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Preliminary pharmaceutico-analytical study of *Mukhadooshikaharalepa Churna*

Research Article

Ambika S[1*], Gazala Hussain[2]

1. PG Scholar, 2. Associate Professor, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan.

Abstract

Introduction: *Lepa* is a *bahirparimarjana chikitsa* that helps in *bringing samyata* in *sthanika dosha* and *dhatu.* Many *lepa* are mentioned in Ayurveda pharmaceutics for the treatment of *mukhadooshika*. Among it, one is a combination of *Lodhra, Kustumburu, Vacha, Vatapallava*, and *Narikelashuktya. Mukhadooshika* is a type of *kshudraroga,* featuring the formation of *pidaka* on face. The symptoms of *mukhadooshika* resembles with acne vulgaris. Aim: An attempt is made to analyze the physico-chemical parameters of the *mukhadooshikahara lepa churna*. Materials and methods: The pharmaceutical preparation is easy and simple with easily available ingredients. The organoleptic characters like appearance, odour, taste and physico-chemical parameters like pH, total ash. Water Soluble ash, Alcohol soluble extractives, Water soluble extractives, loss on drying and HPTLC were carried out. Observations and results: The obtained results were discussed in the present paper. Discussion and conclusion: *Mukhadooshikahara lepa churna* is a simple preparation and can be prepared by easily available drugs. HPTLC fingerprinting at different wavelengths was carried out. At 254 nm, 366nm and 620nm 11, 8 and 10 peaks were found with different retention factor starting from 0.02 to 0.80, 0.03 to 0.096 and 0.07 to 0.80respectively. The analytical study findings can be taken as a preliminary standard for *mukhadooshikahara lepa churna.*

Key Words: *Lepa, Mukhadooshika, Kshudraroga*, Ayurveda Pharmaceutics.

Introduction

Topical applications have been given significance in Ayurveda therapeutics and its emphasis is seen in classical texts of Ayurveda. *Lepa* is a *bahirparimarjana chikitsa* that helps in bringing *samyata* in *sthanika dosha* and *dhatu* (1)

Many *lepa* are mentioned in Ayurveda pharmaceutics for the treatment of *mukhadooshika*. Among it, one is a combination of *Lodhra, Kustumburu, Vacha, Vatapallava*, and *Narikelashuktya* (2) (Table 1).

Mukhadooshika is a type of *kshudraroga*, featuring the formation of *pidaka* on face (3). The symptoms of *mukhadooshika* resembles with acne vulgaris.

Wide range of treatment exists for Acne vulgaris which include both topical application and oral medicine. But side effects like skin irritation, contact dermatitis, photo sensitivity by topical application are often noticed. So there is an intense need for potential, well tolerated treatment which can limit the disease without affecting the beauty and reduce its psychological impact. While mentioning the treatment modalities for *Mukhadhooshika* all the *Acharya* of Ayurveda have given importance for *lepa* (4)

Hence an attempt is made to analyze the physico-chemical parameters of *the mukhadooshikahara lepa churna*.

*** Corresponding Author:**

Ambika S

Post Graduate Scholar,

Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda Hospital, Hassan. India

Email Id: ambikasudarshan152@gmail.com

Materials and Methods

Pharmaceutical study

Place of collection of Ingredients

Lodhra, vacha and *dhanyaka w*ere collected from CKKM Pharmacy, Kerala and *vatapallava* and *narikelashuktya* from local drug vendor Chikmagalore.

Authentication of Ingredients

The ingredients *Lodhra, vacha* and *dhanyaka* were authenticated from CKKM Pharmacy Kerala and *vatapallava* and *narikela shuktya* were authenticated from the *Dravya Guna* Department, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka. Authentication was done based on macroscopic and microscopic characters, organoleptic features as well as morphological appearance.

Place of study

Teaching pharmacy, Dept. of *Rasashastra* and *Bhaishajya Kalpana*, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka.

Mukhadooshika lepa churna was prepared in a single batch in following method.

Materials

Apparatus: *Khalva yantra* (Mortar-pestle), *Patra* (Vessel), *Darv*i (Spoon), *Tula yantra* (Weighing machine), Sieve, Tray, and Mixer.

