

# The Role of Media in the Preparation of Vanga Bhasma

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**ABSTRACT :** Vanga Bhasma is one of the renowned Ayurvedic metallic preparations commonly prescribed by the physicians; mostly in Prameha Roga (Urinary diseases). For its preparation, several media (Marana Dravya) and methods are recommended in Rasashastra texts, most of them are utilizing herbs as a media. Total 80 different methods are found described in classics for the preparation of Vanga Bhasma, out of which two methods are adopted for comparison through this present study. One of them was prepared through Jarana (combustion with herbs) and Marana (incineration), the application of heat by means of Upala (dry cow dung cakes) following the reference of Rasamritam (3/88-94) which is in common practice now a days. Another method is very unusual, in which application of heat was given by Vastraputa (heating by burning of cloths) without Jarana, as per the reference of Rasa Ratna Sammucchaya (5/162). Though the second method found suitable for easy preparation but it is not useful for large scale manufacture. VMD of the Vastraputa Vanga Bhasma was 37.2  $\mu\text{m}$  found which is larger than Vanga Bhasma (15.7  $\mu\text{m}$ ) prepared by Puta Method. For both the Bhasma XRD shows major phase as  $\text{SnO}_2$ .

**Key words :** Vanga, Tin, Shodhana, Jarana, Marana, Vastraputa.

## INTRODUCTION

The metal & minerals are generally used in unique dosages from i.e. Bhasma without which these could not be absorbed & assimilated in the body. A number of methods of preparation have been described in our classics on the basis of Maraka dravyas. These are classified into four groups on the basis of percentage of purity of final compound i.e. the Bhasma prepared by using Rasabhasma (compounds Mercury) are described as best media while using Herbal materials & Gandhaka are Madhyama (better) & Kanishka (Good) respectively<sup>1,2,3,4,5</sup>. So, considering the above facts, present study to evaluate the role of media during Marana process in terms of their pharmaceutical qualities by taking the example of Vanga was carried out.

Vanga (Tin - Stannum) is one of the most popular metal for its wide spread applicability since Vedic period, while therapeutic indication of the specially prepared metal powder<sup>6</sup> is described since Samhita period. "Rasarnava"<sup>7</sup>, one of the oldest book of Rasashastra has also give the description regarding Vanga and their uses, for, metallic transformation reactions (Samskara)<sup>7</sup>. Its Bhasma preparation is also commonly used in ayurveda for therapeutic purpose. It is observed that Churnodaka, Arkadugdha, Nirgundi Swarasa etc. are commonly used

as a media for the Shodhana of Vanga. Apamarga Panchanga in  $\frac{1}{4}$ <sup>th</sup> ratio than that of Vanga is commonly used for Jarana and Kumari Swarasa is also commonly used media for Bhavana (wet levigation). Gajaputa, Ardhagajaputa and Laghuputa have been described for the purpose of application of heat in the Marana (incineration) of Vanga. A few references are also mentioned in classics for the preparation of the Vanga Bhasma consuming shorter time duration. In this method Vanga Patra are mentioned to be smeared with some oily media and then directly subjected to Puta placing in between a bundle of cloth, cow dung or herbal powder etc. By this method one can get yield of Dhaval Varna (white coloured) Vanga Bhasma in very short duration comparative to previous one. Specific colour of the finished product is one of the quality parameters for Bhasma, as mentioned in literature<sup>7</sup>. Colour of Vanga Bhasma is recommended to be white in colour, but the Bhasma, available in market are found to be yellow, pink or else. Thus, in this study, an attempt has been made to prepare Vanga Bhasma using different media (Marana Dravya) & procedure. A comparative study has been carried out to evaluate the role of media and process for the preparation of desired white coloured Bhasma. An attempt was also made to introduce SOPs and validate the Marana procedure of Vanga Bhasma.

## Aims and Objectives:

1. To validate the process of Marana of Vanga.
2. To check the role of media in the preparation of Vanga Bhasma.

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## MATERIALS AND METHODS

### Procurement of raw materials :

Tin was considered as Vanga for their similar characteristics and was collected from Pharmacy, Gujarat, Ayurved University, Jamnagar. Apamarga panchanga (*Achayrenthus aspera*), Chinchwa Twaka (*Tamarindus indica*), Pippal Twaka (*Ficus religiosa*), Palash Twaka (*Butea monosperma*) was also collected from the Pharmacy. Churnodaka (*lime water*)<sup>8</sup> and Bhallataka (*Semicarpus anacardium*)<sup>9</sup> oil were prepared according to the classical references.

