

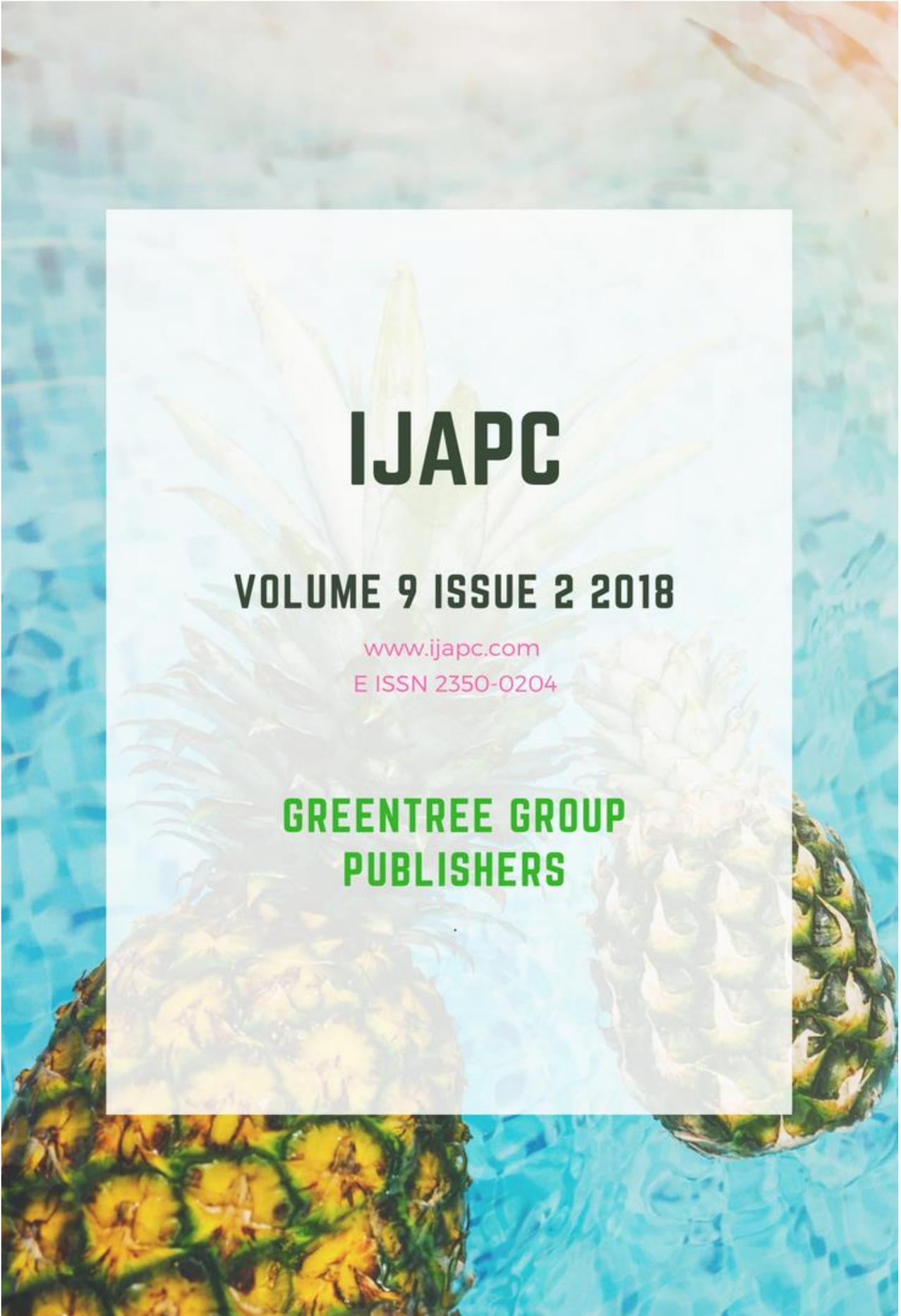


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Pharmaceutical Study of *Vanga Bhasma*

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ABSTRACT

Vanga bahasma is a type of herbo-mineral preparation. Usage of herbo minerals as therapeutic agents has been in practice since centuries. *Ayurvedic* system of medicine should be considered the pioneer regarding the pharmaceutical processing and therapeutic application of metals. Herbo mineral formulations of *Ayurveda* constituting *bhasma* as an ingredient are as superior as it is even today. Manufacturing methods of *bhasma* preparations are in tune with nanotechnology of contemporary era and proved the advancement of *Rasashastra*, which may cover scientific validation of today.

