

## ANALYTICAL STUDY OF VANGA BHASMA

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### ABSTRACT

Ayurveda the Science of Life has an overarching access in treating various ailments and also has a perpetual approach in maintaining disease free health. In order to accomplish these objectives this science count on Rasa Shastra & Bhaishajya Kalpana to engineer the medicines which are of high standards, target oriented, having no side effects and of aristocratic quality. Amongst these multifarious medicines bhasma shows dynamic and committed results in treating assorted ailments. Vanga bhasma is one of the most liberally used bhasma in numerous illnesses. In the present study Vanga bhasma is prepared by conventional method and was analyzed on various parameters.

**KEYWORDS:** *Vanga Bhasma, Electron Spectroscopic Chemical Analysis*

### INTRODUCTION

While treating any patient Acharyas have given unique importance to the medicines amongst the four pillars of treatment.<sup>1</sup> In general if we see, there are limitations in the action of herbal medicines as compare to the herbo-metallic combinations, which have shown promising results in various diseased conditions. So one can say the molecules designed by Indian alchemy have upper hand in treating various diseases.

The authenticity of any medicine depends upon its pharmaceutical cloning, excellence in quality and admirable results. In the present study, Vanga bhasma<sup>2</sup> is prepared vide reference from the text by conventional

method and further taken for analytical study in the light of modern parameters to give scientific validation and objective parameter to the drug so that Vaidya gets authentic medicines.

### MATERIAL AND METHODS

The preparation of Vanga bhasma was carried out by traditional method of Dhatu (metallic) bhasma preparation. To begin with raw drug ashodhita Vanga was treated with samanya shodhana procedure by Dhalana method using Taila, Takra, Gomutra, Aranala and Kulattha kwatha as medias. Further on this samanya shodhita Vanga, vishesha Shodhana procedure was carried

using Choornodaka as media.

The marana of Vishesha shodhita Vanga was done by first converting Vanga to powder form by Jarana procedure then puta procedure was carried out to give bhasma form.

**Selection of raw drugs:** All raw drugs were judiciously procured from authentic source by following stringent classical grahya – agrahya lakshanas.<sup>3</sup>

**Shodhana of Vanga (Purification / Detoxification)**

The raw drug ashodhita Vanga was treated with shodhana procedure in two steps.

**1. Samanya shodhana<sup>4</sup>**

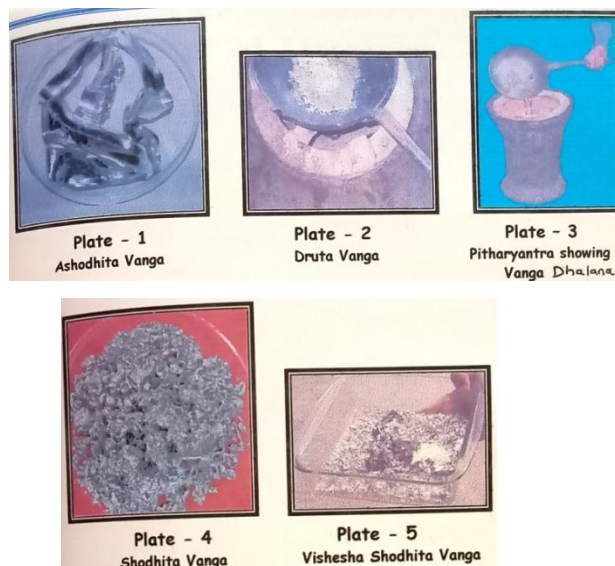
The 2 kg ashodhita Vanga was taken in an iron cauldron (Loha Kadhai) and heated. Since it is having low melting point (231.9 °C), it melts quickly. Heating was continued till molten Vanga looks red hot. This molten Vanga was immediately poured in the 1st media i.e. Teela taila (Sesame oil) through Pithara yantra. This Dhalana (melting and quenching) method was used sequentially in all other medias which includes Takra (Butter milk), Gomutra (Cow’s urine), Aranala (Fermented liquid)

**Samanya & Vishesha Shodhana**

and Kulattha kwatha (decoction of Dolichos biflorus Linn.) for 7 times in each media under aseptic conditions and following Standard operative procedures. Fresh liquid Medias were taken each time.

