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PHARMACEUTICAL PROCESSING AND STANDARDIZATION OF MAHAUSHADHI KWATHA: AN AYURVEDA FORMULATION

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ABSTRACT

Background: Mahaushadhi kwatha is an herbal preparation (decoction) mentioned in Yoga ratnakara. It is mainly indicated in the management of amavata (rheumatoid arthritis). All ingredients of this formulation are easily available and also its pharmaceutical preparation is simple. In this present study pharmaceutical work of the formulation was carried out along with organoleptic and analytical studies. These analytical parameters help in standardization of formulation and aid to assess the therapeutic value of drugs. As there are no standard readings recorded in any authoritative books for mahaushadhi kwatha, hence an effort has been made to record the analytical parameters of mahaushadhi kwatha in this article.

Objectives: To describe the method of preparation and analytical parameters of mahaushadhi kwatha.

Methods: Ingredients viz. Shunti *(Zingiber officinale)* and Guduchi (*Tinospora cordifolia)* were taken in dry form 1 part each, made into coarse powder. It was soaked overnight in 4 parts of water and later boiled and reduced to 1/4th part. The sample of prepared kashaya was analyzed at SDM Centre for Research in Ayurveda and Allied sciences, Kuthapady, Udupi.

Results: The results of analytical parameters like Refractive index, Specific gravity, Viscosity, Total solids (%), pH and Rf values of HPTLC were obtained.

Conclusion: As the analytical values of mahaushadhi kwatha are not mentioned in any of the authoritative books, these parameters can be taken as the preliminary standards for the formulation.

Keywords: Ayurveda, Mahaushadhi kwatha, Shunthi, *Zingiber officinale*, Guduchi, *Tinospora cordifolia*, Amavata, Analytical study, HPTLC

INTRODUCTION

Mahaushadhi kwatha is a formulation mentioned in amavata chikitsa of yogaratnakara **[1]**. It consists of ingredients viz. Guduchi (*Tinospora cordifolia*) and shunti *(Zingiber officinale)*. Due to its wide range of properties, both these drugs are widely used as single drug therapies as well as in many of the formulations. These drugs are commonly available and also possess amapachaka (digestive), shothahara (anti-inflammatory) and sholahara (analgesic) properties. Various studies on shunti and guduchi have shown to have anti-inflammatory, analgesic properties **[2]**, while guduchi has proven anti-arthritic **[3]** and immune-modulatory effect **[4]**. Due to the above properties, these drugs are of importance in the treatment of amavata.

The type of preparation that is to be adopted is decided based on the nature of pharmaceutically active ingredient present in the crude drug, so that the active principles are properly extracted in the particular preparation. As the drugs are soft in nature the kwatha of these two drugs can be prepared in the ratio of 1:4 i.e., one part of total crude drug and 4 parts of water, which will help in proper extraction of the active principles.

The authenticity of a formulation is assessed by testing the organoleptic, analytical and physio-chemical parameters, which helps to assure a genuine and consistent product with adequate amount of active principles and thereby also helps to standardize the preparation for its therapeutic use.

In case of Mahaushadhi kwatha, there are no standard readings recorded in any authoritative books, hence an effort has been made to record the analytical parameters of Mahaushadhi kwatha in this article.

MATERIALS &METHODS

Collection of drugs:

The necessary ingredients required for the preparation of Mahaushadhi kwatha were acquired from CKKM pharmacy, Thripuninthura, Ernakulam, Kerala.

The formulation Mahaushadhi kwatha was prepared as per the general method of preparation of kwatha kalpana as

mentioned in the authoritative books of Bhaishajya kalpana.

Ingredients:

Mahaushadhi kwatha was prepared as per the reference of Yoga ratnakara. The ingredients and quantities are as follows **[1]**.