Method

Raw Ingredients (Fig 1) of *Mukhadooshika hara lepa* were taken in equal quantity (Table 1). Ingredients were pounded separately (5). Ingredients were sieved to obtain coarse powder of churna.(Fig 2)

Table 1: Ingredients with quantity

Sl.No	Sanskrit Name	Botanical Name	Part Used	Quantity
1	*Lodhra*	*Symplocos racemosa* Roxb.	Bark	200g
2	*Kustumburu*	*Coriandrum sativum* Linn.	Dried seeds	200g
3	*Vacha*	*Acorus calamus* Linn.	Rhizome	200g
4	*Vata*	*Ficus benghalensis* Linn.	Tender leaves	200g
5	*Narikela*	*Cocos nucifera* Linn.	Inflorescence	200g

Fig 1: **Raw ingredients of *mukhadooshikahara lepa curna***

Lodhra	***Vacha***	***Dhanyaka***	***Vatapallava churna***	***Narikelashuktya churna***

Fig 2: preparation of *mukhadooshikahara lepa curna*

Lodhra Churna	***Vacha Churna***	***Dhanyaka churna***	***Vatapallava churna***	***Narikelashuktya churna***

Precautions taken

The ingredients were dried to avoid moisture content. The spilling of drug was avoided while triturating.

Analytical study

Mukhadooshikahara lepa churna was analyzed by following parameters as per the references available in protocol for testing published by CCRAS

- Morphological evaluation- Organoleptic characters
- Physico-chemical evaluation – Total ash, Acid insoluble ash, Water Soluble ash, Alcohol soluble extractives, Water soluble extractives, pH and HPTLC

Place of study

SDM Research Centre of Ayurveda and Allied sciences, Udupi, Karnataka

Date of study: 10-12-2020 to 25-01-2020

- **Organoleptic characters**: This test was done for *mukhadooshikahara lepa churna.*
- **Materials:** *Mukhadooshikahara lepa churna*
- **Method:** Here, Colour and odour of the samples were examined.

Physico-chemical parameters:

Total Ash (6)

- **Materials:** Platinum/ silica dish, Crucible, Muffle furnace, Weighing balance, Ashless Filter paper, *Mukhadooshikahara lepa Churna*
- **Method:** 2 g of sample was incinerated in a tarred platinum crucible at temperature not exceeding 450˚C until carbon free ash was obtained. Percentage of ash was calculated with reference to weight of the sample.

Acid insoluble Ash (7)

- **Materials:** Beaker, Crucible, Ash less filter paper, Hot plate, Muffle furnace, Desiccators, dil. HCl, *Mukhadooshikahara lepa Churna*
- **Method:** To the crucible containing total ash, 25ml of dilute HCl was added. The insoluble matter was collected on ash less filter paper (Whatman 41) and washed with hot water until the filtrate was neutral. The filter paper containing the insoluble matter was transferred to the original crucible, dried on a hot plate and ignited to constant weight. The residue was allowed to cool in suitable desiccators for 30 min and weighed without delay. The content of acid insoluble

ash was calculated with reference to the air dried drug.

Alcohol soluble extractive (8)

- **Material:** Conical flask, Crucible, Hot air oven, Distilled alcohol, *Mukhadooshikahara lepa Churna*
- **Method:** 4 g of the churna was weighed accurately in a glass stoppered flask. 100 ml of distilled Alcohol (approximately 95%) was added and shaken occasionally for 6 hours. It was allowed to stand for 18 hours. Later, it was filtered rapidly taking care not to lose any solvent. 25ml of the filtrate was pipetted out in a pre-weighed 100 ml beaker. It was evaporated to dryness on a water bath. Later, it was kept in an air oven at 105^{0}C for 6 hours, cooled in desiccators for 30 minutes and weighed. The percentage of Alcohol extractable matter of the sample was calculated. The experiment was repeated twice, and the average value was taken.

Water soluble extractive (9)

- **Material:** Conical flask, crucible, hot air oven, distilled water, *Mukhadooshikahara lepa Churna*
- **Method:** 4 g of the curna was weighed accurately in a glass stoppered flask. 100 ml of distilled water was added, shaken occasionally for 6 hours. It was allowed to stand for 18 hours. Later, it was filtered rapidly taking care not to lose any solvent. 25ml of the filtrate was pipetted out in a pre-weighed 100 ml beaker and evaporate to dryness on a water bath. It was kept in an Hot air oven at 105°C for 6 hours, cooled in a desiccator and weighed. The experiment was repeated twice. The average value was taken.

