



Research Article

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Preparation and standardization of *kasis bhasma* by two different methods and its analytical study

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ABSTRACT

Different ayurvedic texts have mentioned different methods of shodhan (Purification) and maran (incineration) of ayurvedic mineral preparations of kasis. Though different methods of shodhan and maran are described in various texts complete physio chemical standardization is necessary to prepare the pure form and for quality assurance as well as It is necessary to understand the chemical changes that take place after various ayurvedic processes. **Aims and Objectives:** 1. Procurement of grahya kasis from local market and its chemical analysis 2. Purification of kasis in dolayantra and its chemical analysis 3. Preparation of kasis bhasma by two methods given by ras tarangini and its chemical analysis. **Setting and Design:** observational analytical study. **Place of study:** Department of Rasa Shastra and BK, GS Ayurvedic medical college. **Materials and methods:** Ashudhha kasis is purified and subjected to incineration by two types, Snuhipatra swaras bhavana, and kanji and Nimbu swaras bhavana as given in rasa tarangini. Chemical composition of the raw form, pure form as well as two types of bhasmas is analyzed in laboratory. **Results:** 1. Analysis of kasis at each stage of its formation to kasis bhasma shows the changes in physical and chemical properties due to its transformation as it is heated thermal decomposition starts 2. The chemical analysis of kasis bhasma shows highest percentage of ferric iron in comparison with raw and shodhit form. 3. Chemical analysis of kasis bhasma obtained by incineration process, by Snuhipatra swaras bhavana, and kanji and Nimbu swaras bhavana does not show any notable difference in chemical composition. Both methods can be used to prepare kasis bhasma as per availability of bhavana dravya.

Keywords: *Kasis bhasma, Snuhipatra swaras bhavana, Nimbu swaras bhavana.*

INTRODUCTION

Different *ayurvedic* texts have mentioned different methods of *shodhan* (purification) and *maran* (incineration) of *ayurvedic* mineral preparations of *kasis*. Though different methods of *shodhan* and *maran* are described in various texts^[1, 2, 3], complete physio chemical standardization is necessary to prepare the pure form and for quality assurance as well as It is necessary to understand the chemical changes that take place after various *ayurvedic* processes

Kasis which come in “Uparasa varga”^[4] in Ayurvedic literature, is one of the important drug used in ayurvedic therapeutics. It is a green colour mineral of iron, which is chemically ferrous sulphate. It is of two types, *valu kasis* and *pushpa kasis* out of which, *pushpa kasis*^[5] is used for therapeutic purposes. Major sources of mining are in the Simha Bhumi district of Bihar. The therapeutic application of this *kasis* are many, including *visa*, *svitra*, *pandu*, *asmari* etc. Raw kasis form is purified by boiling in the juice of *Bhringaraj*(*eclipta alba*)^[6] for 3 hours, with the help of *dolayantra*. After purification, incineration is done with multiple methods which include incineration^[7] with the help of *kanji* and *nimbuswaras bhavana*, and by giving *laghuputa* as well as with *snuhi patra swarabhavana* for seven times and subjected for *laghuputa*^[8] (*Misra GS. Acharya Madhava’s Ayurveda Prakasa. Varanasi: Chaukhamba Bharti Academy; 2007. p. 325.*), continued till *kasis* loses its soreness. There is a paucity of data to indicate superiority of one method over the other for incineration as well as step by step changes that take place during purification and incineration of *kasis*. We undertook this analytical study to assess the superiority between two methods of incineration as well as to understand and analyse the chemical changes that take place during incineration of *kasis*.

AIMS AND OBJECTIVES

1. Procurement of *grahya kasis* from local market and its chemical analysis.
2. Purification of *kasis* in *dolayantra* and its chemical analysis.
3. Preparation of *kasis bhasma* by two methods given by *Ras tarangini* and its chemical analysis.

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MATERIALS AND METHODS

Collection of raw material

Pushpa kasis is *grahya* type of *kasis* according to the ancient *Ayurvedic* texts and hence the *pushpa kasis* was procured from local market (500 grams). Study was done in Rasa shastra and BK Department of GS Ayurvedic medical college.

Shodhana of raw kasis

Purification of the raw sample (500 grams) was done in *dolayantra* by *bhringaraj swaras* for 3 hours.

It is carried by the procedure mentioned in the *rasa tarangini*. After purification was complete the material was collected and sundried. when it became fully dry, weight was taken it was 400 grams.