Table 1: Ingredients

S. No.	Name of the drug	Latin name	Part used	Quantity
1	Guduchi	*Tinospora cordifolia*	Stem	1 part
2	Shunti	*Zingiber officinalis*	Rhizome	1 part
3	Water	-	-	4 parts

Preparation of Mahaushadhi kwatha [5]

Ingredients viz. Shunti and Guduchi were taken in dry form 1 part each (total 28 kg), made into coarse powder. It was soaked overnight in 4 parts of water (112 L). Due to the starchy nature of raw materials the water was absorbed by the drug, hence 40 L of extra water was added and later boiled and reduced to 1/4th part. After reduction, the decoction was filtered and the prepared Kashaya was packed in amber bottles of 100ml and 200-ml capacity, labeled and stored as per GMP standards.

Total yield: 33.5 liters

Physical characteristics of kwatha:

Colour: Light brown

Odour: Characteristic odour of shunti (Ginger)

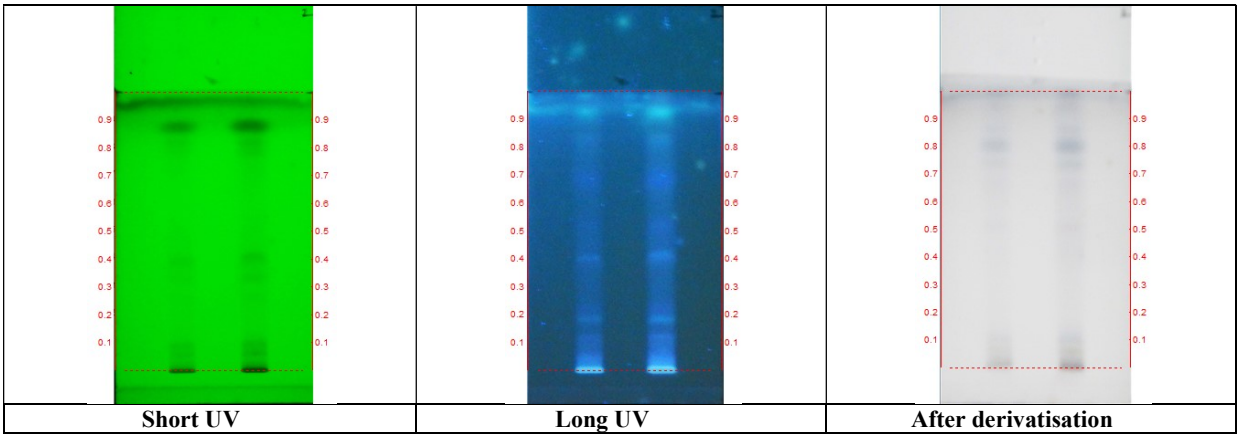
Taste: Tikta (bitter), katu (pungent)

RESULTS

HPTLC photo documentation of ethanol extract of Mahaushadhi kwatha Shown in Figure 1.

Table 2: Results of standardization parameters of Mahaushadhi kwatha

Parameter	Results n = 3 %w/w
	Mahaushadhi kwatha
Refractive index	1.34079
Specific gravity	1.044
Viscosity	1.78
Total solids (%)	90.68
pH	6.00



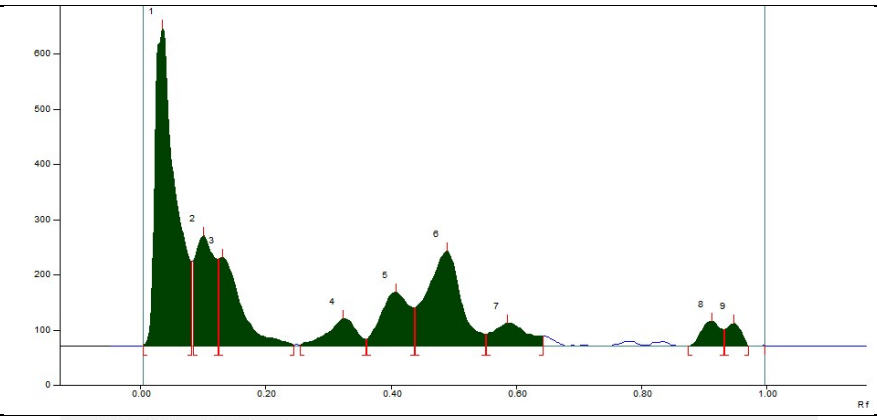
Short UV | Long UV | After derivatisation