**1. Vishesha shodhana<sup>5</sup>**

This samanya shodhita Vanga was taken for Vishesha Shodhana. This procedure was carried using Choornodaka (lime water) as a media by Dhalana method. Heating of Samanya shodhita Vanga was done in loha kadhai till red hot molten stage is achieved and then quenching it in choornodaka for seven times was performed. Every time fresh choornodaka was used.



**Observations of Vanga during**

Drava Dravya	Before Shodhana				During Shodhana		After Shodhana			
	Colour	Odour	Weight	Consistency	Sound	Splashing	Colour	Odoour	Weight	Consistency

Tila Taila (7 times)	White shining	Odourless	2000 gms	Soft, strips of Tin metal, malleable	No sound	No splashing	Silver white, shining	Oily smell	2000 gm, no loss	Hard, disc shape, metallic mass
Takra (7times)	Silver white, shining	Oil y smell	2000 gms	Hard, disc shape, metallic mass	Loud hissing sound	Splashing with sound	Off white, less shining	Curdy smell	1985 gms Loss-15gms	Pieces, hard sharp, pointing
Gomutra (7times)	Off white, less shining	Curdy smell	1985 gms	Pieces, hard sharp, pointing	Loud hissing sound	Splashing with sound	Pale white with no shining	Aromatic	1970 gms loss 15gms	Pieces, hard sharp, pointing , some powder form
Aranala (7times)	Pale white with no shining	Aromatic	1970 gms	Pieces, hard sharp, pointing , some powder form	Loud hissing sound	Splashing with sound	Yellowish white, no shining	Acidic smell	1960 gms Loss 10gms	Pieces, less hard, sharp, pointing , some powder form
Kulatt ha kwath (7times)	Yellowish white, no shining	Acidic smell	1960 gms	Pieces, less hard, sharp, pointing , some powder form	Loud hissing & bubbling sound	More Splashing with loud sound	Brownish white, no shining	Odo ur less	1940 gms loss 20gms	Soft small pieces, less sharp & pointing, metallic form, more powder
Choor nodaka (7times)	Brownish white, no shining	Odourless	1940 gms	Soft, small pieces, less sharp & pointing, metallic form, more powder	Loud hissing & bubbling sound	More Splashing with loud sound	Curdy white, no shining	Odo ur less	1920 gms loss 20gms	Soft Small pieces, less sharp, pointing, metallic form, more powder

**Marana of Vanga**<sup>6</sup>

The marana of Vanga was carried out in two steps:

1. Vanga Jarana<sup>7</sup> ( Heating & Stirring):

Vishesha shodhita Vanga (1000gms) was taken in a big sized Iron cauldron and heated till it melts. Little quantity of course powder of panchangas (whole plant) of Apamarga

(*Achyranthes aspera* Linn.) was sprinkled on

the sides of molten Vanga and at the same time continuous rubbing was carried out using another loha kadhai having long handle. Once Apamarga choorna gets fully burn again little quantity was added. It took almost 4 hours for complete conversion of Vanga to powder form. The total powder

was collected in the centre of the loha kadhai and then covered with sharava and strong heat was given for 1 hour. Then it was allowed to self cool and further kshara nirmulana was done by washing with the help of water. The confirmation of Jarita Vanga devoid of Kshara was done using litmus paper.



