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Modification of *Kakubhadi Churna* into *malahara* and its physicochemical analysis

Research Article

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Abstract

Samskara is the process of modification of *Guna* of a given substance which is responsible for conversion of a raw material into medicine. These *Samskara* are responsible for the change in quality and property of any medicine. Primary preparations of *Bhaisajya Kalpana* known as *Panchavidha kashaya Kalpana* are modified into secondary dosage forms like *Vati, Avaleha, Malahara, Sneha kalpana* etc in order to achieve better shelf life, easy administration and palatability. *Churna kalpana* is an *Upkalapana* of *Kalka kalpana*, it is mentioned to be used in many disease conditions. One among these is *Kakubhadi churna*, which is indicated to be sprinkled externally on *Dushta Vrana*. As this method of application is cumbersome and not patient friendly, an attempt has been made to modify *Kakubhadi churna* into *Malahara*. *Malahara* is similar to ointments and creams in modern pharmaceutics. When compared to *Churna*, it has as an extended shelf life and also drugs in the form of *Malahara* are easy to apply and store. Taking all this under consideration, present study was taken up to modify *Kakubhadi churna* into *Malahara*. Physico chemical analysis of prepared *Churna* and *Malahara* was also done to achieve preliminary standard.

Key Words: *Kakubhadi churna, Kakubhadi malahara, Modification, Physico chemical analysis, Dushta Vrana, Samskara*.

Introduction

The term *'Churna'* may be applied to the powder of a single drug or a mixture of two or more. It is the fine powder of a drug. Different *Churna* are mentioned to be used for different disease conditions (1). *Kakubhadi Churna* (Table 1) is a *Yoga* used which is to be sprinkled externally on *Dushta Vrana* (2). But this method of application is discomforting to patients and hence modification becomes essential.

Malahara kalpana is also classified under *Bahya kalpana* (external application). *Malahara* word has been derived from the words '*Malham' or Marham'* which are Unani in their origin (3). It was described by *Yogratnakara* for the first time in *Ayurveda*. Later it gained more importance and was included in the Ayurveda pharmaceutical dosage forms.

In the present study, *Churna* was modified into *Malahara* for ease of application and to achieve a better shelf life. Physico chemical analysis of prepared *Churna* and *Malahara* was also done to achieve preliminary standard.

Aims and objectives

In the present study, *Churna* was modified into *Malahara* for ease of application and to achieve a better shelf life. Physico chemical analysis of prepared *Churna* and *Malahara* was also done to achieve preliminary standard.

Material and method

Collection & Authentication of the drug:

The raw drugs required for the preparation of medicine were procured from CKKM pharmacy Kerala, which is GMP certified pharmacy. *Katphala* was procured from Uttrakhand. *Tila taila* and Bee wax was procured from the local market. These drugs were tested for genuinity at Dept. of Dravyaguna Vijnana, Sri Dharmasthala Manjunatheswara College of Ayurveda & Hospital, Hassan. The authentication was done based on organoleptic and morphological characters.

Preparation of *Kakubhadi Churna* (Sample 1) (4):

Dried stem bark 90gms each of *Kakubha (Arjuna), Udumbara, Ashwatha, Jambu, Lodhra* and *Katphala* was taken and pulverised to get fine powder as per the standard method of preparation. Obtained powder was sieved through a cotton cloth to get a fine powder. Prepared *Churna* was kept in air tight container for further study.

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Table1. Drugs and quantity of *Kakubhadi churna*

Ingredients	Botanical Name	Quantity
Kakubha	*Terminalia arjuna* (Roxb.)	90gms
Udumbara	*Ficus racemosa*	90gms
Ashwatha	*Ficus religiosa*	90gms
Jambu	*Syzigium cumini*	90gms
Lodhra	*Symplocos racemosa*	90gms
Katphala	*Myrica nagi*	90gms
Total		**540gms**

Preparation of *Kakubhadi Malahara* (Sample 2)

Preparation of *Kakubhadi kwatha* (5)

Prepared *kakubhadi c*oarse powder 40 gms of each, *Kakubha (Arjuna), Udumbara, Ashwatha, Jambu, Lodhra and Katphala* was soaked in 16 times of water (w:v) and left overnight. Next day it was subjected to heat with continuous stirring and the quantity was reduced to 1/4th of the initial volume. The liquid was filtered through four folded clean cotton cloth and the filtrate was collected as *Kakubhadi Kwatha*.