### Preparation of Vanga Bhasma (Putapaka method) :

**Shodhana** : Shodhana of Vanga was done in Churnodaka (lime water) by Dhalana (heating and pouring) procedure<sup>8</sup> repeatedly for seven times.

**Jarana** : Shodhita Vanga was further transferred in an iron vessel (Kadhai) placed over LPG gas stove and melted by applying heat. Melted Vanga was continuously rubbed with the help of iron ladle along with mixing of Apamarga panchanga in little by little amount up to which all the Vanga attained powder form. In this way total 1/4<sup>th</sup> part of Apamarga panchanga of Vanga was utilized. After attaining powder form even at high heat (600°C); all the powder collected in the center of the pan and covered with the earthen saucers (Sharava). The heat was increased up to which (637°C) bottom of the vessel became red hot<sup>8</sup> for two hours. After self cooling, the Jarita Vanga was washed with distilled water repeatedly for three times as a general practice to remove the amount of Kshara being incorporated during the processes of Jarana.

**Bhavana** : The Jarita Vanga was levigated with Kumari (Aloe vera) juice for avg.2.5hr & small pellets were made. One layer of these pellets were placed in an earthen saucer covered with another earthen saucer and sealed with the help of mud smeared cloth. After proper drying of sealing it was subjected for heat with the help of Upala (cow dung cake -Table No.3). This Putapaka procedure was repeated in the same manner for six times<sup>10</sup>.

### Preparation of Vanga Bhasma (Vastraputa method)<sup>1</sup>

Vanga Patra was smeared with oil of Bhallataka and placed in between the Kalka of Bhallataka and Powder of Chinchwa, Pippal and Palash Twaka. All these materials were packed and tied in bundle of clothes and burned in a closed room having Nirvatasthana (free from direct air flow). After self cooling white colour Vanga Pushpa was collected carefully.

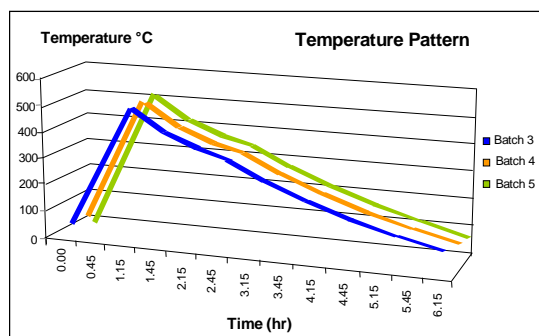
The final yield of both types of Vanga Bhasma has been analyzed on classical and modern parameters.

Physico-Chemical analysis of different media was carried out on parameters like pH, Total solid content, specific gravity. Qualitative test for various ions present in the media has also been carried out.

## OBSERVATIONS AND RESULTS

In Putapaka method, after the Shodhana procedure average 495.3g Shuddha Vanga was obtained from 500g of Vanga (Table 1) i.e. average 0.87 % loss was observed during the procedure. In the Jarana procedure 6.93% increase was found in the weight of Vanga and a decrease of 3.39% was observed after the Kshalana (washing with water) of Jarita Vanga (Table 2). As per the volume mentioned for Ardthagajaputa, total 90 cow dung cakes (9.5kg by weight) were used for providing the heat in the first batch of Putapaka. The same quantity was repeated up to three Putas. From 4<sup>th</sup> Puta, colour of the Chakrikas became pinkish white and hardness was increased. Then for further Putas, the numbers of cow dung cakes were decreased up to 70. In the second batch total 70 cow dung cakes were used for first four Putas, but due to slight hardening and discoloration of the material, the cow dung cakes were reduced to 50 in further Putas. On the basis of previous batches, only 45 numbers i.e. approx. 4.5-5.0 kg by weight of Upala (cow dung cakes) were utilized for the application of heat in each Puta of the third batch. After every Puta hardness of the Chakrikas (pellets) were decreased except after 3<sup>rd</sup> and 4<sup>th</sup> Puta where slight increase in hardness was observed but it was less in comparison to previous batches. The same method was followed for fourth batch.(Table 3). It was observed that 45 cow dung cakes (4.5-5.0 kg) recorded peak temperature up to 514°C achieved after 50 minutes of heating, maintained for 1 to 2 minutes and afterwards getting decreased to 500°C within 6 to 6.5 hours. The 9.23% average loss was observed during total process of preparation of Bhasma for one batch (Table 4).