Plate - 6  
Vanga Jarana



Plate - 7  
Jarita Vanga

### Observations during Vanga Jarana

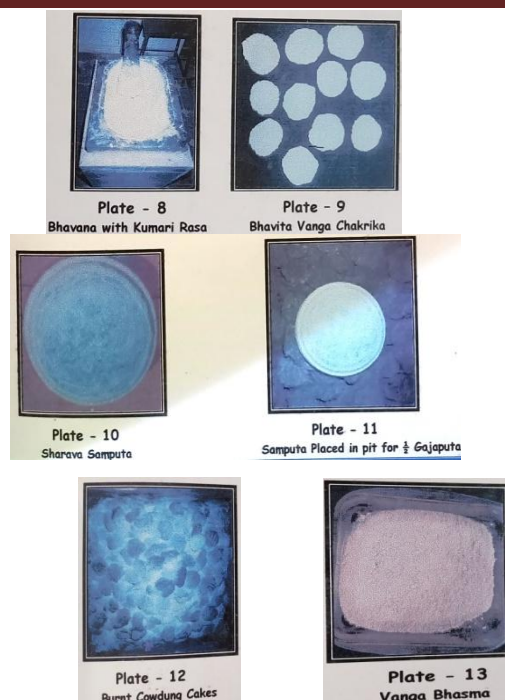
Time	Approximate conversion of vanga to powder form	Apamarga Choorna Used	Observations
½ hr	No conversion, Vanga in molten state	10-20 gms	Light smoke after adding choorna, to avoid spilling of Vanga slow rubbing needs to be done
1hr	5-10%	30-40 gms	Smoke of burning choornas, Rubbing was smooth, Grayish black powder seen on the sides of cauldron
2hr	35-40%	80-100gms	Sluggish rubbing, smoke with choorna, Blackish white ash could be seen
3hrs	90%	180gms	On pressing small globules of unconverted tin could be seen, colour whitish
4hrs	Almost 100 %	255gms	Even On pressing small globules of unconverted tin could not be seen, colour whitish

### Vanga Bhasmikaarana (Incineration)<sup>8</sup>

Jarita Vanga was taken in a khalva yantra and bhavana was given to it by Ghrita kumari (Aloe vera Linn.) swarasa. Trituration was carried out for 3hrs, and then chakrikas (pillets) were prepared (3.5 inch diameter & 1-2 mm thickness) and kept for

drying. Dried chakrikas were placed in an earthen sharava arranged in single layer. Another sharava with same dimensions was placed over it in reverse direction. The edges of both sharavas were sealed with seven layers of mud smeared cloth strip by sandhi bandhana method. After drying this samputa

was placed for incineration process with ardhagajaputa agni samskara i.e. using 525 cow dung cakes. The placement of cow dung cakes in the pit was done as 375 cakes below in a pit over which sharava samputa was placed and then remaining 150 cakes were placed above it. Agni was ignited from all four corners. It took 8 hours for complete burning of cow dung cakes and self cooling. Samputa was removed out carefully and then two sharavas were separated attentively to avoid contamination. This puta procedure was repeated for 6 more times. The colour of finished product ‘Vanga bhasma’ was ivory white and was fulfilling all sumruta bhasma parikshas.



**Observations of Vanga Marana**

Test	Before Marana	Observations During giving 7 Ardhagaja Puta						
		I	II	III	IV	V	VI	VII
Colour	White	White	Whitish Yellow	Whitish Yellow	Yellowish White	Yellowish White	Yellowish White	Ivory White
Taste	Slightly alkaline	Slightly alkaline	Test less	Test less	Test less	Test less	Test less	Test less
Appearance	Powder	Powder	Fine Powder	Fine Powder	Fine Powder	Very fine powder	Very fine powder	Very fine powder
Weight	1075gms	1050gms	1038gms	1022gms	1016gms	1006gms	998gms	990gms
Odour	Slightly alkaline	Slightly alkaline	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

Swarasa Required	-	800-850ml	800-850ml	800ml	750-800ml	750-800ml	750-800ml	750-800ml
Varitarata	40-50%	-	-	-	-	-	observed	100%
Rekhapooranata	NOB	NOB	NOB	NOB	NOB	NOB	OB	OB

- NOB- Not observed , OB- Observed

## DISCUSSION

In the present study Vanga Dhatu (Tin Metal – Sn) was converted in the Bhasma form by using traditional method and this Vanga bhasma was tested on both Ancient and Modern Parameters

### Ancient Parameters<sup>9</sup>

Colour: Ivory white	Varitartva: Positive	Mruduta: Positive
Odour: Odourless	Rekhapooranata: Positive	Nischandratva: Positive
Touch: Very fine smooth powder	Nirdhumatva: Positive	Apunarbhava : Positive
Taste: Tasteless	Gatarastava: Positive	