•Determination of pH (10)

- **Material:** pH meter, Distilled water, *Mukhadooshikahara lepa Curna*
- **Method:** Preparation of buffer solutions:
- Standard buffer solution: Dissolved 1g of mukhadooshikahara lepa churna of pH 4, 7 and 9.2 in 100 ml of distilled water.
- Determination of pH: 1 ml of sample was taken and made up to 10 ml with distilled water, stirred well and filtered. The filtrate was used for the experiment. Instrument was switched on. 30 minutes time was given for warming pH meter. The pH 4 solution was first introduced and the pH adjusted by using the knob to 4.02 for room temperature 30°C. The pH 7 solution was introduced and the pH meter adjusted to 7 by using the knob. The pH was introduced in 9.2 solutions and checked the pH reading without adjusting the knob. Then the sample solution was introduced and reading was noted. Repeated the test four times and the average reading were taken as result.

•Loss on drying (11):

- **Material:** Drying dish, Hot air oven, *Mukhadooshikahara lepa Churna*
- A sample of 10 grams of the prepared mukhadooshikahara lepa churna were taken in a tarred evaporating dish and dried at 105^{0}C for five hours and weighed. The process of drying and weighing was continued at one-hour interval until difference between two successive weighing corresponded to not more than 0.25%.

• HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY (HPTLC) (12)

- **Material:** weighing balance, distilled ethyl alcohol, water bath, HPTLC applicator, *Mukhadooshikahara lepa Churna*
- **Method:** 1g of Mukhadooshikahara lepa churna was extracted with 10 ml of alcohol. 5 µl and 10 µl of the extract were applied on a pre-coated silica gel F254 on aluminum plates to a band width of 7 mm using Linomat 5 TLC applicator. The plate was developed in Toluene: Ethyl acetate: Formic acid (8: 1: 0.2). The developed plates were visualized in UV 254, 366, after derivatisation with vanillin-sulphuric acid and scanned under UV 254 and 366. RF (Retention factor), colour of the spots and densinometric scan were recorded.

Observations and Results

Pharmaceutical observations and results

This section contains the observation and results made during the preparation of medicine.

Observation of preparation of *mukhadooshikahara lepa Curna*.The ingredients of *mukhadooshikahara lepa* were taken washed and dried. Each washed and dried drug was taken of 200g. Each drug was pounded separately in *khalva yantra* initially after that grinded in mixer to get coarse form. *Lodhra* was hard and difficult to pound because of its fibrous nature and there was more loss compared to other drugs. *Vacha* was comparatively less hard and characteristic odour was observed during churna preparation. *Dhanyaka* was easy to pound and characteristic odour was observed. *Narikela shuktya* was light in weight and having more density and easily pounded. All the individual drug powdered mixed homogeneously and 720g *churna* obtained. The final product of churna was light brown colour with characteristic odour because of *vacha* and *dhanyaka*

Analytical Observations an Results

Table 2: Organoleptic Characters of *Mukhadooshikahara churna*

Sl Num	Organoleptic Characters	*Mukhadooshikahara lepa churna*
1	Colour	Brownish white
2	Odour	Characteristic smell
3	Consistency	Solid
4	Taste	Astringent, pungent

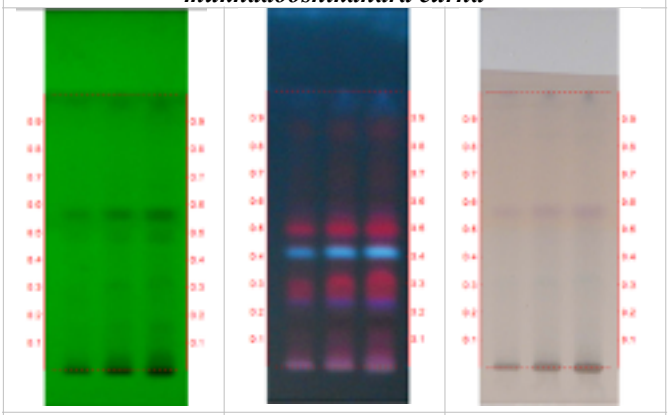
Table 3: Physico-chemical parameters of *Mukhadooshikahara churna*

Parameters	Results n=3 %w/w *Mukhadhooshikahara curna*
pH	5.69
Loss on drying (Avg ± SEM)	7.21 ± 0.01
Total ash (Avg ± SEM)	9.99 ± 0.02

