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Phytochemical Evaluation of Lekhaniya Mahakashaya Ghana – A Polyherbal Formulation



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ABSTRACT

Background: The prevalence of Obesity is increasing day by day in India and other parts of the world very abruptly. An approach for formulations with the assurance of good quality, without side effects and managing obesity in a holistic way is needed. *Lekhaniya Mahakashaya* is an Ayurvedic polyherbal formulation, a group of ten drugs indicated in *Sthaulya (Obesity)*. *Lekhaniya Mahakashaya Ghana*, was prepared to prolong the shelf life of the *Kwatha*(Decoction) form of *Lekhaniya Mahakashaya Gana*. **Objective:** The present study aims for phytochemical analysis of *Lekhaniya Mahakashaya Ghana* Powder. **Material and methods:** *Lekhaniya Mahakashaya Ghana* Powder was prepared from *Lekhaniya Mahakashaya* using *Rasakriya* method. Then LMG powder was subjected for phytochemical analysis along with the High-end instrument analysis HPTLC. **Result and Discussion:** LMG Powder showed secondary metabolites such as Flavonoids, Alkaloids, Steroids, Cardiac glycosides, pH 4.52 which is weakly acidic in nature, LOD 12.013%, TA 6.7955, AIA 0.884%, WSA, 4.8335, WSE58.03%. This extractive value is in much amount can be due to LMG powder is due to it is concentrated aqueous extract and it is completely soluble in water. **Conclusion:** The present analysis reveals that LMG powder is weakly acidic and is showing the presence of all the secondary metabolites having hypolipidemic activity. HPTLC provides the fingerprinting of LMG powder.



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INTRODUCTION

Traditional health-care systems in our country have existed for centuries¹. Modern science can be used to investigate Ayurvedic effective compositions. It is a natural and holistic approach to physical and mental health, as well as disease prevention and management. The World Health Organization has recently recognized Ayurveda².

*Lekhaniya Mahakashaya*³, LM (Decoction) consists of a group of ten drugs (Table no.1). *Panchvidha Kashaya Kalpana* has a shorter shelf life so the utility has been limited to a minimal time. Keeping in concern the compliance of the patient, and shelf life there is the need to preserve it with a longer shelf life so it was converted into *Ghana* form. While increasing the shelf life and compliance with the patient, active constituents of a formulation should not be altered or vanished making it less therapeutic. So, this study aims for the phytochemical evaluation of the *Lekhaniya Mahakashaya Ghana*.

MATERIALS AND METHODS

Raw Material Collection:

To prepare *Lekhaniya Mahakashaya* First, Raw ingredients were taken in the ratios and used parts as shown in Table No.1, were procured from KAHER's Shri BMK *Ayurveda Mahavidyalaya*, Belagavi. Authentication of raw ingredients was carried out at Drug Testing Laboratory (DTL) for ASU drugs approved by AYUSH and GOI, KAHER's Shri BMK *Ayurveda Mahavidyalaya*. Procured excipients and chemicals from KLE College of Pharmacy, Nehrunagar, Belagavi.

Table No. 1: Ingredients of *Lekhaniya Mahakashaya* with parts used and proportion.

S.No.	Ingredients	Botanical name	Part used	Proportion
1.	<i>Mustaka</i>	<i>Cyperus rotundus</i> Linn.	Tuber	1 part
2.	<i>Kushtha</i>	<i>Saussurea lappa</i> C.B. Clarke	Root	1 part
3.	<i>Haridra</i>	<i>Curcuma longa</i> Linn.	Rhizome	1 part
4.	<i>Daruharidra</i>	<i>Berberis aristata</i> D.C.	Root/stem	1 part
5.	<i>Ativisha</i>	<i>Aconitum heterophyllum</i> Wall.	Root	1 part
6.	<i>Katurohini</i>	<i>Picrorhiza kurroa</i> Royle Ex. Benth.	Root	1 part
7.	<i>Chitraka</i>	<i>Plumbago zeylanica</i> Linn.	Root bark	1 part
8.	<i>Chirbilwa</i>	<i>Holoptelea integrifolia</i> planch.	Bark, leaf	1 part
9.	<i>Vacha</i>	<i>Acorus calamus</i> Linn.	Rhizome	2 parts

Preparation of *Lekhaniya Mahakashaya*⁴

Coarse powder of *Lekhaniya Mahakashaya* was taken and soaked in water overnight, boiling was carried out in 16 times water and reduced to 1/8th in an open Stainless steel vessel, the prepared decoction is then sieved and kept for further process.

Preparation of *Lekhaniya Mahakashaya Ghana Powder*⁵

The *Lekhaniya Mahakashaya Ghana*, LMG was prepared by reheating the decoction at a temperature of 60-70 °C till it is devoid of water. The obtained semisolid *Ghana* was Dried further in the sunlight until it is completely dry and then it was powdered, sieved, and stored in an airtight container.

Physicochemical Analysis⁶

Organoleptic characteristics, Loss on drying (LOD), Total Ash value (TA), Acid insoluble ash (AIA), Water-soluble ash (WSA), Water Extractive value (WSE), and pH, were assessed and a standard procedure was followed.