KEYWORDS

Vanga Bhasma, Bhasma, Herbo-mineral



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INTRODUCTION

Good manufacturing practice is very important in the field of *ayurveda* that leads to quality assurance of *ayurvedic* physician. Most of drug used in *ayurvedic* system of treatment are of herbo –mineral medicines. The formulations are also either herbal drug or herbo mineral drugs. The substances of herbal and mineral origin cannot be used in their crude form and need proper processing to convert them into suitable form for internal administration¹.

Manufacturing methods of *bhasma* preparations are in tune with nanotechnology of contemporary era and proved the advancement of Rasashastra, which may cover scientific validation of today.

Ayurvedic pharmaceuticals are receiving a new thrust through a reappraisal of *bhasma* preparations as novel nano-technological application².

Hence pharmaceutical study of formulations utilizing the tools and technique presently available has become a necessity for producing quality drug as well as revalidating the claim of ancient *Acharyas*.

MATERIALS AND METHODS

In this present study the Pharmaceutical processes carried out during the

preparation of *Indravati* had been dealt under various sections as follows:

1. Preparation of *Vanga bhasma*

Materials and methods used in this preparation are based on availability, feasibility in classical indication of Rasashastra, traditional value and expert opinions.

❖ **Materials include:**

1. Major raw drugs
2. Associated drugs

❖ **Major Drug:**

Ashudha Vanga was the major raw material used in this study. For the preparation of *bhasma*, *Vanga* was procured from NIA pharmacy, Jaipur. That was in the form of a solid mass.

❖ **Associated Drugs:**

➤ **Drugs for *samana* shodhana of *Vanga*³ (Table-1)**

Table 1 Required liquid media and their quantity for *Samana Shodhana* of *Vanga*:

S. No	Ingredients	Quantity per <i>shodhana</i>	Total quantity used
1	<i>Tila taila</i>	200 ml	1400 ml
2	<i>Takra</i>	200 ml	1400 ml
3	<i>Gomutra</i>	200 ml	1400 ml
4	<i>Kulattha kwatha</i>	200 ml	1400 ml
5	<i>Tila taila</i>	200 ml	1400 ml

Tila taila, *Takra*, *Gomutra*, *Kanji*, and *Kulattha Kwatha*, were used for *Samana shodhana* of *Vanga*. *Tila taila* was procured from the NIA Pharmacy *Takra* was procured from Saras dairy, Jaipur. *Gomutra* was freshly collected from



the local cow shed. *Kanji* (Sour gruel) were prepared in departmental lab.

Kulattha Kwatha (decoction of *Dolichus biflorus*) was prepared freshly in departmental lab.

➤ **Drugs for *Vishesha Shodhana*⁴ (Table-2)**

Table 2 Required materials and their quantity for *vishesha Shodhana* of *Vanga*

S. No.	Ingredients	Quantity
1	<i>Samanya shodhita vanga</i>	182 g
2	<i>Nirgundi patra swarasa</i>	200ml for each <i>dhalana</i> .
3	<i>Haridra churna</i>	12.5g for each <i>dhalana</i> .

Nirgundi patra swarasa and Haridra churna

➤ **Drugs for *Vanga jarana*⁵**

Haridra Yavani Jeerak Chinchu and Ashwattha (Fig-5).

➤ **Drug for *Marana* of *Vanga*⁶**

Kumari swarasa (Fig-4)

Preparation of *Kanji* (Sour gruel)⁷ (Table-3 & 4)

Table 3 Observations during preparation of *Kanji*:

Wt. of Rice	Water added (5 times)	Wt. of cooked rice	Water added to it (3 times)
500g	2.5 Liter.	1.950 Kg.	5.850 Lt

Table 4 Characteristics test of *Kanji*

S. No	Test	Initial phase	Terminal phase
1	Colour	Cream	Yellowish
2	Odour	Non-specific	Strongly acidic
3	Test	Salty	Sour
4	Ph	6	2
5	Transparency	Turbid	Transparent
6	Effervescence	-ve	-ve

Date of Commencement: 12/05/2017

Date of Completion: 25/05/2017

Showing Ingredients of *Kanji*:

Material required:

Rice - 500gm.

Water -2.5 Lt.

Rajika -125 gm.

Muli-250 gm.

