ORIGINAL ARTICLE

Pharmacognostical, physicochemical, and high performance thin layer chromatography evaluation of *Manjisthadi kwatha* in the management of psoriasis

Jayesh Odedra[1], A. B. Thakar[1], N. N. Bhatt[2], C. R. Harisha[3], V. J. Shukla[4]

[1]Department of Panchakarma, IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India, [2]Department of Kayachikitsa, IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India, [3]Department of Pharmacognosy and Pharmaceutics, IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India, [4]Department of Pharmaceutics, IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India

Abstract

Background: *Manjisthadi kwatha* is mentioned in Ayurvedic classics as a therapeutic formulation to treat *Kustha,* particularly *Ekkustha* (psoriasis). There is about 2.5% of whole world population today who are suffering from psoriasis but management is till unsatisfactory. *Manjisthadi kwatha* contains manjistha (*Rubia cordifolia*), *Katuki* (*Picrorhiza kurroa*) and *Vacha* (*Acorus calamus*), *Guduchi* (*Tinospora cordifolia*), *Nimbi* (*Azadirachta indica*), *Daruharidra* (*Berberis aristata*) and *Triphala.* All ingredients of *Manjisthadi kwatha* having *Kushthaghna* property. The skin diseases are considered in the umbrella of *Kushtha*. Thus, it is more effective in Psoriasis internally. **Materials and Methods:** *Manjisthadi kwatha* powder was evaluated for their pharmacognostic and pharmaceutical analysis. **Results:** Microscopic characters were found of *Manjistha, Nimbi Vacha, and Guduchi Triphla*. Results obtained in pharmaceutical parameters of *Manjisthadi kwatha* powder such as loss on drying 15.19%, ash value 8.48%, and alcohol soluble extract 58.6% w/v are within limit mentioned by Ayurvedic pharmacopoeia of India. High performance thin layer chromatography profile of *Manjisthadi kwatha* powder showed similarities in number of spots. **Conclusion:** From the study, data developed can be espoused for laying down the standards for *Manjisthadi kwatha*.

Key words: High performance thin layer chromatography, *Manjisthadi kwatha*, pharmaceutical analysis, pharmacognostical

INTRODUCTION

Manjisthadi comprising of *Manjistha, Vacha, Guduchi, Nimba, Katuki, Daruharidra,* and *Triphla* was explained in *Shadangdhar samhita* for curing of *Kustha* (Psoriasis).[1] During past decades herbal medicines pointed out in Ayurveda are getting gratitude globally. Maintaining the quality standard of a poly herbal formulation is a challenging task. Available data concerning scientific evaluation of *Manjisthadi kwatha* is none. Quality control for safety and efficacy of herbal products is of paramount importance.[2,3] With the help of identity, purity, content, and other chemical, physical, or biological properties, or by the manufacturing processes quality can be defined as the status of a drug. The analytical techniques have always been cited to understand the quality of the outcome in Ayurveda. It describes different qualitative parameters to critic genuine plant identification, preparations and having scientific evidence, they are not competent to provide quantitative information. Using the modern techniques, qualitative and quantitative analysis of drugs and instruments of the science is of absolute importance to rationalize their acceptability in modern system of medicine.

Different chromatographic analysis is routinely used and plays an important role in the quality control of

Address for correspondence:
Jayesh Odedra, Department of Panchakarma, IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India. Phone: +91-9429563141.
E-mail: drjayeshodedra@gmail.com

Received: 09-01-2017
Revised: 24-01-2017
Accepted: 30-01-2017

Table 1: Ingredients of *Manjisthadi kwatha*

Sanskrit name	Latin name	Parts used	Quantity
Manjistha	*Rubia cordifolia*	Whole plant	1 part
Haritaki	*Terminalia chebula* Retz.	Fruit	1 part
Bibhitaki	*Terminalia bellerica* Roxb.	Fruit	1 part
Amalaki	*Emblica officinalis* (Gaertn.)	Fruit	1 part
Katuki	*Picrorhiza kurroa* (Royle *ex* Benth)	Root	1 part
Vacha	*Acorus calamus*	Root, hardwood	1 part
Darunisha	*Berberis aristata* Dc.	Fruit, root, hardwood	1 part
Guduchi	*Tinospora cordifolia* (Thunb.) miers	Hard wood	1 part
Nimba	*Azadirachta indica* A. Juss.	Fruit, leaf, stem	1 part

R. cordifolia: Rubia cordifolia, T. chebula: Terminalia chebula, E. officinalis: Emblica officinalis, P. kurroa: Picrorhiza kurroa, A. calamus: Acorus calamus, B. aristata: Berberis aristata, T. cordifolia: Tinospora cordifolia

complex herbal medicines. High performance thin layer chromatography (HPTLC) can provide an electronic image of the chromatographic fingerprint and a densitogram to detect the presence of marker compounds in a plant sample. The advantage of HPTLC in the analytical testing of herbal products is that it provides positive identification as well as visualization of the separated fractions of the sample component and helps in quantitative, qualitative analysis with the same system.