**GRAPH NO. 1 : TEMPERATURE OF PUTA WITH 45 COW-DUNG CAKES (4.5 TO 5 KG IN WEIGHT) :**



In Vastraputa method, for 50g of Vanga Patra, total 1kg of mix powder of Chinchu, Pippal, Palash Twaka, 100g of paste of Bhallataka and 150g of Bhallataka oil were utilized. In this procedure average 37.33g Vanga Bhasma was obtained in summer season. The weight of cloth was needed to be increased up to 5kg during winter season and average 41.47g yield of Vastraputa Vanga Bhasma was obtained. (Table 5)

#### Analytical Contrive :

Both the Vanga Bhasma were soft in touch, tasteless and not having any specific odour. The colour

of the Vanga Bhasma prepared by Puta method was Pinkish white for Batches  $V_1M_1$  and  $V_2M_2$ . It was observed dull white in Batches  $V_3M_3$ ,  $V_4M_4$ ,  $V_5M_5$ . Vanga Bhasma prepared by Vastraputa method was found White for all the Batches.

There was no significant change observed in the pH, total solid content and specific gravity of Churnodaka at 40°C after Shodhana of Vanga.

The results of qualitative organic assay for detecting the presence of various ions in the different media used for the preparation of Vanga Bhasma are presented in Table 7.

TABLE NO. 1 : CHANGE OF WEIGHT OF VANGA AFTER SHODHANA :

Weight(g)	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7
Initial	500	500	500	500	500	500	500
Final (dry)	489	496.4	498.2	496	497.6	496	496.4
% change	2.2↓	0.72↓	0.36↓	0.8↓	0.48↓	0.8↓	0.72↓

↓ : Decrease

TABLE NO. 2 : WEIGHT OF APAMARGA PANCHANG , DURATION AND LOSS OF VANGA DURING JARANA :

Batch Code	Wt. of Shodhita Vanga ( g )	Wt of Apamarga panchanga (g) ¼ part	Duration	Wt. of Jarita Vanga ( g )	Wt. Increase in %	%loss of Vanga after Kshalana
$V_1J_1$	489.0	122.50	6 hr 30 min	535.02	9.00	4.72
$V_2J_2$	496.4	128.10	7 hr 00 min	540.44	8.80	3.33
$V_3J_3$	498.2	124.60	7 hr 00 min	525.32	5.30	2.96
$V_4J_4$	496.0	124.00	7 hr 15 min	526.17	6.04	2.74
$V_5M_5$	497.6	124.40	7 hr 00 min	525.00	5.50	3.19
Avg.	495.3	124.72		530.39	6.93	3.39

TABLE NO. 3 : NUMBER OF COW DUNG CAKES USED IN DIFFERENT BATCHES :

Batches	1 <sup>st</sup> Puta	2 <sup>nd</sup> puta	3 <sup>rd</sup> puta	4 <sup>th</sup> puta	5 <sup>th</sup> puta	6 <sup>th</sup> puta	7 <sup>th</sup> puta
$V_1M_1$	90	90	90	70	70	70	70
$V_2M_2$	70	70	70	70	50	50	50
$V_3M_3$	45	45	45	45	45	45	45
$V_4M_4$	45	45	45	45	45	45	45
$V_5M_5$	45	45	45	45	45	45	45

TABLE NO. 4 : FINAL YIELD OF VANGA BHASMA BY PUTA METHOD :

Weight(g)	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5
Initial	500.09	513.02	510.23	502.02	508.26
Final (VB)	464.60	466.00	462.09	461.02	460.4
% change	7.06 ↓	9.16 ↓	9.43 ↓	8.16 ↓	9.41 ↓