Table 2. Drugs and quantity of *Kakubhadi Kwatha churna*

Ingredients	Quantity
Kakubha	40gm
Udumbara	40gm
Ashwatha	40gm
Jambu	40gm
Lodhra	40gm
Katphala	40gm
Total	**240gm**

Preparation of *Kakubhadi taila* (6)

Kalka of the same drugs was prepared (1 part), *Tila taila* (4 parts) K*watha* (16 part) was used as *Drava Dravya* while preparing *Kakubhadi Taila* and continuously heated on medium heat till *Sidddhi lakshna* such as froth appearance, desired colour, odour and taste of drug were observed. Then the *taila* was collected for further use.

Table 3. Ingredients and their quantity for the preparation of *Taila*

Drugs	Quantity
Kakubhadi kalka	52gm
Tila taila	260ml
Kakubhadi kwatha	940 ml

Preparation of *Kakubhadi malahara* (7)

Prepared *Kakubhadi taila* (240ml) was added with 1/6th part (40 gms) of *Siktha* (Bee wax) and heated by using double boiler method. Once bee wax was melted properly, mixture was filtered with the help of a cotton cloth to get rid of the physical impurities. After this 24gms of fine powder of *Kakubhadi churna* was added to the taila and mixed properly with the help of a spatula. Later on, it was transferred to an air tight container.

Table 4. Ingredients for the preparation of *Kakubhadi malahara*

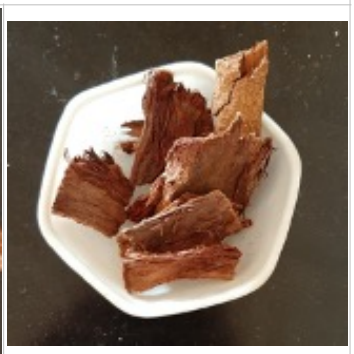
Drugs	Quantity
Bee wax	40gms
Kakubhadi taila	240 ml
Kakubhadi churna	24gms

Fig 1. Preparation of Kakubhadi Churna

***Kakubha* (Arjuna)**

Udumbara

Ashwatha



Jambu

Lodhra

Katphala

Pulverisation

Prepared fine *Churna*

Fig 2. Preparation of Kakubhadi Malahara

Prepared Kakubhadi taila

Kakubhadi churna

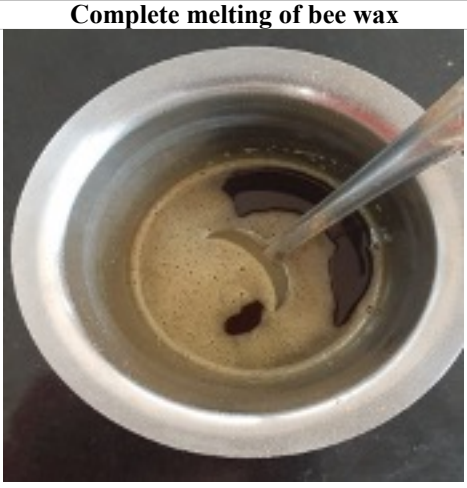
Bee wax

Preparation of *Sikta taila*

Complete melting of bee wax

Filteration

Adding of fine *Churna*



Mixing of *Churna* in *Sikta taila*

Kakubhadi malahara

Analytical study

The analysis prepared *Churna* and *Malahara* was carried out at SDM Research Centre of Ayurveda and Allied Sciences, Udupi as per standard protocol.

Organoleptic characters (8)

Organoleptic characters of the test sample were documented by means of examination using sense organs.

Physico - chemical parameters:

Spreadability test (9)

The spreadability of bases were determined by keeping the sample between two Plexiglass at 370˚C, it is based on linearity and spreading diameter measurements. Viscosity and spreading diameter is independent of derivative used. 1gm of the *malahara* was placed between the Plexiglas plate and known weight was kept upon it and was then measured the diameter of spread and was calculated using the formula,

$$S = m * l/t$$

S – Spreadability of the formulation
m – Weight (g) tied on the upper plate
l – Length (cm) of the glass plates
t – Time taken (s) for the plates to slide the entire length.

