is weighed separately. The ingredients 1 & 2 take in equal quantity and 3-5 are mixed well in 1/3 quantity and mass mixing till a homogenous mixture was obtained.^[2] This preparation was carried out at Pharmacy, ITRA, Jamnagar.

PHARMACOGNOSTICAL STUDY

The Pharmacognostical study of *Guduchi-Mustaadi Kashaya* was carried out at the Pharmacognosy laboratory, ITRA, Jamnagar. The *Guduchi-Mustaadi Kashaya* was evaluated by organoleptic characters like taste, odour, colour, and touch by researchers.^[3]

For microscopic analysis, a small quantity of GMK coarse powder 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 under Carl-zeiss Trinocular microscope to study for identification of Lignified elements of *Guduchi, Musta,* Haritaki, *Amalaki* and *Bibhitaki*. The micro-photographs were taken by using corl-zeiss Trinocular microscope attached with camera.^[4]

Microscopic standards mentioned in API for individual drugs were taken as a reference for authentication.

PHARMACEUTICAL PARAMETERS

Guduchi-Mustaadi Kashaya was subjected to pharmaceutical parameters like loss on drying at 110°C,^[5] ash value,^[6] water soluble extractive,^[7] methanol soluble extractive^[8] and pH value^[9] of finished product were studied in the pharmaceutical laboratory, 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 at the pharmaceutical chemistry Laboratory, ITRA, Jamnagar.^[10] It

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

RESULTS

Pharmacognostical study

Present sample of GMK was found to have below mentioned organoleptic characteristics (Table 2)

No.	Organoleptic Characters	Results
1	Colour	Light brownish
2	Taste	Bitter followed by Astringent
3	Odour	Slightly aromatic
4	Touch	Coarse

 Table 2: Organoleptic characteristics of Guduchi-Mustaadi Kashaya.

Coarse Powder microscopy of GMK sample showed Stone cell, Scleroids of *Haritaki* (*Terminalia chebula* Retz.), Pitted stone cell, Scleroids, Tricome, Stone cells of *Bibhitaki* (*Terminalia bellirica* Roxb.), Silica deposition of *Amalaki* (*Emblica officinalis* Gaertn), Starch grains, Annular vessels, Brown content and Stone cells of *Musta* (*Cyperus rotundus* Linn.), Collenchyma cellls, Pitted vessels, Cork cells of *Guduchi* (*Tinospora cordifolia* Thunb.) were observed. The microphotographs of the same are displayed in Figure 1.





a) Cork cells, b) Simple fibers, c) Chollenchyma cells, d) Pitted Vessels, e) Pitted Vessels of *Guduchi*; f) Brown content, g) Cork cells, h) Lignified fibers i) Prismatic crystals, j) Simple Fibers and k) Starch grains of Musta; l) Epicarp cells, m) Stone cells of Haritaki; n) Fibers, o) Mesocarp of Amalaki; p) Stone cells, q) Trichome of *Bibhitaka*.

Figure 1: Microscopic Features of Guduchi-Mustaadi Kashaya.

Pharmaceutical analysis of GMK

Results of pharmaceutical parameters are mentioned in Table 3 & Table 4.

Table 3: Ph	vsical ana	lvsis of	Guduchi-M	Mustaadi	Kashava.
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Sr. no	Parameters	Guduchi-Mustaadi Kashaya					
1.	Shape (Appearance)	Coarse powder (Yavakuta)					

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Sr. no	Parameters	Guduchi-Mustaadi Kashaya
1.	pH 10% Aqueous Sol. (%w/w)	6.00
2.	Loss on drying at (110°)	5.505 % w/w
3.	Ash value	10.22 % w/w
4.	Water soluble extractive	2.92 % w/w
5.	Methanol soluble Extractive	30 % w/w

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HPTLC

The results of present study are reported in the Table 5. Densitogram of the present study GMK sample is shown in Figures 2A and 2B.

Table 5: Results of HPTLC of Guduchi	-Mustaadi Kashaya.
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	Wave Lengths	Short UV (254 nm) Long UV (366 nm)
	No of Spots	15 04
	Max Rf Value	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$
Wave	Lengths	Densitogram
Figu Densi of TC Short r	ures 2A itogram GV with UV (254 nm)	$u = \frac{140}{130} + \frac{140}{100} + \frac{140}{100$
Figu Densi of T(Long r	rres 2B itogram GV with UV (366 nm)	700 650 600 550 500 400 500 500 500 500 500 500 5

Figure 2: Densitogram of HPTLC of Guduchi-Mustaadi Kashaya.

DISCUSSION

Data of present study will help to finalize the QC parameters of this *Guduchi-Mustaadi Kashaya* in future. Present study has generated preliminary quality control data of *Guduchi-Mustaadi Kashaya*. It was confirmed by microscopic evaluation that the ingredients of *Guduchi-Mustaadi Kashaya* i.e., *Musta, Guduchi Haritaki, Amalaki* and *Bibhitaki*, were

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genuine. Presence of microscopic characters of all the ingredients in *Guduchi-Mustaadi Kashaya*, infers that there is no major change in phytochemicals and microscopic structure of the raw drugs during the pharmaceutical processes.