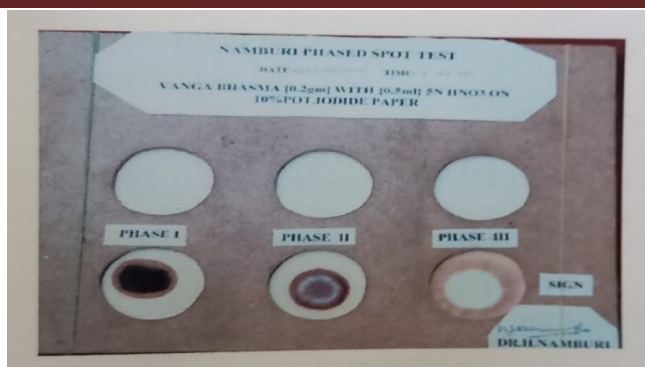
The organoleptic analysis of Vanga bhasma as mentioned in the texts of Ayurveda reveals that it is very soft to touch, have white colour and do not produce any taste when kept on tongue nor it emits any odour when it is smelt. Tests such as nishchandravam (lusterless), rekhapurnatvam (particle size enters in the furrows of finger), varitara (floating of product on water) etc should be positive. It was seen when tested, the prepared bhasma have complied with all physical tests mentioned in the literature.

### Modern Parameters<sup>10</sup>

Ash value: 93.28% w/w	Loss on Ignition: 0.8524% w/w
Acid insoluble ash: 79.524% w/w	Tin (Sn): 68.748%
Loss on Drying at 1100 c : 0.25% w/w	

### Namboories phased spot test<sup>11</sup>

Dr. Hanmantrao Namboori has designed unique technique to tests bhasmas and sindura kalpanas called ‘Namburi Phased Spot Test’. Prepared Vanga bhasma was also tested with same test.



I Phase - Dark brown solid spot in the centre  
“Immediate reaction”

II Phase - Formation of Glittering grey spot  
“Delayed reaction”

III Phase - after 8 hrs of I phase the dark brown spot fades away leaving behind yellowish white as big as glittering spot  
“Late reaction”.

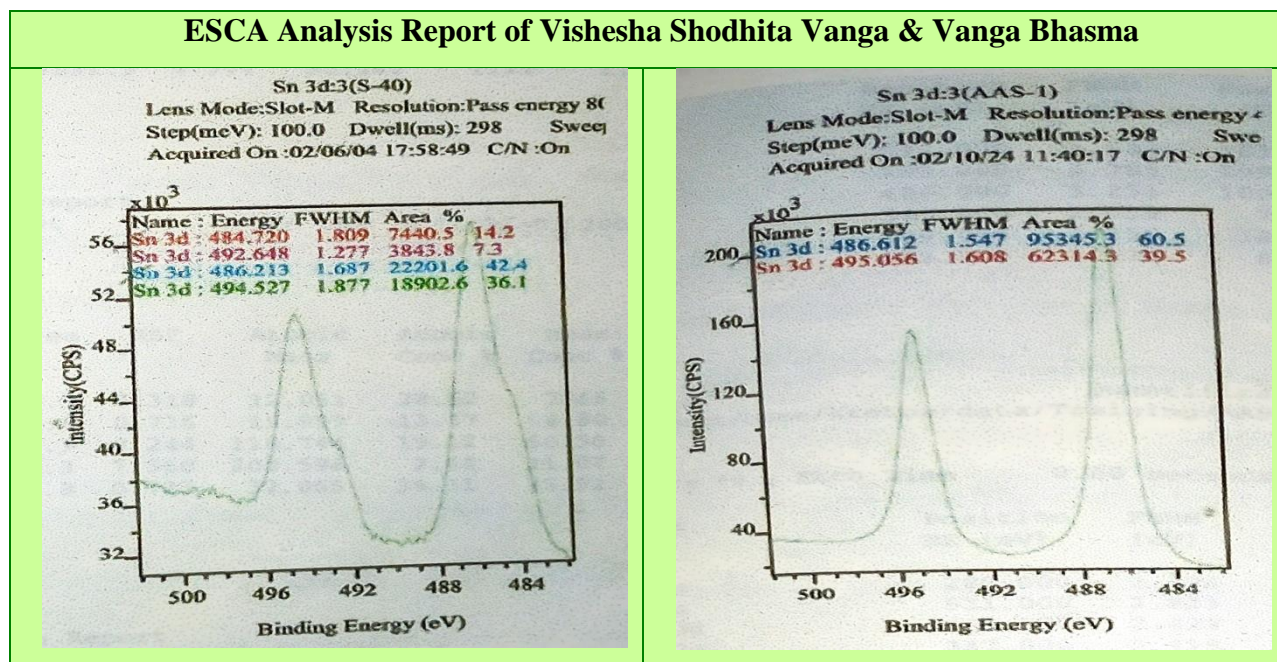
When prepared bhasma was tested, the colour pattern was observed tallying with the standard pattern of mulika marita Vanga bhasma on chemical reacting paper designed