Figure 1: Solvent system - Toluene: Ethyl Acetate: Acetic acid: water (3.0: 3.0: 0.8: 0.2)
Track 1 – Mahaushadhi kwatha– 4µl
Track 2 – Mahaushadhi kwatha– 8µl

Table 3: R_f values of Mahaushadhi kwatha

Short UV	Long UV	After derivatisation
0.06 (L.green)	-	0.06 (Purple)
0.09 (L.green)	-	-
-	0.12 (F. blue)	0.12 (Purple)
-	0.19 (F. blue)	-
0.27 (L.green)	-	-
0.42 (L.green)	0.42 (F. blue)	-
-	-	0.44 (Purple)
-	0.52 (F. blue)	0.52 (Purple)
-	0.68 (F. blue)	0.68 (Purple)
-	-	0.74 (Purple)
0.78 (L.green)	-	-
-	-	0.81 (Purple)
0.83 (L.green)	0.83 (F. blue)	-
-	-	0.87 (Purple)
0.89 (D.green)	-	-
-	0.94 (F. blue)	-

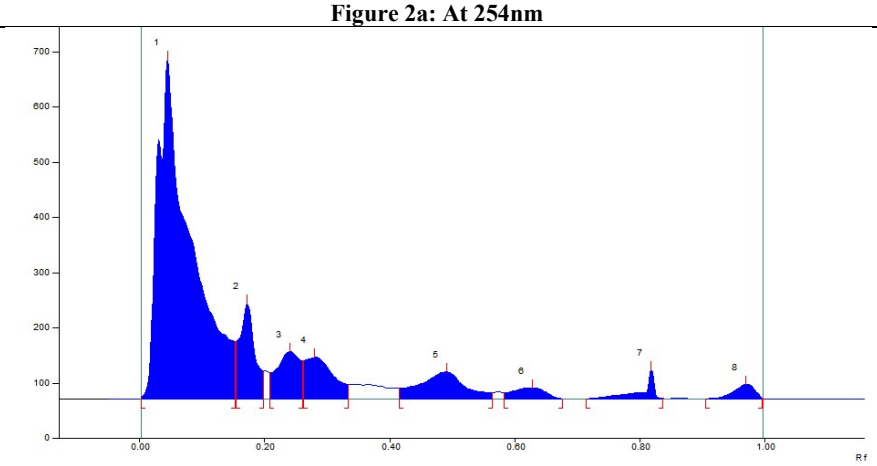
*D – dark; L – light; F – fluorescent



Track 2, ID: Mahaushadi kwatha

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	1.7 AU	0.04 Rf	575.8 AU	41.65 %	0.08 Rf	53.4 AU	13441.6 AU	36.58 %
2	0.08 Rf	154.0 AU	0.10 Rf	199.6 AU	14.44 %	0.12 Rf	57.5 AU	4562.8 AU	12.42 %
3	0.13 Rf	158.3 AU	0.13 Rf	160.2 AU	11.59 %	0.25 Rf	2.4 AU	4037.9 AU	10.99 %
4	0.25 Rf	1.9 AU	0.32 Rf	50.1 AU	3.62 %	0.36 Rf	12.3 AU	1613.6 AU	4.39 %
5	0.36 Rf	12.7 AU	0.41 Rf	97.0 AU	7.02 %	0.44 Rf	69.5 AU	3172.5 AU	8.63 %
6	0.44 Rf	69.6 AU	0.49 Rf	172.7 AU	12.49 %	0.55 Rf	21.2 AU	6615.6 AU	18.00 %
7	0.55 Rf	21.4 AU	0.59 Rf	41.2 AU	2.98 %	0.64 Rf	17.5 AU	1636.5 AU	4.45 %
8	0.88 Rf	0.1 AU	0.91 Rf	44.9 AU	3.25 %	0.93 Rf	30.3 AU	977.5 AU	2.66 %
9	0.93 Rf	30.4 AU	0.95 Rf	41.1 AU	2.97 %	0.97 Rf	0.3 AU	692.4 AU	1.88 %

