

## Qualitative Analysis of 'Sasyaka Bhasma (Blue Vitriol)' Using 'Namburi Phased Spot Test' (NPST)

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### Abstract

*Sasyaka Bhasma* (calx of *Sasyaka*, i.e. Copper sulphate or Blue vitriol), a unique mineral product and one among the *Maharajas of the Rasashastra* (Ayurvedic Pharmaceutics or Indian Iatro-chemistry), due to its wide therapeutic utility; it is used in several formulations. *Sasyaka Bhasma*, a unique mineral product used traditionally in the management of *Kushta* (Leprosy), *Hrudroga* (Heart diseases), *Switra* (Vitiligo), *Shula* (Abdominal pain), etc., was prepared according to the prescription in the Ayurvedic classics and subjected to various *bhasma pariksha* (tests for calx), including the Namburi Phased Spot Test (NPST), one of the qualitative tests described for various Ayurvedic preparations. NPST helps to differentiate between, and thus identify, various *bhasmas* (calx). It depends upon the pattern of the spot, which develops after a specific chemical reaction. *Sasyaka Bhasma* prepared by classical reference in our department was subjected to abovesaid tests and the results were compared with standard protocol. The prepared *bhasma* had shown the nearest results to standard NPST of *Sasyaka Bhasma*.

**Keywords:** Namburi Phased Spot Test (NPST); *Sasyaka Bhasma* (Blue vitriol).

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### Introduction

*Sasyaka Bhasma* (calx of *Sasyaka*, i.e. Copper sulphate or Blue vitriol) is one of the *Khaniya dravya* (Mineral substance) and "best *Rasayana* (Immunomodulator)." Its *bhasma* (calx) has as its main indication, *Kushta* (Leprosy). *Shula* (Abdominal pain), *Hrudroga* (Heart diseases) *Switra* (Vitiligo), *Firanga* (Skin disease), *Arsha* (Piles) and *Amlapitta* (Acidity).<sup>1</sup> *Sasyaka bhasma* prepared using *Nimba Swarasa* (Juice of *Azadirachta indica*) and *Lakucha Swarasa* (Juice of *Artocarpus lacucha*) is considered as the best in *Rasashastra* branch

of Ayurveda. However, in this competitive, commercialized world, the quality of *bhasma* is always open to question. For the quality assessment of *bhasma*, various *bhasma parikshas* (tests for calx) are mentioned in Ayurvedic 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 (*bhasma* or *sindura* - calx) under examination is put on specially prepared chemical reacting papers (What man paper impregnated with suitable reagent), a spot appears which manifests a series of color and

pattern changes. Techniques involving spot test or chromatography are commonly used in chemistry. It thus has the advantage of measuring sensitivity of reactions at different time intervals. This method is used to study or detect continual chemical reactions taking place gradually between two chemical substances on static media at every second or even fraction of a second. The technique was developed and standardized by Namburi Hanumantha Rao in 1970, it has been accepted by CCRAS, New Delhi. It is used to assess the *bhasma* qualitatively.<sup>2</sup>

NPST and other classical tests are performed on *Sasyaka Bhasma* sample: in order to compare with standard protocol and to evaluate its quality.

### Materials and Methods

A three-part methodology was used:

1. Obtaining sample of *Sasyaka* (Copper sulphate or Blue vitriol): Raw *Sasyaka* was obtained from Dorle and Sons professional supplier in Kolhapur and was authenticated by HOD Rasashastra department of Shri J.G.C.H.S Ayurvedic Medical College, Ghataprabha, Karnataka.
2. *Sasyaka Bhasma* was prepared as per classical method and subjected to classical *bhasma pariksha* (tests for calx).
3. Subjecting *Sasyaka Bhasma* sample to NPST (Evaluation of NPST).

#### Preparation of *Sasyaka Bhasma* (Blue vitriol)

Authenticated raw *Sasyaka* (Copper sulphate or Blue vitriol) was taken from the department of Rasashastra, Shri J.G.C.H.S Ayurvedic Medical College, Ghataprabha, Karnataka, and subjected to *Shodhana* (Purification) by *Nimbu swarasa* (Juice of *Azadirachta indica*) using *Khalva yantra* to remove impurities and increase its potency. For *Shodhana* 1000 gm *Sasyaka* was taken and made it into small pieces. These pieces were kept in a *Khalva yantra* and sufficient quantity of *Nimbu swarasa* was added and *bhavana* (trituration with constant pressure) was given for 02 *yama* (06 hours in a day for two days) until it becomes dry. After complete drying up of mixture it was stored in bottles and used for *marana* (Incineration) procedure.<sup>3</sup>