Acid insoluble ash (Avg ± SEM)	1.67 ± 0.02
Water soluble ash (Avg ± SEM)	2.77 ± 0.01
Alcohol soluble extractive (Avg ± SEM)	6.50 ± 0.01
Water soluble extractive (Avg ± SEM)	11.14 ± 0.01

Results of HPTLC

Fig 3: HPTLC photo-documentation ethanol extract *of mukhadooshikahara curna*



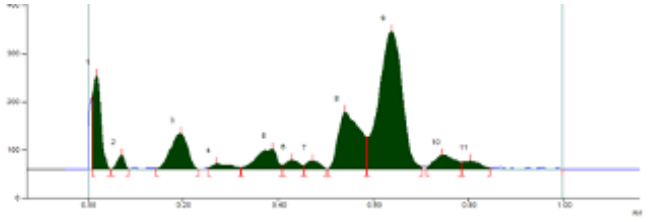
Short UV	Long UV	Under white light (after derivatisation)

Table 4: RF value of *Mukhadooshikahara lepa churna*

Short UV	Long UV	Under white light (after derivatisation)
0.16 (Green)	-	-
-	0.18 (FD. red)	-
-	0.23 (FD. purple)	-
0.30 (Green)	0.30 (FD. red)	0.30 (L. Purple)
-	0.42 (F. blue)	-
0.48 (Green)	-	-
-	0.50 (FD. red)	-
-	0.54 (FD. red)	-
0.58 (D. green)	-	0.58 (D. Purple)

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

Figure 4: Densinometric scan of *Mukhadooshikahara churna* at 254nm

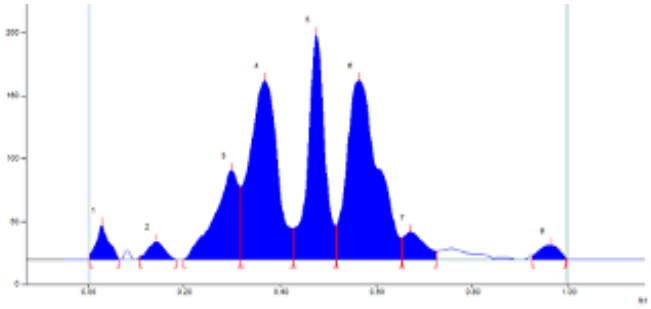


Track: 16, ID: Mukhadooshikahara churna

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	151.6 AU	0.02 Rf	180.9 AU	23.14 %	0.05 Rf	0.5 AU	2461.2 AU	11.12 %
2	0.05 Rf	0.3 AU	0.07 Rf	29.8 AU	3.53 %	0.09 Rf	0.4 AU	325.4 AU	1.47 %
3	0.14 Rf	1.2 AU	0.20 Rf	74.2 AU	8.86 %	0.23 Rf	0.0 AU	1897.1 AU	8.57 %
4	0.25 Rf	3.4 AU	0.27 Rf	11.7 AU	1.40 %	0.32 Rf	3.4 AU	327.9 AU	1.48 %
5	0.32 Rf	3.8 AU	0.39 Rf	41.6 AU	4.97 %	0.41 Rf	6.5 AU	1275.0 AU	5.76 %
6	0.41 Rf	6.7 AU	0.43 Rf	19.2 AU	2.29 %	0.45 Rf	7.9 AU	390.8 AU	1.76 %
7	0.45 Rf	8.1 AU	0.47 Rf	17.7 AU	2.11 %	0.50 Rf	0.5 AU	355.1 AU	1.60 %
8	0.50 Rf	0.4 AU	0.54 Rf	110.2 AU	14.10 %	0.59 Rf	65.9 AU	3884.1 AU	17.54 %
9	0.59 Rf	66.2 AU	0.64 Rf	285.4 AU	34.05 %	0.70 Rf	5.4 AU	9852.2 AU	44.50 %
10	0.71 Rf	5.7 AU	0.75 Rf	29.3 AU	3.49 %	0.79 Rf	15.0 AU	926.7 AU	4.19 %
11	0.79 Rf	15.1 AU	0.80 Rf	17.2 AU	2.05 %	0.85 Rf	2.3 AU	446.8 AU	2.02 %

Peak	Maximum position (Retention Factor)	% Area
1	0.02	11.12
2	0.07	1.47
3	0.20	8.57
4	0.27	1.48
5	0.39	5.76
6	0.43	1.76
7	0.47	1.60
8	0.54	17.54
9	0.64	44.50
10	0.75	4.19
11	0.80	2.02

