

# Evaluation of market samples of 'Yashada bhasma' using 'Namburi Phased Spot Test'

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## ABSTRACT

Yashada bhasma (Calx of Yashada i.e. Zinc) which has its main indication in Prameha (Diabetes) and Netra vikaras (Eye disorders) was prepared according to the prescription in the Ayurvedic classics and subjected to various bhasma parikshas, including the Namburi Phased Spot Test (NPST), one of the qualitative tests described for various Ayurvedic preparations. NPST helps differentiate between, and thus identify, various bhasmas. It depends upon the pattern of the spot, which develops after a specific chemical reaction. Three market samples of Yashada bhasma, which were said to be Parada marita (incinerated using Mercury), were also subjected to the above tests and results compared. The various bhasmas exhibited marked differences in colour, and though NPST yielded desired results for all the samples, there were differences in their spot patterns and colour. The bhasma prepared in our department produced the most accurate results.

**Key words:** Namburi phased spot test, Yashada bhasma

## INTRODUCTION

Yashada (Zinc) is one of the Puti Lohas (Metals with low melting points eg Lead, Tin etc.). Its bhasma (calx) has as its main indication, Prameha (Diabetes). In the 14<sup>th</sup> century, Rasaka satva (the metallic extract of Zinc carbonate/Zinc oxide) was also independently known by the name "Yashada". Since then, its bhasma has been in therapeutic use for various disorders including Prameha (Diabetes), Pandu (Anemia), Vatavyadhis (Neuro-muscular diseases), and Netra vikaras (Eye diseases). Yashada bhasma prepared using Parada (Mercury) is considered the best in Rasashastra<sup>[1]</sup> branch of Ayurveda. However, in this competitive, commercialized world, the quality of a bhasma is always open to question. For

bhasma quality assessment, various bhasma parikshas (tests) have been described in the classics.

The Namburi Phased Spot Test (NPST), a spot test based on a chemical reaction, is a new technique for assessing the quality of a prepared bhasma. When a drop of clear solution of a substance under examination (Bhasma or Sindhura) is put on specially prepared chemical reacting papers, a spot appears which manifests a series of colour and pattern changes. In chemistry, techniques involving spot tests or chromatography are widely used. The NPST involves observations of the spot and its colour, at three successive phases spread over three different time intervals. It thus has the advantage of measuring sensitivity of reactions at different time intervals. In other words, it constitutes a method to study or detect, every second or even fraction of a second, continual chemical reactions taking place gradually between two chemical substances on static media. The technique was developed and standardized by Dr. Namburi Hanumantha Rao in 1970, it has been accepted by CCRAS, New Delhi.

NPST and other classical tests were performed on samples of Yashada bhasma: the first prepared classically using Parada; and three other market samples, also said to be Parada marita, in order to compare and evaluate their quality.

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## MATERIALS AND METHODS

A three-part methodology was used:

- Obtaining samples of Yashada bhasma: first prepared classically, three others as market samples.
- Subjecting all samples to classical bhasma parikshas.
- Subjecting all samples to NPST.

### Preparation of Yashada bhasma

Authenticated raw Yashada (Zinc metal) was taken from the department of Rasashastra, K. L. E. U. Shri B. M. K. Ayurveda Mahavidyalaya, Shahapur, Belgaum, Karnataka, and subjected to Samanaya shodhana<sup>[2]</sup> (general purification) by the Dhalana (liquefying and pouring) method in Tila (*Sesamum indicum*) Taila (oil), Takra (butter milk), Gomutra (Cow's urine), Kanjika (sour gruel), Kulattha (*Dolichus biflorus*), and kwatha (decoction). Dhalana was carried out three times in each liquid media. After samanya shodhana, Vishesh shodhana<sup>[3]</sup> (specific purification) was carried out by the (same) Dhalana method in Churnodaka (lime water) seven times. After shodhana, the metal became more brittle, and was then subjected to Jarana<sup>[4]</sup> (roasting) using Apamarga panchanga churna (*Achyranthes aspera*). After jarana, the metal was converted into a very fine grey shining powder which was deemed fit for Marana (incineration). The powder was then subjected to Marana<sup>[5]</sup> by triturating it with Shuddha Parada (purified Mercury), 1/4 of Yashada and Shuddha Gandhaka (purified Sulphur), 1/4 of Yashada, to form a black powder, to which one bhavana (trituration in liquid media) each with Kumari swarasa (fresh juice of *Aloe vera*) and Nimbu swarasa (fresh juice of *Citrus limon*) was given and Chakrikas (pellets) prepared. After drying, they were kept in sharava (casseroles), sandhi bandhana (sealing) was done and subjected to Gajaputa with 1000 cow dung cakes. After two gajaputas, Yashada bhasma of a yellowish colour was obtained.