↓ : Decrease

**TABLE NO. 5 : QUANTITY OF VANGA PATRA, MEDIA AND FINAL YIELD VANGA BHASMA OF PREPARED BY VASTRAPUTA METHOD :**

No. of Batch	Vanga Patra (g)	Bhallataka		Cotton Cloth (g)	Chincha, Pippal, Palash Twaka powder (g)	Obtained Bhasma (g) (VSVB)
		Oil	Kalka			
1	50	25	25	200	-	0
2	50	25	25	400	-	2.0
3	50	25	-	800	-	12.0
4	50	50	50	1000	-	6.0
5	50	25	25	1,600	-	10.0
6	50	25	25	1000+2.5 (jute cloth)	-	8.0
7	50	25	25	3,200	-	20.0
8	50	25	100	6,400	-	18.0
9	50	100	100	3000	1000	38.0
10	50	100	-	3,500	1000	39.8
11	50	100	100	5000	1000	20.2
12	50	100	100	3,500	1000	36.0
13	100 (S)	225	100	3,200	1000	39.1
14	100 (S)	225	100	6,400	2000	30.0
15	100 (S)	225	100	6,400	2000	31.0
16	50 (S)	150	100	3,500	1000	32.4
17	50 (S)	150	100	3,500	1000	34.6
18	50(S)	150	100	3,500	1000	32.0
19	50 (S)	150	100	3,500	1000	39.0
20	50(S)	150	100	3,500	1000	39.2
21	50(S)	150	100	3,500	1000	36.0
22	50(S)	150	100	3,500	1000	36.9
23	50(S)	150	100	3,500	1000	36.0
24	50(S)	150	100	3,500	1000	36.1
25	50(w)	150	100	3,500	1000	19.8
26	50(w)	150	100	5000	1000	40.1
27	50(w)	150	100	5000	1000	42.4
28	50(w)	150	100	5000	1000	40.0
29	50(w)	150	100	5000	1000	41.9

W : Winter season, S : Summer season

**TABLE NO. 6 : PHYSICO-CHEMICAL PARAMETERS OF VANGA BHASMA :**

Parameters	Samples	
	VB	VSVB
Loss on drying (%W/W)	0.2435	0.4664
Ash value (%W/W)	99.83	97.89
Acid insoluble ash (%W/W)	84.67	84.67
Water soluble extractive (%W/W)	01.56	00.39
Phase Identification(XRD)	SnO <sub>2</sub>	SnO <sub>2</sub>
Particle size(VMD) $\mu$ m	15.7	37.2
EDAX (Sn %)	72.21	78.43

VB : Vanga Bhasma preparad by Puta method; VSVB : Vanga Bhasma preparad by Vastraputa method

**TABLE NO. 7 : RESULTS OF QUALITATIVE TESTS FOR DETECTING THE PRESENCE OF VARIOUS IONS IN THE DIFFERENT MEDIA USING FOR PREPARATION OF VANGA BHASMA :**

Qualitative test	Apamarga panchanga ash	Chincha, Pippal, Palash Twaka ash
Test for Sodium	+	+
Teat for Potassium	+	+
Test for Chloride	+	+
Test for Bicarbonate	+	+
Test for Calcium	+	+

## DISCUSSION

During Shodhana two times of Churnodaka in volume than weight of Vanga was taken. For quenching it is essential that all the material should get dipped into the liquid media. Bumping of the melted Vanga (Tin) was observed during Shodhana, It may be due to sudden reduction in the inter molecular space of the molten metal or due to sudden fall in the temperature from 245 °C to 45°C. The process may lead to the formation of coarse grain structure of the metal, which is more brittle in nature than the original form. Thus it may be one of the main reason in the transformation of some part of Vanga to coarse powder form.

The pH of Churnodaka was detected to be highly alkaline i.e. 13. Thus repeated heating and quenching of the metal in the basic liquid media may lead to corrosive changes in the metal and also may be utilized for the removal of alkaline soluble impurities from the metal. Volatile impurities may also be evaporated during the procedure.

Due to continuous rubbing, more surface area of the metal is exposed to the air, which may facilitate to concerned compound formation and gradually the metal converted to powder form.