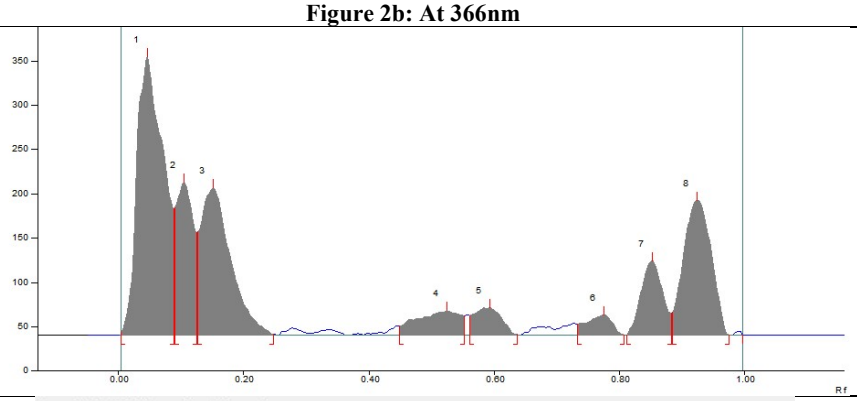
Figure 2a: At 254nm



Track 2, ID: Mahaushadi kwatha

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	2.0 AU	0.05 Rf	614.6 AU	55.92 %	0.15 Rf	04.4 AU	23421.6 AU	65.07 %
2	0.15 Rf	104.6 AU	0.17 Rf	173.3 AU	15.77 %	0.20 Rf	51.3 AU	3007.9 AU	8.36 %
3	0.21 Rf	48.1 AU	0.24 Rf	86.1 AU	7.84 %	0.26 Rf	69.4 AU	2350.6 AU	6.53 %
4	0.26 Rf	69.6 AU	0.28 Rf	75.5 AU	6.87 %	0.33 Rf	25.9 AU	2480.1 AU	6.89 %
5	0.42 Rf	19.5 AU	0.49 Rf	49.0 AU	4.46 %	0.56 Rf	11.2 AU	2587.6 AU	7.19 %
6	0.58 Rf	11.6 AU	0.63 Rf	20.6 AU	1.87 %	0.68 Rf	0.3 AU	790.4 AU	2.20 %
7	0.71 Rf	0.1 AU	0.82 Rf	52.9 AU	4.81 %	0.84 Rf	1.4 AU	697.0 AU	1.94 %
8	0.91 Rf	0.0 AU	0.97 Rf	27.1 AU	2.46 %	1.00 Rf	1.4 AU	657.0 AU	1.83 %

Figure 2b: At 366nm



Track 2, ID: Mahaushadi kwatha

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	3.2 AU	0.05 Rf	314.6 AU	32.43 %	0.09 Rf	42.4 AU	9654.5 AU	33.61 %
2	0.09 Rf	143.3 AU	0.10 Rf	172.1 AU	17.75 %	0.13 Rf	15.9 AU	3432.1 AU	11.95 %
3	0.13 Rf	116.9 AU	0.15 Rf	165.9 AU	17.10 %	0.25 Rf	0.9 AU	5684.1 AU	19.79 %
4	0.45 Rf	10.7 AU	0.53 Rf	27.5 AU	2.83 %	0.55 Rf	21.7 AU	1369.7 AU	4.77 %
5	0.56 Rf	22.2 AU	0.59 Rf	30.8 AU	3.18 %	0.64 Rf	0.6 AU	991.8 AU	3.45 %
6	0.73 Rf	12.3 AU	0.78 Rf	23.0 AU	2.37 %	0.81 Rf	0.3 AU	678.1 AU	2.36 %
7	0.81 Rf	0.3 AU	0.85 Rf	84.0 AU	8.66 %	0.88 Rf	24.7 AU	2069.8 AU	7.21 %
8	0.89 Rf	25.3 AU	0.93 Rf	152.1 AU	15.68 %	0.98 Rf	0.2 AU	4845.3 AU	16.87 %

Figure 2c: At 620nm

Figure 2: Densitometric scan of Mahaushadhi kwatha

DISCUSSION

As Mahaushadhi kwatha is a decoction that is meant for oral ingestion, the consistency of the preparation depends on length of boiling which solubilise the constituents present in guduchi and shunti making it palatable hot decoction. The proportion used for kwatha preparation was four parts as the drugs were soft in nature. The organoleptic characters gave the characteristics features of the ingredients utilised for the formulation indicating the dissociation of the active constituents in the product.