Manjisthadi kwatha is used as drug of choice for *Ekkustha* (Psoriasis). Hence, current study is anticipated to evaluate *Manjisthadi kwatha* powder through pharmacognostic, physicochemical and HPTLC analysis.

MATERIALS AND METHODS

Collection and Preparation of the Drug

All the row drugs of *Manjisthadi kwatha* were collected from the pharmacy of IPGT and RA, Jamnagar. The obtained drugs were shade dried, equally amount had taken and made into a coarse powder with help of mechanical grinder. Ingredients of *Manjisthadi kwatha* are summarized at [Table 1].

Organoleptic Evaluation

Various parameters of the material such as color, odor, touch, and taste of the *Manjisthadi kwatha* powder were observed and recorded [Table 2].[4]

Microscopic Evaluation

Microscopic examination of material powder was carried out with and without staining, by powder microscopy to determine the chemical nature and microphotographs were taken using Carl Zeiss Trinocular microscope.[5]

Table 2: Organoleptic characters of *Manjisthadi kwatha*

Organoleptic characters	Results
Color	Brownish muddy
Odor	Aromatic
Taste	Bitter
Touch	Rough
Appearance	Powder

Physicochemical Analysis

Physicochemical analyses were carried out by following the parameters. Physicochemical analysis such as loss on drying at 110°C,[6] pH value,[7] ash value,[8] water soluble extractive,[9] and methanol soluble extractive[10] were recorded.

Preliminary Phytochemical Investigation

Preliminary phytochemical investigations are carried out by following standard procedure of American Petroleum Institute (API).[11]

High Performance Thin Layer Chromatography

HPTLC was performed as per the guidelines provided by API.[12] A Camag (Switzerland) HPTLC system equipped with a sample applicator Linomat V was used for application of samples. Methanol extract of kwatha powder was used for spotting. Toluene:ethyl acetate:acetic acid (7:2:1 v/v) was selected as solvent system. Camag TLC scanner 3, Reprostar and wincats 1.3.4 were used for scanning the plates. Camag twin trough glass chamber was used for developing the plates. The developed plate was visualized under visible day light, short ultraviolet (UV) (254 nm), long UV (366 nm) and after spraying with vanillin-sulfuric acid reagent and again observed in daylight. The reference values were recorded.

Instrumental Conditions

Application mode: Camag Linomat V, development chamber: Camag twin trough chamber, plate: Precoated Silica Gel GF 254 plate, chamber saturation: 30 min, development time: 30 min, development distance: 10 cm, scanner: Camag scanner III, detection: Deuterium lamp and mercury lamp, data system: WinCATS software.

OBSERVATIONS AND RESULTS

Pharmacognostic Study

Microscopic powder of *Manjisthadi kwatha* was found various characters according to contain which are depicted in [Table 3 and Figure 1].

Table 3: Microscopic characters of *Manjisthadi Kwatha*

Name of drug	Characters found
Manjistha	Border pitted vessels, coloring matters, acicular crystal
Nimba	Cork in surface view, dark brown contains
Vacha	Starch gain, fibrous of *Vacha*
Katuki	Scalariform vessels, rhomboid crystal
Guduchi	Collenchyma cells, egg-shaped grain, border pitted vessels
Daruharidra	Prismatic crystal, fragment of pitted vessels, crystal fibrous
Amalaki	Silica deposition
Haritaki	Epicarp, scleroid, stone cells
Bibhitaki	Scleroids, trichomes