Particle size: Particle size is directly related to the bioavailability of the drug. Particle size was analyzed under the high-power electronic Microscope.

Phytochemical analysis⁷: Organic Phytochemicals were performed on 5% aqueous solution of the LM Ghana Powder.

HPTLC: High-Performance Thin Layer Chromatography analysis was carried out at CMPR, Arya Vaidya Sala, Kottakkal, Kerala. The stationary phase and mobile phase used were Aluminum plate precoated with silica gel 60 F254 of 0.2 mm thickness and Toluene:Ethyl acetate:Methanol: Formic acid in a ratio of 6:4:1:0.5 respectively.

RESULTS

Table No.02: Organoleptic characters of LMG powder

S.No	Color	Odor	Taste	Form
1.	Dark Brown	Characteristic	Bitter, Astringent	Powder

Table No.03: Physicochemical parameters of LMG powder

S.No	Parameters	Results
1.	Loss on drying	12.013
2.	Total Ash value	6.795%
3.	Acid insoluble ash	0.884%
4.	Water-soluble ash	4.833%
5.	Water-soluble extract	58.038%
6.	Particle Size	24.25micron
7.	pH	4.52

Table No.04: Organic Phytochemicals of Aqueous solution of LMG Powder

S.No	TESTS	LMG Powder
1.	Carbohydrates	P
2.	Reducing sugar	P
3.	Monosaccharides	P
4.	Pentose sugar	A
5.	Hexose	A
6.	Non-Reducing Polysaccharides	A
7.	Proteins	P
8.	Amino acids	P
9.	Steroids	P
10.	Saponin	A
11.	Flavonoids	P
12.	Alkaloids	P
13.	Tannin	P
14.	Cardiac glycosides	P
15.	Anthraquinone glycosides	A

* P – Present, A- Absent.

HPTLC:

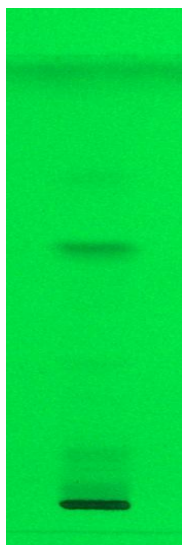


Fig. 01: HPTLC of LMG at 254nm



Fig. 02: HPTLC of LMG at 366nm

HPTLC of LM Ghana has shown peaks at Rf value of 0.05, 0.41, 0.51, 0.92 under UV 366 nm and 0.01, 0.06, 0.08, 0.20, 0.27, 0.35, 0.40, 0.51, 0.66, 0.90 under 264nm.

DISCUSSION

Lekhaniya Mahakashaya Ghana Powder is having organoleptic characteristics nearly similar to that of *Lekhaniya Mahakashaya Kwatha* except for the liquid form. The water extractive value of *Ghana* was found to be 58.03%, hence it will not fully dissolve in the water. This can be due to the heating process some changes might occur at the molecular level of phytoconstituents or physical changes or may be due to tannins which cause the binding of the powder mass together⁸.

The pH was checked to rule out the nature of the solution whether it is acidic/alkaline/neutral. The results of the pH of LMG powder revealed that it is weakly acidic. Particle size is important for maintaining the uniformity of particles. The smaller the size more the bioavailability, to achieve desired drug action drug should first reach the systemic circulation which is enhanced by smaller particle size, and reducing the size of particles may increase the solubility of even poorly soluble drug⁹. Loss on drying of LM Ghana powder was 12.013% this loss can be due to the loss of volatile compounds present in Vacha, Kushtha, Mustaka, Ativisha, Haridra, and Daruharidra.

Secondary metabolites present in LMG Powder are Flavonoids, Alkaloids, Tannins, Cardiac Glycosides, and Steroids, all are having individual actions over obesity directly or indirectly. Flavonoids aids in the regulation of carbohydrate digestion, deposition of adipose, and release of insulin¹⁰. Alkaloids like berberine help to increase brain serotonin levels, which results in lesser food intake and reduces hyperphagia and increase in weight¹¹. Tannins suppresses the accumulation of lipids intracellularly by showing inhibition of fatty acid synthase which further doesn't allow the differentiation of pr-adipocytes¹².

HPTLC is an analytical technique based on the principles of thin layer chromatography, but it is enhanced to have more resolution of compounds to be separated and allow their quantitative analysis¹³. The HPTLC analysis of LMG powder showed a total of 4 peaks under UV 366nm and 10 peaks under UV 254nm. Out of which maximum quantity of compound was found at 0.92 Rf value in UV 366nm and the large quantity of compounds present at Rf value 0.51, 0.90, 0.66 in UV 254nm.

CONCLUSION

The physicochemical analysis of *Lekhaniya Mahakashaya Ghana* Powder revealed that it is weakly acidic. The presence of Flavonoids, Alkaloids, Steroids, Cardiac glycosides, and Tannins was seen which are beneficial for managing Obesity. HPTLC analysis of LMG powder has provided 4 peaks in 366nm and 10 peaks in 254nm. The *Lekhaniya Mahakashaya Ghana* Powder, a potent ayurvedic formulation having the major drawback of its shelf life can be an alternative way, without any side effects to manage obesity, the mother of all other diseases in a holistic manner.

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