### Bhasma parikshas

The prepared Yashada bhasma (sample number 4), and the three market samples (numbers 1, 2 and 3) were subjected to various classical bhasma parikshas like Rekhapurnata, Varitarata, Unama, Nishchandrata, Nirdhuma and Niswadu [Table 1].

### Namburi Phased Spot Test<sup>[6]</sup>

All the four samples were subjected to NPST. Initially, 0.2 gm of bhasma was placed in a centrifuge tube. 0.5 ml of 5N HNO<sub>3</sub> was then added to it drop by drop, and heated for one minute. It was kept in a stand for 50 hours, during which time it was shaken occasionally. It was then allowed to settle while a clear layer formed [Figure 1]. One drop was taken from the clear layer and placed on 10% potassium iodide paper (prepared using Whatman's filter paper no.1), colour changes in the paper was observed over 3 time

periods ref. Figure 2:

1<sup>st</sup> phase: 0 to 5 min.

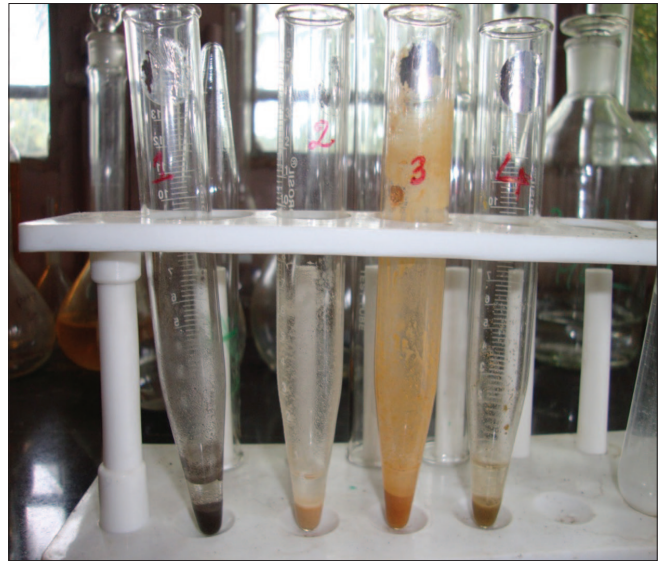


Figure 1: Yashada bhasma samples

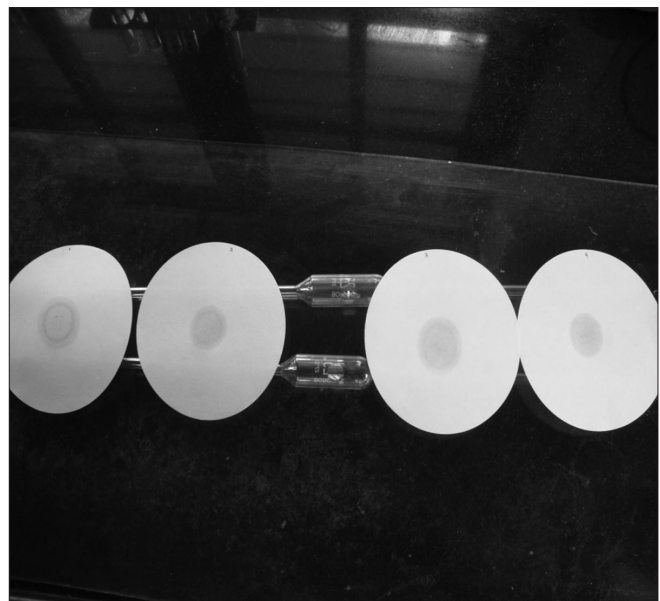


Figure 2: NPST of Yashada samples

Table 1: Analysis of four samples of Yashada bhasma

Parameter / Test	1	2	3	4
Colour	Dark brown	Creamish	Yellow	Dark yellow
Touch	Smooth	Smooth	Fine	Ultra fine
Taste	Absent	Metallic	Absent	Absent
Odour	Absent	Absent	Absent	Absent
Rekhapurnatva	Positive	Positive	Positive	Positive
Varitaratva	Positive	Positive	Positive	Positive
Unama	Positive	Negative	Negative	Positive
Nishchandrata	Positive	Positive	Positive	Positive
Nirdhuma	Positive	Negative	Negative	Positive

**Table 2: NPST of Yashada bhasma**

Phase	Sample 1	Sample 2	Sample 3	Sample 4
1 <sup>st</sup>	Wet central spot spread outside with immediate formation of white glittering surface over the spot	Wet central spot spread outside with immediate formation of dim white surface over the spot	wet central spot spread outside with immediate formation of white glittering surface over the spot	wet central spot spread outside with immediate formation of bright white glittering surface over the spot
2 <sup>nd</sup>	Reddish outer ring around the white spot was seen. Brightness of the white spot was same as that in 1 <sup>st</sup> phase	Reddish outer ring around the white spot was seen. Brightness of the white spot was same as that in 1 <sup>st</sup> phase	Reddish outer ring around the white spot was seen. Brightness of the white spot was bit more than the 1 <sup>st</sup> phase	Thin reddish outer ring around the white spot was seen. The white spot was very bright in this stage