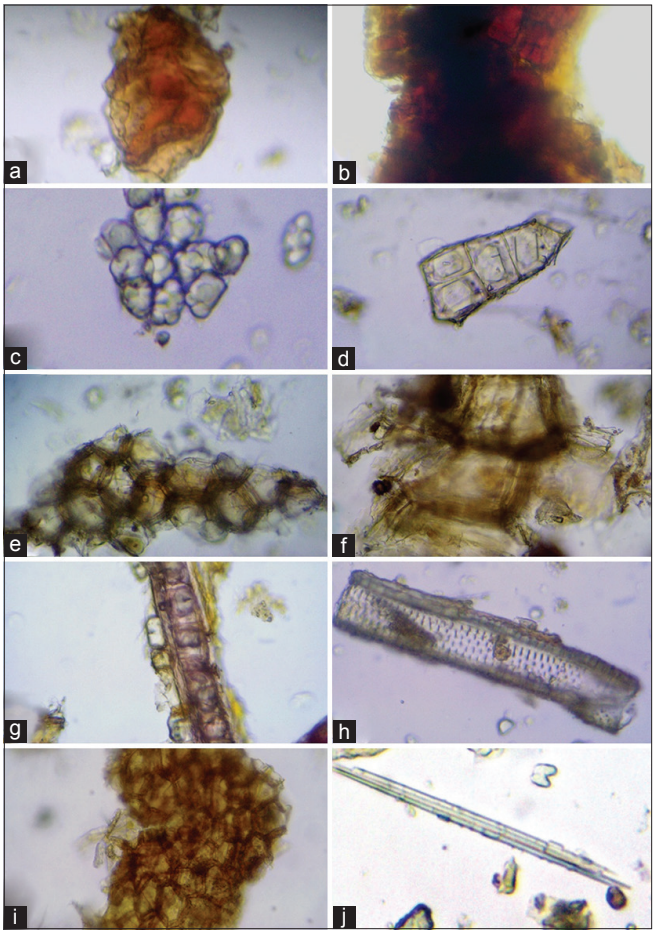

Figure 1: Microscopic characters of *Manjisthadi kwatha.* (a) Coloring matter of Manjistha (b) dark brown contains of nimb (c) egg-shaped grain of guduchi (d) collenchyma of guduchi (e) cork in surface view of nimba (f) cork cells of manjisthadi (g) crystal fibrous of daruharidra (h) border pitted vessels of manjistha (i) cork cells of guduchi (j) acicular crystal of manjisthadi

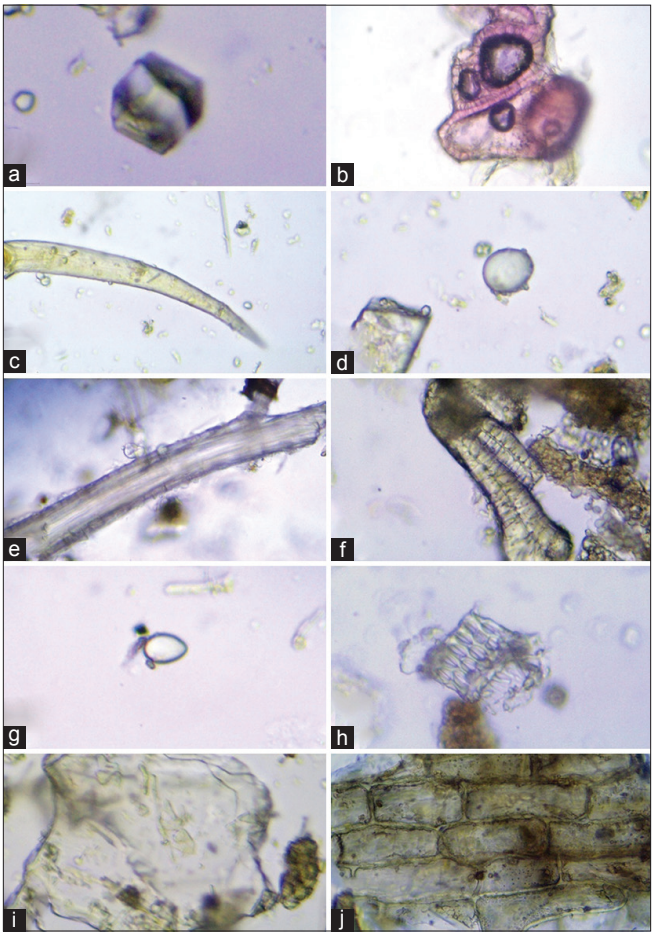

Figure 2: Microscopic characters of *Manjisthadi kwatha.* (a) Rhomboidal crystal of katuki, (b) stone cells of haritaki, (c) trichome of bibhitaki, (d) oil globules of vacha, (e) silica deposition of amalaki, (f) scleroid of bibhitaki, (g) starch grain of vacha, (h) fragment of pitted vessels of daruharidra, (i) silica deposition of amalaki, (j) epicap cells of amalaki

Analytical Study

Results of the analytical study of *Manjisthadi kwatha* powder are as follows.

