ORIGINAL ARTICLE

Quality Control Evaluation of An Ayurvedic Herbomineral Compound – *Mukkadi Bidalaka*

Sangita Kamaliya¹, Neethu Kesavan², D.B. Vaghela³

^{1,2} PhD scholar Dept. of Shalakya Tantra, ³ Asso. Prof. and I/C HOD, Dept. of Shalakya Tantra, Institute of Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India.

ABSTRACT:

Background: *Mukkadi Bidalaka Yoga* is a herbomineral compound which is claimed to be effective in *Madhumehajanya Timira* (Diabetic Retinopathy). In present study, it has been used for *Bidalaka Karma*. **Objective:** Present study was designed to watch out on herbal and mineral drugs used in the preparation of *Mukkadi Bidalaka Yoga* to assess the quality, purity, safety and efficacy of the drug by pharmacognostical (microscopic) study, physicochemical study and chromatographic evaluation. **Methods:** Pharmacognostical study i.e. morphological characters, organoleptic characters and powder microscopy was done for identification and authentication of all the raw drugs. Physicochemical study and HPTLC of final product were done. **Results:** Pharmacognostical characters of *Mukkadi Bidalaka* observed under the microscope were epicarp cells and lignified stone cell of *Haritaki*, Trichome and lignified scleroids of *Bibhitaki*, Scleroids, silica deposition of *Amalaki*, Parenchyma cells and starch grain of *Haridra*, Prismatic crystal, pitted vessels and fibers of *Daruharidra*, Cork cells of *Nimba*, Brown content of *Sariva*, Trichome, oil globule of *Usheera*, Stone cells, scleroids, prismatic crystal and fibers of *Lodhra*, Cork cells, fibers and stone cells of *Vata*, Parenchyma cells and oil globule of *Durva*, Border pitted vessels, lignified stone cells oil globule and lignified fiber passing through medullary rays of *Chandana*, Particles of *Girika*. Border pitted vessels, lignified fiber, lignified fiber passing through medullary rays of *Raktachandana*. Pharmaceutical evaluation of *Mukkadi Bidalaka Yoga* showed results loss on drying at 110°C 5.85 % w/w, pH value 6.0, water soluble extract 21.60% w/w, methanol soluble extract 14.28% w/w, Ash value 3% w/w acid insoluble ash 0.39% w/w. High Performance Thin Layer Chromatography result shows 9 spots at 254 nm and 7 spots at 366 nm. **Conclusion:** Identification and authentication of herbal drug used in the preparation of *Mukkadi Bidalaka Yoga* was done. Pharmacognostical, physicochemical and HPTLC evaluation of prepared drug has been carried out.

KEYWORDS: Diabetic Retinopathy, *Mukkadi Bidalaka*, Pharmacognostical, Standardization

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*Corresponding Author:

Dr. Sangita Kamaliya

PhD scholar Dept. of Shalakya Tantra, Institute of Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India.

E-mail: sokamaliya@gmail.com

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INTRODUCTION

Mukkadi Bidalaka Yoga is one of the herbomineral formulations explained in Ayurvedic text *Sahasrayogam*, a popular text in Malayalam language.¹ This herbomineral formulation contains *Triphala*, *Shweta Chandana*, *Rakta Chandana*, *Haridra*, *Daruharidra*, *Lodhra*, *Sariva*, *Vata*, *Durva*, *Ushira*, *Nimba* and *Gairika*. *Mukkadi Bidalaka Yoga* is for *Bidalaka Karma* described in *Urdwanga Roga Chikitsa* under the *Vartmaroga Chikitsa Prakarana* of *Sahasrayogam* text. *Bidalaka* means application of medicated paste over the eye lid excluding eyelashes.² It is indicated in *Amaja Avastha* of *Netra Roga*.³ It is an inflammatory ocular condition characterized by *Ruja* (pain), *Rakta* (redness), *Shophya* (swellings), *Srava* (discharges) etc.⁴ The contents having properties to pacifying vitiated *Pitta* and *Rakta* and majority have haemostatic activity. Hence, based on its pharmacological properties, it has been selected for transdermal absorption in Diabetic Retinopathy to overcome hemorrhages, exudates and edema from the retina occurs due to poorly controlled blood sugar in diabetic patients.⁵

Standardization of the drug is very essential to evaluate the quality of drug. For this, present study was planned to develop quality parameters of *Mukkadi Bidalaka Yoga* on the basis of pharmacognostical, physicochemical and HPTLC study according to Ayurvedic Pharmacopoeia of India (API), pharmacognostical study and physicochemical analysis of the *Choorna yoga*.⁶

the which is useful for future reference.