In present study color of GMK was Light Brownish. It may be due to combination of 5 drugs which have Brown color as mentioned in API.^[11]

Taste of GMK was *Tikta* (Bitter) followed by Kashaya *Rasa*. *Tikta* taste is due to presence of *Tikta Rasa* of *Guduchi*^[12] and *Musta*.^[13] *Kashaya Rasa* is due to *Kashaya Rasa* of *Haritaki*,^[14] *Amalaki*^[15] and *Bibhitaki*.^[16]

In present study, the microscopic features observed in *Guduchi-Mustaadi Kashaya* confirmed the presence of all five herbal ingredients *Guduchi, Musta, Haritaki, Amalaki* and *Bibhitaki,* as mentioned in API^[17,18,19,20,21] in its individual quality standards. This formulation GMK infers that there is no major change in phytochemicals and microscopic structure of the raw drugs during the pharmaceutical processes.

The pH value is useful to note the acidity or alkalinity of the aqueous solution of the drug. In present study pH is 6.0 so it is slightly acidic in nature.

In present sample, loss on drying is 5.505 % w/w. Less loss on drying indicates that raw drugs were well dried before it was pulverized. Drying of herbs before its procedure and storing dry area are important to reduce the chances of its decay because excess moisture content increases the chance of microbial overgrowth.^[22] Material absorbs moisture during the storage. In conjunction with a suitable temperature moisture will lead to the activation of enzymes and given suitable condition, to the proliferation of living organism. Hence, moisture contents may affect the quality of the drug. Although the loss in weight, in the samples, principally due to water, small amount of other volatile materials will also contribute to the weight loss. Minimum loss on drying found in present study indicates it has minimum moisture, which could be considered as good to have longer shelf life.

Ash value of present sample is 10.22 %w/w. It is below the limits for ash value of its individual ingredients as per API. It indicates 10.22 % material remaining after ignition.

Values of water soluble and alcohol soluble extractive are useful to determine the amount of active constituents of a given preparation. Value of water soluble and methanol soluble

extract of GMK in present study is 2.92 % w/w and 30 % w/w respectively. This might be the one reason for using this formulation as *Kashaya* to get benefits of all its active principles.

The Rf value for a particular substance is always the same if the same solvent and stationary phase are used. Rf values vary from 0 (the substance is not attracted to the mobile phase) to 1 (the substance is not attracted to the stationary phase). Though present study HPTLC data can be used as fingerprinting for the GMK having same type of raw material, prepared with same method at same climatical condition.

LIMITATION OF THE STUDY

This study, was conducted to generate preliminary quality control data of GMK. The data generated in present study can be generalized for the condition were having same source of raw drugs, pharmaceutical procedure, climatic condition and same method of evaluation.

CONCLUSION

This study has generated preliminary data on Pharmacognostical, pharmaceutical parameters and HPTLC of *Guduchi-Mustaadi Kashaya*. This fingerprinting can be useful for future researchers to reproduce this formulation and to establish quality control parameter of *Guduchi-Mustaadi Kashaya*.

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

REFERENCES

- Kushwaha HC, editor. Caraka Samhita, reprint edition, Chaukhambha Orientalia, Varanasi; 2016, Sutra Sthana, Chep.21, verses 22, 393.
- Anonymous, The Ayurvedic formulary of India, Government of India, Ministry of Health and Family welfare, New Delhi, Volume-III, The controller of publications civil lines, Delhi, 2011; 256.
- 3. Khandelwal KR. Practical pharmacognosy, 19th ed. Pune: Nirali prakashan, 2008; 13.
- 4. Trease and Evans, Pharmacognosy, 15th Ed., W.B. Sunders Company Ltd., 1996; 569, 570.
- 5. 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.

- 6. 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.
- 7. 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.
- 8. 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.
- 9. 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.
- 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.
- Ministry of AYUSH, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume I, The controller of publications civil lines, Delhi, Reprint, 2001; Monographs: 5, 12, 26, 29, 45, 47, 125.
- 12. Chunekar KC, Bhavprakash Nighnatu (Indian Materia medica), Reprint ed. Varanasi: Chaukhambha Bharati Academy; 2018, *Guduchyadi varga*, 257.
- 13. Chunekar KC, Bhavprakash Nighnatu (Indian Materia medica), Reprint ed. Varanasi: Chaukhambha Bharati Academy; 2018, *Karpuradi varga*, 232.
- 14. Chunekar KC, Bhavprakash Nighnatu (Indian Materia medica), Reprint ed. Varanasi: Chaukhambha Bharati Academy; 2018, *Haritakyadi varga*, 5.
- 15. Chunekar KC, Bhavprakash Nighnatu (Indian Materia medica), Reprint ed. Varanasi: Chaukhambha Bharati Academy; 2018, *Haritakyadi varga*, 10.
- 16. Chunekar KC, Bhavprakash Nighnatu (Indian Materia medica), Reprint ed. Varanasi: Chaukhambha Bharati Academy; 2018, *Haritakyadi varga*, 9.
- 17. Ministry of Health and Family Welfare, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume I, The controller of publications civil lines, Delhi, 2001; 41.
- Ministry of Health and Family Welfare, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume III, The controller of publications civil lines, Delhi, 2001; 129-130.
- 19. Ministry of Health and Family Welfare, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume I, The controller of publications civil lines, Delhi, 2001; 47.
- 20. Ministry of Health and Family Welfare, The Ayurvedic Pharmacopoeia of India, First

edition, Part I, Volume I, The controller of publications civil lines, Delhi, 2001; 5.

- 21. Ministry of Health and Family Welfare, The Ayurvedic Pharmacopoeia of India, First edition, Part I, Volume I, The controller of publications civil lines, Delhi, 2001; 26.
- 22. https://www.researchgate.net/publication/342420649_Moisture_content_water_content_l oss_on_drying_Part_1_What_exactly_is_meant_and_how_are_these_quantities_determin ed [Retrived on 28/03/23 at 05:33 pm]