Preparation of *bhasma*

After purification, the purified sample was divided into two equal parts. i.e. each 200 grams, sample A and sample B.

In sample A, incineration was done by giving *bhavana* of *kanji* and *nimbuwaras* for 7 times and after subjecting it to *laghuputa* till it loses its sourness.

In sample B, incineration was done by giving *bhavana* of *snuhipatra swaras* and subjecting it to *laghuputa* continuously till it loses its soreness.

Analytical study

Oregano leptic study and Chemical analysis was done for raw *kasis* as well as after its purification.

Analytical study of both the samples was carried out by classical methods (*bhasma* pariksha) [8] of *Varna* (color), *sparsha* (touch), *rasa* (taste), *gandha* (odor), *shabda* (sound), *sukhsmawata*, *mruduwata*. Modern physicochemical parameters used for analysis included determination of PH, specific gravity, loss on drying, percentage of ferrous and ferric, assay of sulfur as SO_4 [9].

RESULTS

We brought 500 gm of raw unpurified *kasis* from local market.

The analysis of raw unpurified *kasis* is as given in table 1.

Table 1: Analytical study of unpurified (raw) *kasis*

Quantity of (raw) unpurified <i>kasis</i> taken for analysis	500 gms
Ph of unpurified <i>kasis</i> on dissolving in neutral solution	4
Loss on drying of raw <i>kasis</i> at 105 degree Celsius	24.91%
Ferrous percentage	18.87%
Ferric percentage	0%
Assay of sulphur as SO_4	11.40%

This unpurified *kasis* was subjected to *shodhan* by *swedan* in *dolayantra* in *bhringaraj swaras*. Analysis of this *kasis* was as shown in table 2

Table 2: Analytical study of *kasis* purified in *dolayantra* by *bhringaraj swaras*.

Quantity of purified <i>kasis</i> gained after <i>shodhan</i> procedure in <i>dolayantra</i>	400 gms
PH of purified <i>kasis</i>	4.2
Loss of drying at 105 degrees	17.56%
Ferrous percentage	24.344%
Ferric percentage	0%
Assay of sulphur as SO_4	14.5838%

This purified *kasis* was divided into two equal parts of 200 gms each, sample A and sample B. After dividing it was subjected to incineration.

Table 3 (Method A): Analytical study of *kasis bhasma* obtained by *bhavana* of *kanji* and *nimbuwaras* each for 7 times and after subjecting it to *laghuputa*.

PH of <i>kasis bhasma</i> by <i>bhavana</i> of <i>kanji</i> and <i>nimbuwaras</i> for 7 times after subjecting it to <i>laghuputa</i>	7
Loss on ignition	0.6388%
Loss on drying at 105 degrees	0.6%
Solubility in water	4.91%
Ferrous percentage	0.002%
Ferric percentage	43.63%
Assay of sulphur as SO_4	0.9883%

Table 4 (Method B): Analytical study of *kasis bhasma* obtained by *bhavana* of *snuhipatra swaras* and subjecting it to *laghuputa* continuously till it loses its soreness.

PH of <i>kasis bhasma</i> obtained by <i>bhavana</i> of <i>snuhipatra swaras</i> and subjecting it to <i>laghuputa</i> continuously till it loses its soreness	7
Loss on ignition	0.1984
Loss on drying at 105 degrees	0.19%
Solubility in water	3.12%
Ferrous percentage	0.02%
Ferric percentage	41.70%
Assay of sulphur as SO_4	0.4835%

Comparative analysis of kasis bhasma by two different methods

Method of preparation	<i>bhavana of kanji and nimbuswaras each for 7 times and after subjecting it to laghuputa (Method A)</i>	<i>bhavana of snuhipatra swaras and subjecting it to laghuputa (Method B)</i>	<i>Difference in two methods</i>
PH of kasis bhasma	7	7	0
Loss on ignition	0.6388%	0.1984	0.4404%
Loss on drying at 105 degrees	0.6%	0.19%	0.44%
Solubility in water	4.91%	3.12%	1.79%
Ferrous percentage	0.002%	0.02%	
Ferric percentage	43.63%	41.70%	1.93%
Assay of sulphur as SO ₄	0.9883	0.4835%	0.5048%
Weight of kasis bhasma	120 gms	130 gms	

DISCUSSION

In the present study, we have standardized *kasis bhasma* in each step of its preparation i.e. from raw *kasis*, purified *kasis* and *kasis bhasma* made by two different methods with organoleptic as well as analytical methods. We have procured raw *kasis* of *pushpa kasis* variety from local market (500grams). Its organoleptic and chemical analysis was done.