According to literatures, Apamarga panchanga is a good Maraka Dravya (combusting material) for Vanga. An overall review of the herbal drugs used for Vanga Marana indicates that most of them contain Kshara (Alkaline matter). Kshara may be worked as a catalyst and convert the metal into powder form. By its Bhedana (penetration) property, Kshara may helps in making the metal softer and brittle. Presence of Chloride ions in the Apamarga may provide for Chloridization of the metal. During the red hot stage, powder was covered with an earthen saucer plate. This leads to create an environment devoid of air specially oxygen and then heat up to red hot stage. These all may be compared with the process of calcinations, in which the metal is allowed to undergo decomposition without melting.

Though Ardhagajaputa was mentioned for the preparation of Vanga Bhasma, but there is no any clear reference available regarding the dimensions or the number of Cow dung cakes in relation to Ardhagajaputa. In the present study increase in the hardness and discoloration of Chakrikas (pellets) lead to decrease the number of cow dung cakes gradually, because increase in these two observations may indicate towards excess heating of the Vanga during incineration. On the basis of the result obtained it may be considered that for getting white coloured bhasma from average 506.54g of Jarita

Vanga, total 45 number i.e. 4.5 to 5 kg by weight of cow dung cakes should be considered along with pit size of 35cm each in length, breath and height. As per the variation observed in the size and variety of Upala (cow dung cakes) found through out India, average weight should also be considered along with the temperature pattern followed for the preparation of Vanga Bhasma. Here final colour of the bhasma suggests the formation a compound having majority of SnO<sub>2</sub>. Kumari Swarasa may also supply trace elements to prepare the Vanga Bhasma.

Although references about the Vastraputa method of preparation of Vanga Bhasma is available in various classical literatures but the ingredients (Maraka Dravya) utilized during the process are found mentioned in Rasa Ratna Sammucchaya 5/162. Here also no clear indications are found regarding the procedure and amount of material, but as per the reference given in Rasapaddhati<sup>11</sup> total twenty times of powders of Chinch, Pippal, Palash Twaka were taken here in comparison to Vanga Patra. Thus the reference was adopted for this study.

Vanga is a very soft metal and has low melting point. Thus, comparatively lower temperature for a longer duration is needed for preparation of Vastraputa Vanga Bhasma. Winter season is preferable season for preparation of Vastraputa Vanga Bhasma because in summer season there is chance of increase in the temperature which may lead to lessen the yield. Bhallataka oil contains 42.69% of Phenolic constituents i.e. anacardone and nicotinic acid<sup>12</sup>. Phenolic constituents are corrosive in nature, and may help in easy worn out of the metal<sup>13</sup>. The bark of Chinch, Palash, and Pippal has thermogenic properties<sup>12</sup> which may help in maintaining constant temperature through out the procedure.

## CONCLUSION

1. For getting white coloured Bhasma 45 number of (4.5 to 5 kg) cow dung cakes should be considered for average 506.54g of Jarita Vanga.
2. For 50 g Vanga Patra, total 3.2 kg of cloth, 150 g Bhallataka oil, 100 g Bhallataka Kalka and 1.0 kg powders of Chinch, Pippal and Palash Twaka are needed for the preparation of Vastraputa Vanga Bhasma in summer season and the amount of cloth increased up to 5.0 kg during winter season may be taken as standard.
3. Vastraputa Vanga Bhasma method was found to be easier, convenient, and less time consuming in comparison to Putapaka Vanga Bhasma. But, the only disadvantage of this method is that, it is not suitable for large scale production.

4. Colour of the Vastraputa Vanga Bhasma was white while dull white by Putapaka method. Tin oxide (SnO<sub>2</sub>) is the major compound find in both the Vanga Bhasma.