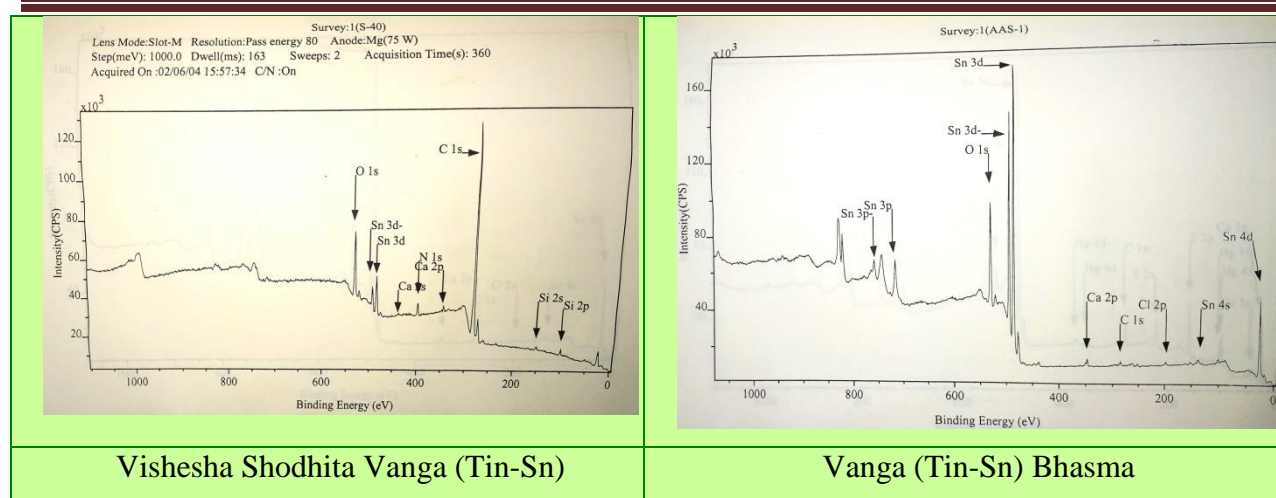
by Dr. H. Namburi, indicating high standards of bhasma.

### Electron Spectroscopy for Chemical Analysis

Further the sample of Vishesha Shodhita Vanga and Vanga Bhasma were analysed with surface based on Ultra high vacuum technique of Electron Spectroscopic Chemical Analysis (ESCA) at Indian Institution of Chemical Technology Hyderabad.

### ESCA Analysis Report of Vishesha Shodhita Vanga & Vanga Bhasma





The ESCA analysis of Vanga after vishesha shodhana reveals presence of Tin, Calcium, Oxygen, Carbon, Nitrogen & Silicon (most of these elements must have originate from medicinal plants used during preparation of bhasma) with mass concentration of Carbon was 69.96% and that of Tin was 8.92% where as in Vanga Bhasma the mass concentration of Tin got enhanced to 69.04% and that of carbon got reduced to 1.50%. Silicon and Nitrogen were not traceable.

### CONCLUSION

As acknowledge in abstract, the analytical study of Vanga bhasma highlighted the fact that herbo-metallic preparations, prepared by conventional method following stringent SOP's, when analyzed with the light of modern science up to sub atomic level can give accurate interpretation of high standard & quality of Ayurvedic formulations. In this formulation also the study confirmed the formation of organometallic compound at the end of the manufacturing process and as

compared to Shodhita Vanga the mass concentration of Tin increased in Vanga Bhasma which indicates the binding capacity of Tin atoms increased which can be interpreted as Nano medicine. The study was planned as to prepare the product by adhering to Standard Operative Procedure (SOP) and to evaluate relevant physio chemical parameters and develop reference standards which will be one of the tools for quality control.

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