Physicochemical Constants

The results are depicted in Table 4.

HPTLC

In HPTLC, in short UV-254 nm, maximum 8 spots were observed in *Manjisthadi kwatha*. Similarly, in long UV-366 nm, maximum 9 spots were observed [Table 5 and Figure 4].

Nature of adsorbed components, if with different polarity, formerly total number of components and respective

Table 4: Physicochemical constants of *Manjisthadi kwatha*

Parameters	Result
Loss on drying	9.025% w/w
Ash value	5.974%
Water soluble extract	51.568% w/w
Alcohol soluble extract	56.397% w/w
pH	6.5

Table 5: Chromatographic results of *Manjisthadi kwatha*

Conditions	Rf values (8 spots each)
Short ultra violet (254 nm)	0.01, 0.13, 0.26, 0.39, 0.57, 0.64, 0.80, 0.91
Long ultra violet (366 nm)	0.03, 0.19, 0.28, 0.48, 0.56, 0.62, 0.65, 0.85, 0.93

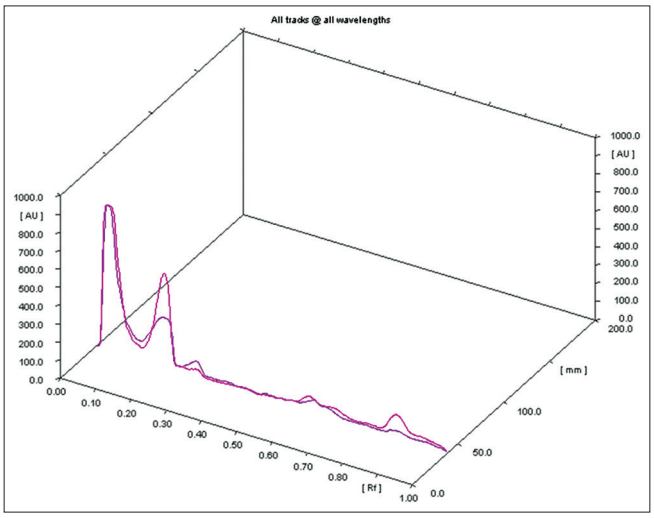

Figure 3: High performance thin layer chromatography three-dimensional evaluation of *Manjisthadi kwatha*