Determination of pH (10)

1 g of sample was taken and 10 ml of distilled water was added, stirred well and filtered. The filtrate was used for the experiment. pH meter was switched on. 30 minutes time was given for warming. 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. Introduced the pH 9.2 solution 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 at 105˚C (11)

10 g of sample was placed in tared evaporating dish. It was dried at 105˚C for 5 hours in hot air oven and weighed. The drying was continued until difference between two successive weights was not more than 0.01 after cooling in desiccator. Percentage of moisture was calculated with reference to weight of the sample.

Rancidity test (12)

1ml of melted fat was mixed with 1ml of conc. HCl and 1ml of 1% solution of phloroglucinol in diethyl ether and then mixed thoroughly with the fat acid mixture. A pink colour indicates that the fat is slightly oxidized while a red color indicates that the fat is definitely oxidized.

Estimation of Total fatty matter (13)

1 g of the sample mixed with 4gm of silica and was introduced into a thimble and placed it in a soxhlet fitted with a condenser. Taken 90 ml of petroleum ether (B.P. 40 - 60°C) in the 150 ml RB flask and boiled for 6 hours. The extract was taken in a pre-weighed conical flask and petroleum ether was evaporated on a water bath. Traces of petroleum ether was removed in vacuum pump. Weight of fat was taken to constant.

HPTLC for *Kakubhadi malahara* (14)

1g of sample was extracted with 10 ml of methanol. 5 µl of each of the above extract was applied on a pre-coated silica gel F254 on aluminium plates to a band width of 7 mm using Linomat 5 TLC applicator. The plate was developed in Toluene: Ethyl Acetate (9:1). The developed plates were visualized in UV 254, 366, and then derivatised with vanillin sulphuric acid and scanned under UV 254 and 366 nm. Rf, colour of the spots and densitometric scan were recorded.

Observation ans Results

Observation and results noted during pharmaceutical and analytical study are given in the following tables:

Table 5: Obtained final product and total loss

Prepared drug	Total quantity of raw drugs	Quantity obtained	Loss
Kakubhadi churna	540gm	390gm	150gm, 27.78%
Kakubhadi malahara	304gm	285gm	19gm, 6.25%

Table 6: Organoleptic characters of both samples

Parameters	*Kakubhadi churna*	*Kakubhadi malahara*
Colour	Brownish yellow	Brown
Odour	Characterstic	characteristic
Taste	Kashaya	-
Consistency	Solid	Smooth, sticky

Table 7. Physico-chemical parameters of both samples

Parameters	Results	
	Kakubhadi churna	*Kakubhadi malahara*
Loss on drying	0.89	0.86
Total ash	9.77	-
Acid insoluble ash	0.1	-
Water soluble ash	2.51	-
Alcohol soluble extractive	10.86	-
Water soluble extractive	9.79	-
pH	6.0	6.0
Rancidity	-	Fat is not oxidised
Total fat	-	82.0
Spreadability	-	9.86