Haridra -50 gm.

Saindhava Lavana - 125 gm.

Mustard oil - 62 gm.

❖ **Method of preparation**

- Rice was cooked in 5 times water.
- When cooked it was removed from fire, allowed to cool and weighed.
- Further 3 times of water was added to the cooled cooked rice.
- The oil was heated by taking it in an iron pan. The mustard and turmeric were added to the hot oil and on crackling of mustard the same was added to the cooked rice.
- Salt and the Radish which was chopped into small pieces was added to the cooked rice.
- Whole material was transferred to a sterile storage container.
- The container was closely packed by *multani mitti* and kept aside for fermentation.
- After the completion of process the supernatant clear liquid was siphoned out by using tube.



➤ Observation was observed during preparation of *kanji* showing table no 3 and 4.

Preparation of *Kulattha kwatha*⁸: (Table-5 & 6)

Table 5 Method of preparation of the *Kulattha kwatha*

Material	Water added (16 times)	Water reduced to (1/8 times)	Final yield
<i>Kulattha</i> 1 kg.	16 Lt.	2 Lt.	2 Lt.

Table 6 Properties of *Kulattha kwatha*

Colour	Odour	Ph
Reddish brown	Pungent	5

❖ **Procedure:**

Kulattha (*Dolichos biflorus*) was taken, coarsely powdered and soaked overnight, in half of the water meant for making decoction. On next day the remaining water was added and the material was boiled over mild fire till the water was reduced to one eighth.

(Table no 5 and 6)

❖ **Preparation of *Nirgundi Patra Swarasa*⁹: (Table-7)**

❖ **Procedure**

Nirgundi Patra 800gm were properly washed and was run in a mixer with 300ml of water. After processing in mixer it was squeezed through cloth and the *swarasa* was collected in a S.S. Vessel. (Table No. 7).

❖ **Extraction of *Kumari Swarasa*: (Table-8)**

Leaves of *Kumari* 100gm were washed in tap water; thorny margins and apex were cut by knife. Mucilaginous pulp was separated from the leaves with the help of knife and pulp was used for levigation. (Table No. 8)

❖ **Raw *Vanga* was taken: 200g**

❖ ***Samanya Shodhana* of *Vanga*:**

❖ **Procedure:**

➤ Raw *Vanga* was taken on long handled iron ladle (*Loha Darvi*) and heated on Gas stove up to melting. (Fig-1)

➤ After complete melting of *vanga*, it was *dhalana* in *Tila taila* which was kept in the *Pithara Yantra*. (Fig-2)

➤ After collection of the *Vanga* from the media whole process was repeated for 6times.

➤ The process of heating and *dhalana* was done in other liquid media viz *Takra*, *Gomutra*, *Kanji*, and *Kulattha Kwatha*, respectively. Every time fresh and same amount of liquid media was taken.

➤ Weight, Temperature and Volume of liquid media was noted each time.

***Vishesha shodhana* of *vanga*:**

❖ **Procedure:**

Samanya shodhita Vanga was taken on iron ladle (*Loha Darvi*) and heated on Gas stove up to melting. When the whole metal was melted, immediately *dhalana* was done in the liquid media (200ml *Nirgundi patra swarasa* and 12.5g *Haridra churna*)



Figure of pharmaceutical process



Fig 1 (melting of vanga)



Fig 2 (Dhalana of vanga)



Fig 3 (Shodhita vanga)



Fig 4 (Bhavna of kumari swarasa)



Fig 5 (Jarana dravya)



Fig 6 (Chakrika nirmana)



Fig 7 (Chacrika, after puta)

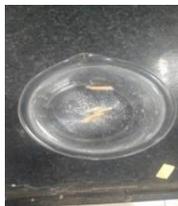


Fig 8 (Unama pariksha)



Fig 9 (Apunarbhav pariksha)



Fig 10 (Rekhapurnatva pariksha)

which was kept in the *Pithara Yantra*. The metal which got settled in the *Pithara Yantra*, was collected (Fig-3) and the whole process was repeated for two times. Every time fresh and same amount of liquid media was taken.

Jarana of shuddha Vanga:

Ingredients: *Shuddha Vanga, Haridra, Yavani, Jeerak, Chinch, Ashwatha.*

❖ **Procedure:**

➤ The specified amount of *Shuddha Vanga* was taken in an Iron pan and was allowed to melt over the gas stove.