3 <sup>rd</sup>	The brightness of white spot reduced considerably and the reddish ring around it also faded away	The brightness of white spot reduced considerably and the reddish ring around it also faded away	The brightness of white spot reduced slightly and the reddish ring around it faded away	The brightness of the white spot was maintained in this stage also. There was a clear yellowish periphery around the centre spot which was missing in all the other samples. It was fluorescent under UV chamber

2<sup>nd</sup> Phase: 5 min to 20 min.

3<sup>rd</sup> Phase: 20 min to 1 day.

## OBSERVATIONS AND RESULTS

Various Bhasma Parikshas were carried out for all the four Bhasmas. Bhasma Parikshan (testing) according to NPST is given in Table 2

## DISCUSSION AND CONCLUSION

The colours of the four bhasmas all differ a great deal, varying from creamish to dark brown. The wide range of colour difference may be due to the amount of Parada (mercury) and Gandhaka (sulphur) added during Marana (Incineration), and also on the number of puta given. The touch of the bhasma showed that samples 3 and 4 are much finer than the other two samples. In sample 2, a metallic taste was present which may indicate improper formation of the bhasma. This was substantiated when it evolved fumes in the Nirdhuma test. Though all samples passed the Varitara test, samples 2 and 3 failed in the Unama test, indicating the presence of untransformed metal in the Bhasma. The Apunarbhava and Niruttha tests were conducted only on sample 4, which passed both tests, showing that chemically the bhasma was totally formed. If these tests had been negative then it would have indicated the presence of a metallic part in the bhasma. In NPST the desired results were seen in all 4 samples, but sample 4 showed more accurate results compared to the others [Figure 2]. The results seemed to be similar, but were not the same - an advantage of conducting NPST over other

classical bhasma parikshas. The classical tests cannot differentiate between bhasmas chemically, but in NPST, as the test is chemical reaction-based, with specific results for specific bhasmas, we can differentiate between bhasmas clearly. This technique is very helpful for quality assessment of Bhasma as per the standards of Rasashastra. In other words, bhasmas can be identified by their name given in Rasashastra by virtue of their quality differences, but not chemically. It is such a simple test that it can be carried out with minimum set up and requirements. CCRAS has also accepted the monograph of NPST, and so the quality of Bhasma can be checked before being used therapeutically. In the present study, though the bhasma was said to be prepared by same method, there was lot of difference in bhasma colour, and according to NPST only sample 4, prepared in our department, gave results in accordance with the text.

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