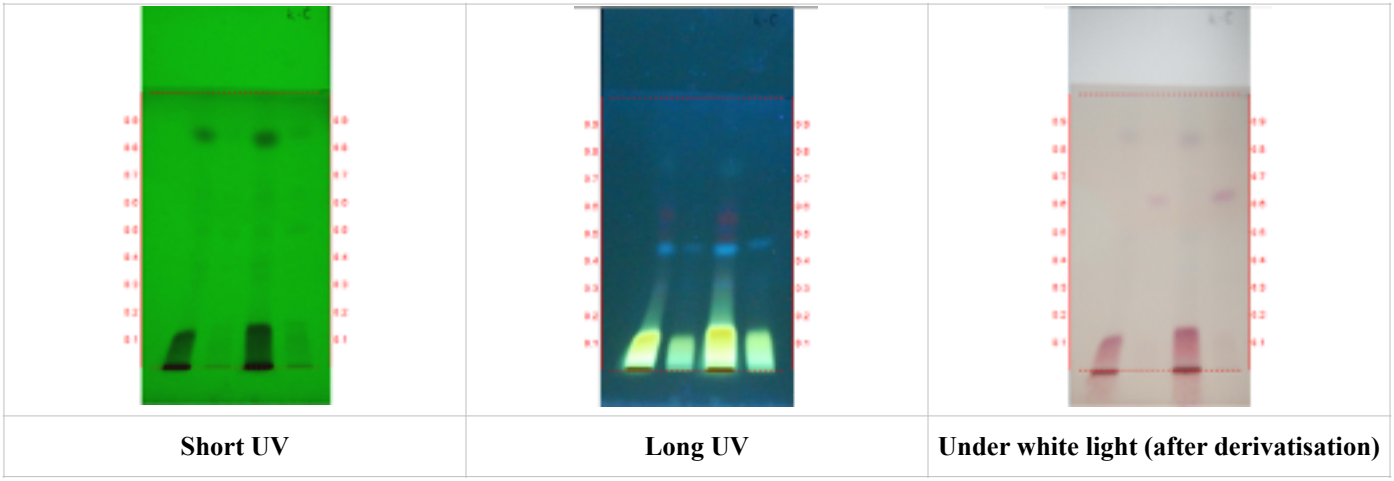
Table 8: Rf value of *Kakubhadi churna and Kakubhadi malahara*

Short UV		Long UV		Under white light (after derivatisation)	
Kakubhadi churna	*Kakubhadi malahara*	*Kakubhadi churna*	*Kakubhadi malhara*	*Kakubhadi churna*	*Kakubhadi malhara*
-	0.12 (Green)	-	0.12 (F. green)	-	-
0.14 (Green)	-	0.14 (F. yellow)	-	0.14 (Pink)	-
-	0.16 (Green)	-	-	-	-
0.33 (Green)	-	-	-	-	-
0.37 (Green)	-	-	-	-	-
-	-	0.45 (F. blue)	0.45(F. blue)	-	-
0.51 (Green)	0.51 (Green)	0.51 (F. blue)	-	-	-
-	-	0.55 (F. red)	-	-	-
0.63 (Green)	0.63 (Green)	-	-	-	0.63 (Pink)
-	-	0.74 (F. blue)	-	-	-
0.84 (Green)	0.84 (Green)	-	-	0.84 (Purple)	-

Table 9: Densinometric scan at 254nm (*Kakubhadi churna*)

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area %
1	0.00 Rf	35.2AU	0.03 Rf	443.6 AU	38.93%	0.06 Rf	77.0 AU	25.34%
2	0.07 Rf	277.1AU	0.17 Rf	405.8 AU	35.61%	0.22Rf	0.2 AU	53.84%
3	0.33 Rf	2.7AU	0.37 Rf	20.4AU	1.79%	0.40 Rf	13.6 AU	1.11%
4	0.40 Rf	13.7AU	0.43 Rf	34.8AU	3.05%	0.49Rf	0.1 AU	1.94%
5	0.50 Rf	0.2 AU	0.55 Rf	24.0 AU	2.11%	0.59 Rf	7.4AU	1.41%
6	0.63 Rf	13.3AU	0.69 Rf	29.8AU	2.61%	0.78 Rf	2.0 AU	3.07%
7	0.86 Rf	3.2 AU	0.92 Rf	181.0 AU	15.88%	0.99 Rf	0.1 AU	13.29%

Figure 3: HPTLC photo documentation of ethanolic extract of *Kakubhadi churna* and *Kakubhadi Malahara* Solvent system – Toluene: Ethyl Acetate (7:1)



Short UV	Long UV	Under white light (after derivatisation)

Table 10: Densinometric scan at 254nm (*Kakubhadi malahara*)