➤ Weighed quantity of *Haridra, Yavani, Jeerak, Chinch, Ashwatha* ranging from 2g to 3 g one by one was added to the molten *Vanga* and stirring continued with iron ladle by applying good amount of pressure.

➤ When all the metal was converted in to powder form and none of the metal remained in metallic form, the powder



was collected in the centre of pan and covered with an earthen saucer and heat was increased up to maximum (*Tivragni* 650°C) approximate for 1 hours.

➤ Intermittently Saucer was slightly lifted to check the color of the powder. When the color changed in to red hot & no melted particles of free metal were observed the heating was stopped and left for self cooling.

Next day, *Jarita Vanga* was collected and weighed.

Marana of Vanga:

Ingredients *Jarita Vanga* 180 g

Kumari Swarasa 50gm in each *Bhavana*.

❖ **Procedure:**

➤ *Chakrika* were prepared by transferring the whole mass on to a plastic sheet by spreading in thin layer in the form of *chakrika* with the help of spatula. (Fig-6)

➤ After the first two *puta* colour of *chakrika* were grayish white and consistency soft. *Chakrika* were found broken in the form of coarse powder and rough in touch.

➤ After 3rd, 4th and 5th *puta* the *chakrika* became hard and colour was just on the outer surface of *chakrika* which appeared as a coating. When the *chakrika* were broken inner surface was dull white.

➤ After 6th *puta*, *chakrika* became soft in touch and the colour of the *Bhasma* became dull white.

➤ After 7th *puta* *chakrika* were again hard and the colour of the *bhasma* became dull white.

➤ After 8th, 9th, and 10th *puta* *chakrika* were soft and the colour of the *bhasma* became white.

➤ After 11th *puta*, *chakrika* became very soft and the colour of the *bhasma* became whiter. (Fig-7)

RESULTS AND OBSERVATION

Table 7 Properties of *Nirgundi Patra Swarasa*

Yield of <i>Swarasa</i>	Color	Taste	Smell	pH	Total Solid Content(%w/w)
635ml	Shiny Green	Astringent & Bitter	Obnoxious	6	3.2

Table 8 Properties of *Kumari Swarasa*

Yield of <i>Swarasa</i>	Color	Taste	Smell	pH
50ml	Watery	Bitter	Pungent	6

➤ **Results of *samanya shodhita vanga*:**

- Initial weight of *Vanga*: 200 g
- Final weight: 182 g
- Loss of weight: 18 g
- % loss: 9

➤ **Results of *vishesha shodhit vanga*:**

- Initial weight of *Vanga*: 182 g
 - Weight after *Vishesha Sodha*: 182g
- Weight gain: No loss no gain



Table 9 A Numerical summary of various parameters obtained during the pharmaceutical process of *Jarana of Vanga*

Weight of Vanga	Weight of <i>jarana dravya</i>	Duration(Hrs)	Weight of <i>Jarita Vanga</i>	Weight Increase	Color of <i>Jarita Vanga</i>
175g	125 g	11.30 hours	180	2.8%	Dull white

Results:

Initial weight of *Jarita Vanga*: 180g

Weight of *Vanga bhasma* after 11 puta:
181 g

Weight: weight gain 1gm.

❖ **Final yield of *Vanga bhasma* was 181 gm and loss was (9.5%).**

❖ ***Bhasma pariksha*:**

The prepared sample of *Vanga Bhasma* was subjected for classical tests and it was seen that the sample complied with the tests.

- *Rekhapurnatv* : +ve (Fig-10)
- *Varitaratwa*: +ve
- *Unama* : +ve (Fig-8)
- *Nishchandrata*: +ve
- *Niswadu*: +ve
- *Apunarbhava* : +ve (Fig-9)

DISCUSSION

Samanya Sodhana of Vanga:

For *samanya shodhana* the common method of the *Dhatu Sodhana* was adopted. Hor of *dhalana* was *Tila Taila, Takra, Gomutra, kanji* and *Kulattha Kwatha*, as per the reference of *Rasasantasamucchaya*. Among the five media only *Gomutra* is alkaline with the pH of 10 whereas rest of the media are

acidic in nature with the order being *Kanji* (2) > *Takra* (5) > *Kulattha kwatha* (6) > *Taila*(6). The order of *dhalana* is mentioned differently by different *Acharyas*. The various liquids used for *dhalana* served the basic purpose of acidic or alkaline medias which were necessary to bring about the desired changes in the metal. If we look in to the medias mentioned for *dhalana* it can be not

❖ All these would have been the easily available options of that time which probably served the purpose of acidic and alkaline media.