#### REFERENCES

1. Vagbhata Rasa Ratna Samucchaya, D. A. Kulkarni, Hindi commentary, Meharchand Lachhmandas publications, 1982, New Delhi, (5/14, 5/162).
2. Vadodkara D. S. et. al. (1988) -Comparative study of media in the preparation of Tamra Bhasma w.s.r. to Tamaka Shawasa, M.D.(Ayu.) thesis, G.A.U., Jamnagar.
3. Sharma N. et.al. (1989) -The effect of three different media in the action of Rajata Bhasma w.s.r. to Vandhyattva (Female Infertility)", M.D. (Ayu.) thesis, G.A.U., Jamnagar.
4. Dave Rajendra R. et.al. (1991) - A Comparative study of Naga Bhasma w.s.r. to different media (Along with it's efficacy in Kshudra Kushta)", M.D. (Ayu.) thesis, G.A.U., Jamnagar.
5. Reddy S. et. al. (2006) -A comparative pharmaceutico-pharmacoclinical study of Tamra Bhasma (prepared by applying different Rasabhasmas) w.s.r. to its effect on Sthaulya, M.D. (Ayu.) thesis, G.A.U., Jamnagar.
6. Agnivesha, Revised by Charaka and Dradhhabala, Charaka Samhita, Sri Satya Narayana Shastri, Vidyotini Hindi commentary by Kashinath Shastri, Dr. Gorakhnath Chaturvedi (1998), Chaukhambha Bharatiya Academy, Varanasi, (Sid.7/88).
7. Manthan Bhairav, Rasarnavam Nama Rasatantram- Parvati Parmeshvar Samvadatmaka, Rasachandrika Hindi com by Dr Indradeo Tripathi and Bhagarithi notes by Pt Taradatta Panta Ayurvedacharya (2001), 4<sup>th</sup> edition, Chaukhambha Sanskrit series office, Varanasi, (8/27,7/110-112,10/48-55).
8. Sharma Sadananda (2000), Rasatarangini, Shastri Kashinath, Hindi commentary, Motilal Banarasi Das, Delhi, (11/216-18,18/8-9,18/19-24).
9. Maharshi Sushruta, Sushruta Samhita, Ayurved Tatva Sandipika, Hindi commentary, Kaviraj Ambikadatta Shastri (2003), Chaukhambha Sanskrit Sansthan, Varanasi, (Su .Ch.1/90-92).
10. Acharya Yadavji Trikamji, Rasamritam, Joshi D. (1998), Translation, Chaukhamba Sanskrit Bhawan, Varanasi, (3/88-94 1/2).
11. Acharya Bindu (1987), Siddhiprada, "Radsapadhhati' Hindi commentary by Dr. Siddhinandana Mishra, Vol 1, Chaukhambha orientalia, Varanasi.
12. PC Sharma, MB Yelne, TJ Dennis (2000), Database on Medicinal plants used in Ayurveda, Vol 1,5 ,CCRAS.
13. Dutta P.K. (1996), General and Inorganic Chemistry, Sarat Book House, Calcutta, Vol. I, 189.

## हिन्दी सारांश

### वंग भस्म निर्माण में माध्यमों का महत्व

जल्पा जानी, बी. जे. पटगीरी, बी. रविशंकर एवं पी. के. प्रजापति

आयुर्वेद में वंग भस्म एक प्रसिद्ध भस्म कल्पना है जो अधिकतर प्रमेह रोग में उपयुक्त होती है। रसशास्त्रीय ग्रन्थों में वंग भस्म के निर्माणार्थ बहुत सी प्रक्रियाओं और माध्यमों का वर्णन मिलता है। लेकिन उनमें से अधिकतर प्रक्रियाएँ काष्ठ औषधियों पर आधारित हैं। हमारे शास्त्रों में वंग भस्म के निर्माण के लिए ८० अलग अलग प्रक्रियाएँ वर्णित हैं। लेकिन वर्तमान अध्ययन के लिए दो अलग अलग प्रक्रियाओं को लिया गया है। उनमें से एक रसामृतम् (३/८८-९४) के आधार पर है जो कि बहुत प्रसिद्ध है और अधिकतर उपयोग में लायी जाती है। दूसरी प्रक्रिया वस्रपुटी वंग भस्म है जो कि रसरत्न समुच्चय (४/१६२) के आधार पर की गई है और यह असामान्य है। माध्यम के महत्व का पता लगाने के लिए उसका भौतिक एवं रासायनिक विश्लेषण किया गया और फार्माकोपियल प्रमाण निर्धारित करने के लिए दोनों विधियों का तुलनात्मक अध्ययन किया गया है।

गुजरात आयुर्वेद युनिवर्सिटी