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area %
1	0.01 Rf	2.2AU	0.03 Rf	211.0AU	37.12%	0.05Rf	73.3AU	18.62%
2	0.05 Rf	73.4AU	0.13 Rf	109.5AU	19.26%	0.17Rf	54.5AU	40.72%
3	0.17 Rf	54.5AU	0.19 Rf	62.9AU	11.07%	0.24Rf	1.1AU	7.81%
4	0.43 Rf	4.0AU	0.46 Rf	11.9AU	2.09%	0.51Rf	0.4AU	2.05%
5	0.52 Rf	2.5AU	0.57 Rf	96.3AU	16.95%	0.61Rf	10.7AU	15.86%
6	0.66 Rf	8.3AU	0.70 Rf	41.8AU	7.36%	0.76Rf	0.6AU	8.35%
7	0.90Rf	0.4 AU	0.95 Rf	34.9AU	6.15%	0.99Rf	0.1AU	6.58%

Table 11. Densinometric scan at 366nm (*Kakubhadi churna)*

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area %
1	0.01 Rf	23.7AU	0.01Rf	38.2 AU	2.84%	0.02Rf	1.0AU	0.32%
2	0.02 Rf	4.3AU	0.07Rf	819.4AU	60.92%	0.17Rf	97.3AU	76.44%
3	0.17 Rf	297.5AU	0.19Rf	388.3AU	28.86%	0.34Rf	26.1AU	18.53%
4	0.34 Rf	26.1AU	0.36Rf	28.0AU	2.08%	0.45Rf	1.6AU	1.66%
5	0.45 Rf	1.7AU	0.50Rf	56.1AU	4.17%	0.55Rf	0.1AU	2.16%
6	0.56 Rf	0.0AU	0.63Rf	15.1AU	1.13%	0.71Rf	0.3AU	0.88%

Table 12. Densinometric scan at 366nm (*Kakubhadi malahara*)

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area %
1	0.00 Rf	0.4 AU	0.08 Rf	601.2 AU	95. 24 %	0.25 Rf	0.1 AU	98.20%
2	0.45 Rf	0.9 AU	0.53 Rf	30.1 AU	4.76%	0.58 Rf	0.0 AU	1.80%

Table13. Densinometric scan at 620nm (*Kakubhadi churna*)

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area %
1	0.00 Rf	41.6AU	0.02Rf	462.0AU	53.14%	0.06Rf	21.5AU	30.81%
2	0.06 Rf	22.5AU	0.17Rf	243.8AU	28.04%	0.20Rf	0.1AU	45.95%
3	0.29 Rf	0.5AU	0.36Rf	17.3AU	1.99%	0.39Rf	13.1AU	18.53%
4	0.39 Rf	13.4AU	0.42Rf	31.9AU	3.67%	0.45Rf	6.9AU	2.90%
5	0.50 Rf	5.7AU	0.55Rf	30.9AU	3.55%	0.60Rf	1.3AU	3.60%
6	0.70 Rf	1.7AU	0.75Rf	16.3AU	1.88%	0.79Rf	0.4AU	2.10%
7	0.88 Rf	1.3AU	0.94Rf	67.2 AU	7.72%	1.00 Rf	0.5 AU	10.29%

Table 14. Densinometric scan at 620nm (*Kakubhadi malahara*)

Peak	Start position	Start height	Max position	Max height	Max %	End position	End height	Area %
1	0.00 Rf	0.3 AU	0.02Rf	71.3AU	39.68%	0.08Rf	8.1AU	29.24%
2	0.10 Rf	7.1 AU	0.12Rf	10.4AU	5.79%	0.18Rf	2.0AU	8.40%
3	0.34 Rf	3.0AU	0.39Rf	16.3AU	9.08%	0.42Rf	2.0AU	11.58%
4	0.45 Rf	3.3 AU	0.49Rf	12.4AU	6.91%	0.52Rf	3.8AU	9.26%
5	0.67 Rf	6.3 AU	0.71Rf	45.8AU	25.53%	0.75Rf	3.5AU	26.44%
6	0.91 Rf	0.6 AU	0.96Rf	23.4AU	13.02%	0.99Rf	3.7AU	15.07%

Discussion

All the ingredients were authenticated before using them to ensure the quality of the ingredients. This is essential step as a part of raw drug standardisation. During preparation of churna it was filtered through a cloth which is equivalent to sieve size 80 which gives fine powder **(15).** There was a loss of 150gm in the final product which may be because of the fibrous nature of the raw drugs used.