The standardisation parameters of liquid oral formulations such as refractive index, specific gravity, viscosity, total solids and pH were assessed to confirm flow property of formulation. Refractive index evaluates the clarity of the palatable preparation and was found to be 1.34079. Specific gravity is an evaluation parameter affirming wt/ml which means constituents that are dissolved in aqueous phase, wt/ml should always be

more than that of carrier solvent (water) in this formulation it was found to be 1.044. Viscosity is resistance to the flow, viscosity of Mahaushadhi kwatha was found to be 1.78. Total solids are the weight of soluble constituents which is 90.68% which is responsible for therapeutic property. pH of kwatha preparation was found to be 6.0 nearly a neutral pH.

The analytical method of standardisation qualitatively carried out using high performance thin layer chromatographic (HPTLC) for Mahaushadhi kwatha (butanol extract) using toluene: ethyl acetate: acetic acid: water (3.0: 3.0: 0.8: 0.2) as solvent system the plates developed when visualized under short UV light showed seven prominent spots at R_f 0.06 (L.green), 0.09 (L.green), 0.27 (L.green), 0.42 (L.green), 0.78 (L.green), 0.83 (L.green), 0.89 (D.green). The visualization under long UV light showed seven prominent spots at R_f 0.12 (F.blue), 0.19 (F.blue), 0.42 (F.blue), 0.52 (F.blue), 0.68 (F.blue), 0.83 (F.blue), 0.94 (F.blue). After derivatisation it showed eight prominent spots at R_f 0.06 (Purple), 0.12 (Purple), 0.44 (Purple), 0.52 (Purple), 0.68 (Purple), 0.74 (Purple), 0.81(Purple), 0.87 (Purple). Densitometric scan of the plate at 254nm showed nine peaks among which prominent ones were at R_f 0.04 (36.58%), 0.13 (10.99%) and 0.49(18.0%), at 366 nm there were total of eight peaks evident among these major ones are at R_f 0.17 (8.36%), 0.49(7.19), after derivatization when the plate was scanned at 620nm total of eight peaks identified among which at R_f 0.05 (33.61%), 0.15 (19.79%) and 0.93 (16.87%) are major according to height and area of the constituents.

CONCLUSION

Mahaushadhi kwatha is a kwatha kalpana mentioned in Yoga ratnakara amavata chikitsa. The preparation includes simple pharmaceutical procedures with cost effective and readily available drugs. Most of the active principles of the ingredients are water soluble in nature. These active principles are the one which are responsible for the effect of formulation in specific disease condition. By conducting various physical and analytical studies the formulation can be standardized and can be put into clinical practise. In this article, the physical and analytical studies were performed for the standardization of Mahaushadhi kwatha. As the analytical values of Mahaushadhi kwatha are not mentioned in any of the authoritative books, these parameters can be taken as the preliminary standards for the formulation.

MONOGRAPH OF MAHAUSHADHI KWATHA

Definition:

Mahaushadhi kwatha is a kwatha preparation which is one among the five primitive preparations of Ayurveda

formulary prepared with the following ingredients.

Formulation composition

Shown in **Table 4**.

Method of preparation:

Procure the raw materials of pharmacopeial quality.

Wash and dry the raw materials numbered 1 and 2 and pass through sieve no 44 to obtain a coarse powder.

Add the specified amount of water into the coarse powder and soak it overnight.

Boil the contents on medium flame till the aqueous part is reduced to $1/4^{th}$ of the total.

Filter the contents through a muslin cloth.