Figure 5: Densinometric scan of *Mukhadooshikahara churna* at 366nm

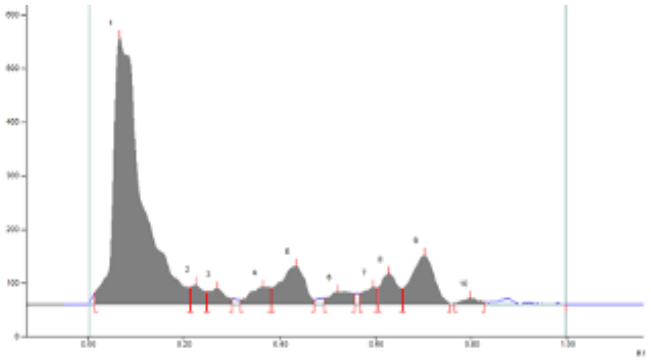


Track: 16, ID: Mukhadooshikahara churna

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	4.6 AU	0.03 Rf	27.4 AU	4.51 %	0.07 Rf	0.2 AU	503.0 AU	2.37 %
2	0.11 Rf	2.1 AU	0.14 Rf	14.0 AU	2.30 %	0.19 Rf	0.0 AU	348.0 AU	1.63 %
3	0.20 Rf	0.1 AU	0.30 Rf	70.5 AU	11.61 %	0.32 Rf	57.4 AU	2534.9 AU	11.94 %
4	0.32 Rf	57.4 AU	0.37 Rf	142.1 AU	23.39 %	0.43 Rf	24.7 AU	5800.6 AU	27.32 %
5	0.43 Rf	24.8 AU	0.48 Rf	176.3 AU	29.36 %	0.52 Rf	27.2 AU	4419.6 AU	20.82 %
6	0.52 Rf	27.4 AU	0.58 Rf	142.1 AU	23.40 %	0.65 Rf	18.9 AU	6598.5 AU	31.07 %
7	0.65 Rf	17.1 AU	0.67 Rf	21.6 AU	3.56 %	0.73 Rf	6.5 AU	683.5 AU	3.22 %
8	0.03 Rf	2.9 AU	0.98 Rf	11.4 AU	1.88 %	1.00 Rf	0.8 AU	345.4 AU	1.63 %

Peak	Maximum position (Rention factor)	% of area
1	0.03	2.37
2	0.14	1.63
3	0.30	11.94
4	0.37	27.32
5	0.48	20.82
6	0.56	31.0
7	0.67	3.22
8	0.96\	1.63

Figure 6: Densinometric scan of *Mukhadooshikahara churna* at 620nm



Track 15, D: Mukhadooshikahara churna

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	21.1 AU	0.07 Rf	486.5 AU	66.35 %	0.21 Rf	30.7 AU	21175.3 AU	65.61 %
2	0.21 Rf	31.2 AU	0.23 Rf	37.1 AU	4.21 %	0.25 Rf	23.2 AU	673.7 AU	2.09 %
3	0.25 Rf	23.6 AU	0.27 Rf	28.5 AU	3.36 %	0.30 Rf	9.7 AU	702.3 AU	2.18 %
4	0.32 Rf	8.1 AU	0.37 Rf	32.2 AU	3.66 %	0.38 Rf	30.5 AU	953.9 AU	2.96 %
5	0.38 Rf	30.2 AU	0.44 Rf	71.3 AU	8.11 %	0.47 Rf	8.6 AU	2561.2 AU	7.94 %
6	0.49 Rf	11.5 AU	0.52 Rf	20.2 AU	2.63 %	0.56 Rf	19.6 AU	800.6 AU	2.48 %
7	0.57 Rf	19.9 AU	0.60 Rf	32.1 AU	3.65 %	0.60 Rf	30.4 AU	647.3 AU	2.01 %
8	0.61 Rf	30.6 AU	0.63 Rf	56.6 AU	6.43 %	0.66 Rf	28.6 AU	1391.0 AU	4.32 %
9	0.66 Rf	28.9 AU	0.70 Rf	90.7 AU	10.32 %	0.76 Rf	0.2 AU	3077.6 AU	9.54 %
10	0.77 Rf	1.1 AU	0.80 Rf	11.3 AU	1.28 %	0.83 Rf	4.3 AU	287.1 AU	0.89 %

Peak	Maximum Position	% Area
1	0.07	65.61
2	0.23	2.09
3	0.27	2.18
4	0.37	2.96
5	0.44	7.94
6	0.52	2.48
7	0.60	2.01
8	0.63	4.32
9	0.70	9.54
10	0.80	0.89