The *Shodhita Sasyaka* was then subjected to *marana* (Incineration). Purified *Sasyaka* was taken in *khalva yantra* (Mortar and pestle) and *Shodhita Gandhaka* (Purified sulphur), *Shodhita Tankana* (Purified borax) were added in equal quantity, then by giving *bhavana* (trituration in liquid media) with

*Lakucha swarasa* (fresh juice of *Artocarpus lacucha*) *chakrikas* (pallets) were prepared. After drying, they were kept in *sharava* (casseroles), *Sandhi bandhan* (sealing) was done and subjected to *Kukkuta puta* (giving heat by using 100 *vanopalas* – cow dungs). After ten *putas* (Heating device), *Sasyaka bhasma* of dark black color was obtained.<sup>4</sup>

#### *Bhasma Parikshas* (tests for calx)<sup>5</sup>

The *Sasyaka bhasma* prepared by classical method in our department was subjected to various classical *bhasma parikshas* (tests for calx) like *Rekhapurna* (calx enters in furrows of fingers), *Vaaritara* (floats on water), *Unama* (even after keeping a rice grain on *bhasma* it floats on water), *Nischandrata* (absence of shining), *Jihwa pariksha* (taste) and *Nirdhuma* (absence of fumes when kept on fire) (Table 1).

**Table 1:** Analysis of *Sasyaka Bhasma* (Bluevitriol)

Test	<i>Sasyaka bhasma</i> Sample
Color	Dark black
Touch	Ultra fine
Odor	Absent
<i>Rekhapurna</i>	Positive
<i>Vaaritara</i>	Positive
<i>Unama</i>	Positive
<i>Jihwa pariksha</i>	Tasteless
<i>Nischandrata</i>	Positive
<i>Nirdhuma</i>	Positive

#### Namburi Phased Spot Test

##### Method: Phased Spot Test

Materials:

- (a) Distilled water: For reagent preparation
- (b) Reagents: 0.5 ml concentrated HCL
- (c) 5% Potassium ferrocyanide papers (prepared using What man's filter paper no 1)
- (d) Capillary or Pipette: For Putting the spot on paper
- (e) Centrifuge and simple test tube: For the preparation of drug solution
- (f) Glass rods and sheet: For drying of paper and to create a platform during test
- (g) *Sasyaka Bhasma* (Blue vitriol)

##### Procedure<sup>6</sup>

*Sasyaka Bhasma* sample was subjected to NPST. Initially 0.25g of *bhasma* was placed in a centrifuge test tube; 0.5 ml of conc. HCl was then

added to the test tube drop by drop. It was kept in a stand for 2 hours, during which time it was shaken occasionally. It was then allowed to settle while a clear layer formed. One drop was taken from the clear layer and placed on 5% potassium ferrocyanide papers (prepared using What man's filter paper no 1), color changes in the paper was observed over 3 time periods. The color chart of the camlin standard color was used for the comparison of different colors and pattern of the spot at three different time intervals.

- 1<sup>st</sup> phase (Phase of immediate reaction): 0 to 5 min
- 2<sup>nd</sup> phase (Phase of delayed reaction): 05 to 20 min
- 3<sup>rd</sup> phase (Phase of late reaction): 20 min to 24 hours

#### Observations of NPST

**Table 2:** NPST observations of *Sasyaka Bhasma* (Blue vitriol) sample

Phase	NPST observations of <i>Sasyaka Bhasma</i> sample
1 <sup>st</sup> phase (0-5 min)	At the end of first phase dark blue color appears at center with slight bluish periphery enclosed with brown margin.
2 <sup>nd</sup> phase (05 to 20 min)	This continues to be the same by the end of 2 <sup>nd</sup> phase. The bluish periphery became slightly intense brownish margin becomes wide.
3 <sup>rd</sup> phase (20 min to 24 hours)	At the end of 24 hrs, Central spot with dark blue color with moderate bluish periphery with moderately wide brownish margin is seen.

#### Discussion and Conclusion

*Shodhana* of *Sasyaka* was done by giving *bhavana* (trituated with constant pressure) with sufficient quantity of *Nimbu swarasa* for 02 *yama* in *kalvayantra*. *Marana* procedure conducted by giving ten *Kukkuta putas* to obtain the dark black colored *Sasyaka Bhasma*, which has passed all the *bhasma parikshas*. In NPST the desired results were seen. The results seemed to be similar – an advantage of conducting

NPST over other classical *bhasma pariksha*.

#### Conclusion

NPST is a chemical reaction based test helpful for quality assessment of *bhasma* before being used therapeutically. This technique is very helpful for quality assessment of *bhasmas* as per the standards of Rasashastra (Indian Iatro-chemistry or Ayurvedic pharmaceuticals). This test is very simple and can be carried out with minimum setup and requirements. In the present study, the *Sasyaka Bhasma* has shown results in accordance to NPST standards.

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