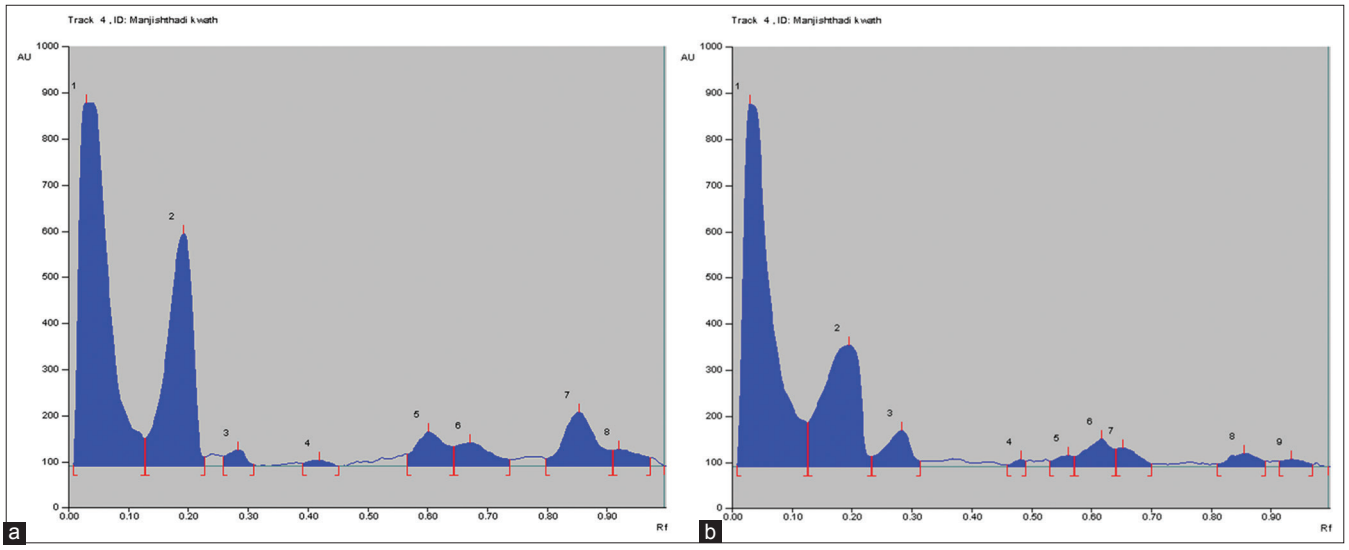

Figure 4: Chromatographic results of *Manjisthadi kwatha.* (a) On performing high performance thin layer chromatography, the chromatogram of *Manjisthadi kwath* showed 8 spots at corresponding Rf values 0.01, 0.13, 0.26, 0.39, 0.57, 0.64, 0.80, 0.91. In short wave UV 254 nm, (b) 9 spots corresponding Rf values 0.03,0.19, 0.28, 0.48, 0.56, 0.62, 0.65, 0.85, 0.93. Obtained in long wave UV 364 nm

reference values also differs. In short, nature of different matrix modulates both the studied parameters.

DISCUSSION AND CONCLUSION

Results obtained in physicochemical parameters of *Manjisthadi kwatha* are within limit mentioned by Ayurvedic pharmacopoeia of India. HPTLC profile of *Manjisthadi kwatha* showed similar in number of spots. This profile can be used for the identification of the medicinally important formulation of *Manjisthadi kwatha*. This work can be considered as the first step toward identifying the followed methods through HPTLC analysis. This is a preliminary analysis and meticulous nature along with the depiction is to be carried-out.

REFERENCES

1. Acharya Sharangdhara, Sharngadhara Samhita, Madhyam Khanda 2, Jivanprada Hindi commentary, Editing by Shailaja Srivastava, Chaukhambha orientalia, Varanasi, 2011. p. 137-42.
2. Tripathi YB, Singh VP, Sharma GM, Sinha RK, Singh D. X-ray diffraction and microscopic analysis of Tamra Bhasma: An Ayurvedic metallic preparation. Indian J Tradit Knowl 2003;2:107-17.
3. Shailajan S, Menon S, Singh A. Quantitative analysis of piperine from Ayurvedic polyherbal formulations using reverse phase high performance liquid chromatography. Int J Pharm Bio Sci 2009;1:1-10.
4. Siddiqui A, Hakim MA. Format for the pharmacopoeial analytical standards of compound formulation, workshop on standardization of Unani drugs, (appendix). New Delhi: Central Council for Research in Unani Medicine; 1995.
5. Mukherjee PK. Quality Control of Herbal Drugs. 2nd ed. New Delhi: Business Horizons; 2007. p. 164-5.
6. Anonymous. Indian Pharmacopeia, Appendix 8 (8.6). Vol. II. New Delhi: Government of India, Ministry of Health and Family Welfare, The Controller of Publication; 1996. p. A89.
7. Anonymous. Indian Pharmacopeia, Appendix 8 (8.11). Vol. II. New Delhi: Government of India, Ministry of Health and Family Welfare, The Controller of Publication; 1996. p. A95.
8. Anonymous. The Ayurvedic Pharmacopoeia of India, Part 1, Appendix 2 (2.2.3). 1st ed., Vol. VI. New Delhi: Government of India, Ministry of Health and Family Welfare; 2008. p. 242.
9. Anonymous. The Ayurvedic Pharmacopoeia of India, Part 1, Appendix 2 (2.2.8). 1st ed., Vol. VI. New Delhi: Government of India: Ministry of Health and Family Welfare; 2008. p. 243.
10. Anonymous. The Ayurvedic Pharmacopoeia of India, Part 1, Appendix2 (2.2.7). 1st ed., Vol. VI. New Delhi: Government of India: Ministry of Health and Family Welfare; 2008. p. 243.
11. Shukla VJ, Bhatt UB. Methods of Qualitative Testing of some Ayurvedic Formulations. Jamnagar: Gujarat Ayurvedic University; 2001.
12. Anonymous. Ayurvedic Pharmacopoeia of India, Part-2, Appendices. 1st ed., Vol-2. New Delhi: Government of India, Ministry of Health of Family Welfare; 2008. p. 165-7.

Source of Support: Nil. **Conflict of Interest:** None declared.