Discussion

Pharmaceutical study

The reference of *Mukhadooshikahara lepa churna* was taken from *Astanga Hrudaya* and the *churna* was prepared out of *Lodhra, Vacha, Dhanyaka, Vatapallava* and *Narikela shuktya*. Raw *vatapallav*a and *Narikela Shuktya* was collected and dried under sunshade to avoid moisture content in final product. *Lodhra, Vacha* and *Dhanyaka* were collected in dry form and washed and dried once again to remove physical impurities. All the raw dried drugs were weighed initially separately in order to calculate loss at the final product**.** Dried *Lodhra* was found difficult to pound and there was loss in the final stage of preparation of *churna d*ue to its fibrous nature**.** Pounding of vacha was comparatively easier than *Lodhra* indicating the hardness of the drug. Aromatic odour was appreciated for vacha and Dhanyaka due to the volatile oils present in the *dravya* and coriandroil**.** Dried vata pallava was light in weight and easy to pound**.** *Narikela shuktya* was light in weight and having more density and easily pounded**.** The final product of all these ingredients were coarse powder and it was brownish white in colour with characteristic odour.

Analytical study

pH

The pH of the *churna* is 5.69 which is weakly acidic. pH as a measure of the hydrogen–ion activity is important from the standpoint of stability or physiological suitability. The optimal pH of face and body lies between 4.7 to 5.75. Hence the churna will not have irritant effect and can be used for external application.

Loss on drying

The value is 7.21 which indicate the moisture content in the churna. Less the moisture content more stable and more moisture and less stable.

Total ash

The value is 9.99 ± 0.02. The residue remaining after incineration is the ash content of the drug. It indicates the purity and identity of raw drugs.

Acid insoluble ash

It is a part of total ash which is insoluble in dilute HCl. In *mukhadooshika hara Lepa churna* 1.67 ± 0.02% will soluble in water.

Water soluble ash

It is a part of total ash which is soluble in water. In *mukhadooshikahara Lepa curna* 2.77 ± 0.01% will soluble in water. These total ash, acid insoluble ash and water soluble ash indicate the purity and identity of raw drugs.

Alcohol soluble extractive

This value is applied for the drugs which contain alcohol soluble constituents such as tannins, resins and alkaloids, thus helps to know active principles. The obtained value is 6.50 ± 0.01%. Lodhra (13), *vacha* (14) and *vatapallava* (15) contains tannins and alkaloids.

Water soluble extractive

Water soluble extractives indicate water soluble constituents such as tannins, sugars, plant acids and mucilage. *Mukhadooshika hara churna* has 11.14 ± 0.01% water soluble extractive because of tannin content in *Lodhra*, *vacha* and *vata* and also due to the mucilage content in vacha.

HPTLC photo documentation:

The prepared *churna* was subjected to HPTLC fingerprinting at different wavelengths (254nm, 366 and 620nm). This study reveals the chemical fingerprint profile of the test samples. In the present study mukhadooshikahara churna was assessed at selected UV regions wavelength (at 254 nm 366 nm & 620nm). The colour spots observed indicates the presence of different components in the sample. It acts as fingerprint of the used sample, which can be used as reference for the preparation of curna. At 254 nm, 366nm and 620nm 11, 8 and 10 peaks were found with different retention factor starting from 0.02 to 0.80, 0.03 to 0.096 and 0.07 to 0.80 respectively. The bands at different Rf value indicate the presence of particular active compounds in *mukhadooshikahara churna.*

Conclusion

Mukhadooshikahara lepa churna is a simple preparation and can be prepared by easily available drugs. In this research work an attempt was made to prepare *the Mukhadooshikahara churna* out of *Lodhra, Vacha, Dhanyaka, Vatapallava* and *Narikela shuktya*. The *Churna* was prepared by general method of preparation of *Churna*. The prepared *Mukhadooshikahara lepa curna* was subjected to organoleptic and analytical study. Analytical studies and HPTLC conducted on the study drug have helped to develop preliminary standards for

Mukhadooshikahara Lepa churna. The results of physico-chemical parameters and HPTLC can be taken as preliminary standards, purity and equinity of *mukhadooshikahara lepa churna*. Number of peaks seen in HPTLC photo documentation can be taken as combination of constituents present in the ingredients of *mukhadooshikahara lepa.*

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