Transfer the filtrate to amber coloured airtight bottles of desired capacity.

Description:

Mahaushadhi kwatha is a brownish liquid with fine starchy precipitates, with characteristic odour and taste of the ingredients predominantly of ginger (taste: astringent-pungent taste).

Identification:

Sample of Mahaushadhi kwatha-10 ml was partitioned with 20.0ml of butanol. Butanol fraction thus collected was reduced to 10.0ml. 4 and 8µl of each of the above extract was applied on a pre-coated silica gel F_{254} on aluminium plates to a band width of 7 mm using Linomat 5 TLC applicator. The plate was developed in Toluene: Ethyl acetate: Acetic acid: water (3.0: 3.0: 0.8: 0.2). The developed plates were visualized under short UV, long UV and then derivatised with vanillin sulphuric acid (VSA) and scanned under UV 254nm, 366nm, 620nm. Rf, colour of the spots and densitometric scan were recorded.

The plates were then visualized under short UV light, which showed seven prominent spots at Rfvalues 0.06 (L.green), 0.09 (L.green), 0.27 (L.green), 0.42 (L.green), 0.78 (L.green), 0.83 (L.green), 0.89 (D.green). The visualization under long UV light showed seven prominent spots at Rf 0.12 (F.blue), 0.19 (F.blue), 0.42 (F.blue), 0.52 (F.blue), 0.68 (F.blue), 0.83 (F.blue), 0.94 (F.blue). After derivatisation it showed eight prominent spots at Rf0.06 (Purple), 0.12 (Purple), 0.44 (Purple), 0.52 (Purple), 0.68 (Purple), 0.74 (Purple), 0.81 (Purple), 0.87 (Purple).

Physico-chemical parameters

Shown in **Table 5**.

Storage:

Store in a dry and clean place in a tightly closed amber coloured bottle away from direct sunlight.

Therapeutic uses: Amavata

Dose:

15-30 ml orally with equal quantity of water thrice a day after food.

Table 4: Formulation composition

S. No.	Name of the drug	Latin name	Part used	Quantity
1	Guduchi	*Tinospora cordifolia*	Stem	14kg
2	Shunti	*Zingiber officinalis*	Rhizome	14kg
3	Jala	Water	-	160 L

Table 5: Physico-chemical parameters

Parameter	Results n = 3 %w/w
	Mahaushadhi kwatha
Refractive index	1.34079
Specific gravity	1.044
Viscosity	1.78
Total solids (%)	90.68
pH	6.00

REFERENCES

[1] Sastri VL. Amavatachikitsa, verse-09. In: Sastri B (editor). Yogaratnakara. Varanasi: Chaukhamba Sanskrit Sansthan, 1999; p.567.

[2] Ali BH *et al*, Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): A review of recent research. Food and chemical toxicology. [Internet]. 2007-09-18 [cited2020-02-18]; Volume, 46, Issue 2. p. 409-420. https://www.ncbi.nlm.nih.gov/pubmed/17950516

[3] Singh S.S, Pandey S.C, Srivastava. S, Gupta V.S, Patro. B, Gosh A. C. Chemistry and medicinal properties of *Tinospora cordifolia* (Guduchi). Indian journal of Pharmacology [Internet]. 2002-09-09 [cited 2018-03-04]; Volume 35: 83-91.http: //medind.nic.in/ibi/t03/i2/ibit03i2p83.pdf

[4] Gupta, Sushila & Singh, Ranjit & Ashwlayan, Vrish. (2011). Pharmacological activity of *tinospora cordifolia*. Pharmacology online. [Internet]. Jan 2011 [cited 2020-02-19] Issue1. p. 644-52. https://www.researchgate.net/publication/317032866_PHARMACOLOGICAL_ACTIVITY_OF_TI_OSPORA_CORDIFOLIA/citation/download

[5] Sharangadhara. Kwathakalpana (chapter No-2), verse-03. In: Srivastava S (editor). Sharang-adhara Samhita. Varanasi: *Chaukhambha orientalia*. 2003, Madhyama khanda; p. 135.