MATERIALS AND METHOD

Collection of row drugs

Most of the raw drugs for *Mukkadi Bidalaka Yoga* were procured from the Pharmacy of Gujarat Ayurved University, Jamnagar. *Vatankuras* were collected from local area of Jamnagar. All the row drugs were identified, authenticated and certified according to the guideline of Ayurvedic pharmacopoeia of India⁷, by individual powder microscopy in the department of pharmacognosy I.P.G.T. & R.A., Jamnagar.

Table 1: Contents of modified *Mukkadi Bidalaka Yoga*

S.No.	Drug	Botanical/Latin name	Parts used	Quantity
1	<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Dried Fruit without Seed	1 Part
2	<i>Amalaki</i>	<i>Phyllanthus emblica</i> Linn.	Dried Fruit without Seed	1 Part
3	<i>Bibhitaki</i>	<i>Terminalia bellerica</i> Roxb.	Dried Fruit without Seed	1 Part
4	<i>Shuddha Gairika</i>	Red ochre FeO	Mineral	1 Part
5	<i>Shweta Chandana</i>	<i>Santalum album</i> Linn.	Heart Wood	1 Part
6	<i>Rakta Chandans</i>	<i>Pterocarpus santalinus</i>	Heart Wood	1 Part
7	<i>Haridra</i>	<i>Curcuma longa</i> Linn.	Rhizome	1 Part
8	<i>Daruharidra</i>	<i>Berberis aristate</i>	Rhizome	1 Part
9	<i>Lodhra</i>	<i>Symplococcus racemosus</i> R Br	Stem Bark	1 Part
10	<i>Sariva</i>	<i>Hemidesmus indicus</i> R Br	Root	1 Part
11	<i>Vata</i>	<i>Ficus bengalensis</i>	Leaf Bud	1 Part
12	<i>Durva</i>	<i>Cynodon dactylon</i>	Whole Plant	1 Part
13	<i>Ushira</i>	<i>Vetivera zizanoidis</i> Linn.	Root	1 Part
14	<i>Nimba</i>	<i>Azadirachta indica</i> Juss.	Leaves	1 Part

Preparation of drug

After getting all the row drugs of *Mukkadi Bidalaka Yoga*, it was dried and powdered separately and the powder was sieved through mesh size 85. All the drugs were taken in equal quantity and mixed together and packed into sterile jar.

Organoleptic study

Organoleptic parameters like colour, odour, texture, touch and taste of the finished products were observed and recorded.⁸ It was done by *Panchagyanendriya* (Examination by the sense Organs) *Pariksha*.

Microscopy study

Powder microscopy study of selected drug were done separately with and without stain. Drugs were studied under the Carl Zeiss Trinocular microscope attached with camera and the microphotographs were taken under the microscope.⁹

Physicochemical parameters

Physiochemical parameters i.e. loss on drying,¹⁰ pH value,¹¹ water soluble extract,¹² methanol soluble extract,¹³ ash value¹⁴ and HPTLC as per Ayurvedic Pharmacopeia of India and CCRAS¹⁵ guidelines at the pharmaceutical chemistry laboratory, IPGT & RA, Jamnagar.¹⁶

High Performance Thin Layer Chromatography (HPTLC)

Methanol extract of *Mukkadi Bidalaka Yoga* spotted on pre coated silica gel GF 254 aluminum plates by means of CAMAG Linomate V sample applicator fitted with a 100 µL Hamilton syringe. The mobile phase consisted of Toluene, Ethyl acetate and Acetic acid in a ratio of 7:2:1 v/v. After development densitometric scan was performed with a CAMAGT. L. C. scanner III in reflectance absorbance mode at 254 and 366nm under control of Win CATS Software.¹⁷

OBSERVATIONS AND RESULTS

Organoleptic Characters:

Organoleptic characters like colour, odour, taste, touch and texture of *Mukkadi Bidalaka Yoga* are shown in Table 2.

Table no. 2 : Organoleptic Characteristics of *Mukkadi Bidalaka Yoga*

S. N.	Characteristics	Results
1	Colour	Reddish Brown
2	Odour	Characteristic
3	Taste	Astringent
4	Touch	Soft
5	Texture	Fine

Microscopic Characters

Pharmacognostical characters of *Mukkadi Bidalaka Yoga* observed under the microscope were epicarp cells and lignified stone cell of *Haritaki*, Trichome and lignified scleroids of *Bibhitaki*, Scleroids, silica deposition of *Amalaki*, Parenchyma cells and starch grain of *Haridra*, Prismatic crystal, pitted vessels and fibers of *Daruharidra*,

Cork cells of *Nimba*, Brown content of *Sariva*, Trichome, oil globule of *Usheera*, Stone cells, scleroids, prismatic crystal and fibers of *Lodhra*, Cork cells, fibers and stone cells of *Vata*, Parenchyma cells and oil globule of *Durva*, Border pitted vessels, lignified stone cells oil globule and lignified fiber passing through medullary rays of *Chandana*, Particles of *Gairika*. Border pitted vessels, lignified fiber, lignified fiber passing through medullary rays of *Raktachandana*. Details of which are depicted in plate no: 1.