For preparation of malahara the decoction of the ingredients was prepared initially. Ratio of water taken for the preparation of *Kwatha* depends upon the hardness of the drug **(5).** Here the hardness of the drugs could not be determined so general method of preparation of *Kwatha* was followed. Drugs were soaked overnight in water as it helps in softening of the drugs, which in turns facilitate the transfer of active principles from drug into the liquid media.

A wide mouthed stainless steel vessel was used for the preparation of taila because of its inert property. Wide mouthed vessel will help in the easy evaporation of water content and may provide more space for spreading nature of the material under *Paka*. While adding *Kalka*, bubbles were appreciated due to escape of air suspended while preparation of *Kalka*. While adding the kwatha, the oil floats over the mixture, due to its less specific density compared to other ingredients **(16).** Heating was continued on mild fire along with continuous stirring to avoid charring and to attain proper *Paka*. In the later stage of boiling the colour of mixture changed into brownish black due to the presence of *Kalka* and *Kwatha.*

While nearing to *Paka*, the Taila started splashing due to the escape of moisture present in *Kalka*. At this stage, continuous stirring was required to avoid adhering of *Kalka* at the bottom of the vessel and fire was reduced to minimum to prevent the loss of *Sneha* due to splashing and excess heat. *Taila Siddhi Lakshana* were examined and *Taila* was taken out from the fire and filtered while it was still warm in order to increase the yield and for ease of filtration.

The froth was observed during the preparation, which may be because of formation of lower fatty acids as unsaturated fat continuously undergoes oxidation on heating. **(17)**

Initially temperature was 34˚C. After half an hour it reached up to 96˚C and maintained at 80^0C throughout the preparation. There was a loss of 20 ml of *Taila* which might be because of the absorption of *Taila* by the *Kalka*.

Malahara should always have a smooth and ointment like consistency for ease of application. Colour of final product was brownish yellow because of the presence of bee wax. Yield of final product was 285gm out of 304gm. This may be because of the physical impurities present in bee wax.

Kakubhadi malahara was having a little bit darker colour because of the presence of bee wax and *Tila taila* in it. It was soft to touch because of the presence of bee wax.

pH of *Kakubhadi Churna* was 6. No change in pH was noticed in *Kakubhadi malahara*, which is near to neutral, so it is less likely to cause irritation when applied on the skin.

Total ash value of *Kakubhadi churna* was 9.77. It is used as a criterion for purity and identity of crude drugs.

Value of water soluble extractive of *Kakubhadi churna* was found out to be 2.51. It indicates water soluble constituents such as tannins, sugars, plant acids and mucilage.

The alcohol soluble extractive for *Kakubhadi churna* was found out to be 10.86. This value is applied for the drugs which contain alcohol soluble constituents such as tannins, resins and alkaloids, thus helps to know active principles. *Kakubhadi churna* was having a water soluble extractive value of 9.79. It indicates the presence of water soluble constituents such as tannins, sugars, plant acids and mucilage.

Rancidity is the process of complete or incomplete oxidation or hydrolysis of fats and oils when exposed to air, light, or moisture or by bacterial action, resulting in unpleasant taste and odour. The rancidity test of Kakubhadi malahara showed no oxidation which indicates better shelf life.

Spreadability was found out to be 9.86. It plays an important role in the administration of a standard dose of a medicated formulation to the skin and the efficacy of a topical therapy. Results indicated that Kakubhadi malahara can be easily applied without any difficulty.

HPTLC: *Kakubhadi churna* and *Kakubhadi malahara* were assessed at selected UV regions wavelength (at 254 nm and 366 nm and 620nm). The spots/peaks due to different components were documented. It was followed to standardize the samples on preliminary level. 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 same kind of *Malahara.*

Conclusion

In this research work, an attempt was made to modify *Kakubhadi churna* into *Malahara.* First *Kakubhadi churna* was prepared by following the classical method of *Churna* preparation. Then *Malahara* was prepared by modified method using bee wax and *Tila taila.* The prepared *churna* and *malahara* were also subjected to analytical study. *Kakubhadi churna* can be easily modified into malahara. Analytical studies and HPTLC conducted on the study drug have helped to develop preliminary standards for *Kakubhadi churna and Malahara.*

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