During the process of *Samanya Shodhana*, *Vanga* was heated up to melting; then it was poured for 7 times each in *Tila Taila, Takra, Gomutra, kanji* and *Kulattha Kwatha*. Every time fresh and same amount of liquid media was taken. The amount of liquid media taken was equal in amount to the quantity of *Vanga*. It should be noted that the quantity should be sufficient enough for immersing the metal and hence the volume depends on the diameter of *Pithara Yantra* taken. Initial weight of *Vanga* was 200g which reduced to 182 gm after *shodhana*. *Vanga* melts at



232° C but the duration of Melting was extended after every *Dhalana* process.

On heating, the Sn-Sn bonds get energized and when plunged into liquid media get broken into smaller fragments by reacting with liquid resulting in probably, free Sn radicals. *Vanga* became more silvery white in colour after first *dhalana*. Blackish colour was noted in the second and third *Dhalana* and some part of *Vanga* change in to greyish powder. A large amount of slag formed and floats on liquid media or seen floating over molten tin. As the *Shodhana* progressed, more & more *Vanga* converted in to Blackish powder. Basically during melting of *Vanga* the conversion into powder indicate the formation of oxide form of *Vanga*.

❖ ***Vishesha Sodhana of Vanga:***

Vanga turned to slight yellowish green color, brittle along with fine particles at the end of special purification process. Turmeric powder adhered to tin caught fire during heating, forms carbonaceous material and floats over molten tin. Melting duration of *Vanga* was extended on every *Dhalana* procedure due to presence of carbonaceous material. Weight of *Vanga* was unchanged after *vishesha shodhana*. The loss was prevent due to addition of particles of *Haridra*.

❖ **Procedure of *Jarana* (Roasting):**

The *Vishesha Shodhita Vanga* 175 gm (7 gm was taken separately for *Vishesha Shodhita Vanga* sample) was taken in an iron pan subjected to heating in open air. To the molten tin the coarse powder of *haridra*, *yavani*, *jeerak*, *chinch*, *ashwattha* were added little by little and rubbed with back of iron ladle with pressure. The process continued till it turned to powder form completely. This is known as *Jarita Vanga* (roasted tin). The *jarana* drugs was added 125 gm, though the *Rasashastra* advise to add ¼th *jarana dravya* to the metal .The process took 11:30 hours for converting 175g *Shudha Vanga* in to powder form without any free metal and a weight gain of 5gm was observed which may be due to the addition of *Jarana dravya* ash.

❖ **Procedure of *Marana* (Incineration):**

Jarita Vanga was triturated with *Kumari swarasa* till it turned to semi solid form. Pellets were made, dried and encapsulated and subjected to heating in electric muffle furnace. The same process was repeated for 11 times to get *Bhasma* as described in *Ayurvedic* classics. For 1st *Put* 180g *Jarita Vanga* was taken. *Bhavana Drava* was taken 50 gm & *Bhavana* was given for 3hrs. During the process, increase in weight was noticed after successive *puta* with a final weight gain of 1gm which may be due to addition of organic materials of



Bhavana dravya. *Vanga* fall into those metal in which the intensity of heat should be increased as *Putra* no. increases. Hence the maximum temperature was increased from 500 to 650 in successive *puta*. The colour of product turned to white after second heating. Even though the material become soft after two *puta* the stage of *varitaratwa* didn't appeared and hence *puta* were continued until the *bhasma* passed the test. It took 11 *puta* to obtain the *bhasma* which complies with classical *bhasma parikshas*.

body and occurs many disease like *prameha*, *kushtha* etc.

CONCLUSION

The present study established pharmacological process of *vanga bhasma* and we do have reference saying that the product obtained after *Jarana* process can be used therapeutically. But this has been opposed and seems to be irrational as the metal is not completely converted to *bhasma* form after *Jarana*. So it finds to completely form of *bhasma*, necessary to give many *putas*. Before therapeutically use it should be test various parameter like *varitara*, *rekhapoornatwa*, *unama*, *apunarbhava* etc. After these test we can say the *vanga metal* completely transform to *bhasma* form. *Vanga bhasma* is use for therapeutically without any proper pharmaceutical process it's harmful to



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