Physicochemical analysis:

Result of physicochemical analysis of *Mukkadi Bidalaka Yoga*; Loss on drying, Ash value, Acid insoluble ash, water soluble extract, methanol soluble extract and pH are shown in Table 3.

Table 3 : Physico-chemical parameters:

S. N.	Parameters	Result
1	Loss on Drying	5.85 % w/w
2	Ash Value	3% w/w
3	Acid Insoluble Ash	0.39 % w/w
4	Water Soluble Extract	21.60% w/w
5	Methanol Soluble Extract	14.28 % w/w
6	pH	6.0

High performance thin layer chromatography (HPTLC):

Chromatographic study (HPTLC) study was carried out using methanolic extract of *Mukkadi Bidalaka Yoga* and the spots were detected under 254 nm and 366 nm. Densitometric scan reveals 9 R values (0.01, 0.06, 0.13, 0.20, 0.24, 0.72, 0.75, 0.82, 0.88) at 254 nm and 7 R, values (0.01, 0.06, 0.16, 0.19, 0.24, 0.43, 0.75) at 366 nm, being the peaks detected. *Mukkadi Bidalaka Yoga* having more than one ingredient and qualitative HPTLC fingerprinting can be used to develop quality standards for the formulation. Detailed results are shown in the table 4. (Plate no. 2)

Table 4 : HPTLC Results of *Mukkadi Bidalaka Yoga*

Sample	Detection Condition	No. of spots	Rf value
<i>Mukkadi Bidalaka</i>	254 nm	9	0.01, 0.06, 0.13, 0.20, 0.24, 0.72, 0.75, 0.82, 0.88
	366nm	7	0.01, 0.06, 0.16, 0.19, 0.24, 0.43, 0.75

DISCUSSION

For the quality evaluation of *Mukkadi Bidalaka Yoga*, possible and suitable techniques were taken in the present study. Organoleptic characters like odour, colour, touch, taste and texture of *Mukkadi Bidalaka Yoga* are according to the raw drugs, used in preparation of drug. The *Mukkadi Bidalaka Yoga* is reddish brown, astringent due to tannins, soft and fine powder with characteristic odour. Authentication of used drugs was done by histological and morphological examination to prevent misuses of drug adulteration. The pharmacognostical evaluation showed microscopic characters of all the content which were used in drug preparation. This can prove the quality and authenticity of finished product.

Loss on drying indicates the presence of moisture content in the sample when it dried at 105 C. It was found 5.85%w/w, prevent the bacterial, fungal and yeast infection in finished product. Ash value is important qualitative standards to for determining authenticity and purity of sample. Ash value of the sample is 3.0 % w/w indicates best drug action and effects. 6 pH of test drug indicates its acidic nature. Water-soluble and methanol soluble extractive value plays an important role in evaluation of crude drugs. Less extractive value indicates addition of exhausted material, adulteration or incorrect processing during drying or storage or formulating and for this sample it was 21.60% w/w and 14.28%w/w respectively within the limit. The acid insoluble ash is the part of the total ash which is insoluble in diluted hydrochloric acid. The ash or residue yielded by an organic chemical compound is as a rule, a measure of the amount of inorganic matters present as impurity. For test drug acid insoluble ash was 0.39%w/w proves the purity of drugs.

Chromatographic study (HPTLC) of *Mukkadi Bidalaka Yoga* under 254nm and 366nm, it showed 9 spots and 7 spots respectively (Table 4., Plate no. 2). It indicates its possible compounds of the matrix which may be responsible for its therapeutic activity. These findings could be helpful in identification and authentication of the drug.

CONCLUSION

Present study reveals that selected formulation has a quality as per pharmacognostical and pharmaceutical parameters. It helps to give a justification for the quality and authenticity of formulation and meets up to the maximum standards of

the drug. HPTLC study results suggest presence of active herbal drug in the formulation. On the basis of observations and experimental results, this study may be used as reference standard in the further quality control research work and clinical studies.

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Plate 1. Powder microscopic photographs of *Mukkadi Bidalaka Yoga*

Plate 2. HPTLC of methanolic extract of *Mukkadi Bidalaka Yoga* observed under short UV Light:

Peak display at 254 nm

Peak display at 366 nm