When we analyzed raw *kasis*, it was in the form of bright green rough textured crystals with sour taste. The Ph was 4, loss on drying at 105 degrees was 24.91 %. Ferrous percentage was 18.81% and ferric percentage was 0 %. Assay of sulphur as so₄ was 11.40% (Table no 1).

This raw *kasis* was purified in *dolayantra* by *swedan* method for 3 hours in *bhringraj swaras*. *kasis* was completely dissolved into the *bhringraj swaras* used for *swedan* purpose hence the mixture was kept under sunlight till it completely dries. After purification, the *shodhit kasis* gained a specific acidic odor like *amchur*, and colour of *purified kasis* became greenish white, smooth crystals and sour in taste. There was loss of weight of 100 gm. This loss of weight was explained on the basis of evaporation of the water content of the unpurified *kasis* during *swedan* process. In purified *kasis*, the analytical study result is Ph was 4.2, loss on drying at 105 degrees was 17.56%, ferrous percentage was 24.344 %, and ferric percent was 0%. Assay of sulphur as so₄ was 14.58% (Table no 2). After shodhan, we got 400 grams of purified *kasis* which was equally divided into 2 parts 200 grams each.

For each part incineration was done by 2 methods, as mentioned in *Ras tarangini*.

For the first part (method A), *maran* was done by *bhavana of kanji and nimbuswaras* each for 7 times and after subjecting it to *laghuputa*. For *laghuputa*, 20 cow dung cakes were used and 3 *laghuputas* in *sharava samputa* were given. After each *puta* it was tested for sourness and *rekhapurnata* as well as *dantagrey kachakachabhava*. When it becomes sour less the material was carefully removed and weight was taken and noted which it was 120 grams. After this chemical analysis was done and the results are noted down as given in Table no 3. For second part (method B), *maran* was done by *bhavana of snuhipatra swaras* for 7 times and after that *laghuputa* was given with 20 cow dung cakes. such 3 *putas* were given up to it becomes sourless which is a special test as well as other Ayurvedic parameters of *bhasmapariksha* like *rekhapurnata and dantagrekachakachabhav* was also done. When

bhasma passed all the tests it was removed carefully and weight was noted it was 130 grams. At this stage, chemical analysis was done and the results were noted as given in Table no 4. *Kasis bhasma* of both types was brownish red in colour, tasteless, amorphous in appearance with no specific odour was found, and on touching both were soft in texture.

After each *puta*, we observed that Ph increased. Finally it became neutral. Percentage of iron was found more in *shuddha kasis* than unpurified *kasis*. In the purification process of *kasis*, there is no oxidation. Ferrous was not converted into ferric form. In the incineration process by both methods, there was oxidation reaction; ferrous was converted into ferric form. SO₄ was minimally present in both the samples. Water evaporated and we got a final product as reddish colored ferric oxide.

Ferric content in *kasis bhasma* produced by method A was 43.63% while that of method B was 41.70 %. Final product obtained (*kasis bhasma*) was almost one fourth of original quantity, taken as *unpurified kasis*. This can be explained by the fact that there was evaporation of water and sulphur as SO₄. LOD test shows the amount of moisture drying off from the matter. During *bhasma* preparation the moisture content is reduced and it becomes non volatile inorganic material^[10].

Both the samples were colorless, odourless and passed all tests for final *bhasma* products as mentioned in *bhasma pariksha*^[11].

So there was no notable difference between chemical analyses of *kasis bhasma* obtained by these two methods, but further studies (randomized double blind) studies are necessary to assess clinical superiority and therapeutic efficacy of *kasis bhasma* obtained by either of two methods.

CONCLUSION

Analysis of *kasis* at each stage of its formation to *kasis bhasma* shows the changes in physical and chemical properties due to its transformation as it is heated thermal decomposition starts. The chemical analysis of *kasis bhasma* shows the highest percentage of ferric iron in comparison with raw and shodhit form.

Chemical analysis of *kasis bhasma* obtained by incineration process, by *snuhipatra swaras Bhavana*, and *kanji and nimbu swaras bhavana* does not show any notable difference in chemical composition. Both

methods can be used to prepare kasis bhasma as per availability of bhavana dravya.

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