

A Critical Review on Namburi Phase Spot Test

DR. JYOTI SHARMA ^{1*}, DR. SUJATA RATHORE ², DR. ANITHA H. ³

1. PG Scholar, Department of RSBK, Parul Institute of Ayurveda, Vadodara-390019, Gujarat, India
2. PG Scholar, Department of Rachana Sharir, Parul Institute of Ayurveda, Vadodara-390019, Gujarat, India
3. Professor & HOD, Department of RSBK, Parul Institute of Ayurveda Vadodara, -390019, Gujarat, India

***Corresponding Author's
DR. JYOTI SHARMA**

PG Scholar, Department of RSBK, Parul Institute of Ayurveda, Vadodara-390019, Gujarat.

Abstract: - Rasa Shastra is an Ayurvedic branch that was mostly created during the Medieval Era. The process which converts the purified metals and minerals into the bhasma after subjecting them to levigation and incineration is known as Marana. The assessment methods cannot distinguish between bhasmas chemically, but the NPST can because it is based on chemical reactions and produces distinct results for bhasmas. To increase the quality of the formulation and ensure consistency between batches of the formulation, standardisation of the ayurvedic formulation is crucial in the modern era. For the manufacture of the medicines, Ayurvedic pharmaceutical businesses frequently use the Rasaushadi. Identifying the bhasma's quality before buying it from the market is important. Namburi phase spot test helps to detect, every second or even fraction of a second, continual chemical reactions taking place gradually between two chemical substances on static media. It is a simple test that it can be carried out with minimum set up and requirements.

Keywords: - NPST, Standardization, Bhasma, Sinduras, Qualitative test.

Introduction: - Ayurveda ousadhies are Categories into 3 groups: -Kashta ousadhies (Herbal Preparations), Rasa ousadhies (Metallic Preparations), Jangama ousadhies (Animal Preparation). Standardisation in Ayurvedic formulations, ensures the formation of standards for the quality and purity of raw ingredients, quality control during the drug-making process, production of a high-quality final product, storage, and distribution to sustain the quality of the final product. According to WHO recommendations, chromatographic techniques are accurate for standardization and measuring the primary biomarker compounds in herbal and Herbo-mineral formulations.

Different Samskaras are performed on these drugs to convert them into medicines. With relation to the rasa dravyas specially Shodhana, Marana, etc. methods are adopted to make them suitable for internal administration. The metals/minerals which is intended for marana process is known as primary metal and the other drugs which are used in small proportion as a media of marana of primary metal is known as secondary metals. During the process of marana certain secondary metals used as media like mercury and compounds of mercury will amalgamate and help in the disintegration of the particles without showing its presence in the final product.

NPST is the only Qualitative analytical test which identifies the product as per the name of Rasa Shastra such as Kajjali marita bhasma, Gandhaka marita bhasma etc. It was developed by Dr. Namburi Hanumantha Rao in 1970 and recognized by CCRAS, New Dehli. The Namburi Phased Spot Test (NPST) is a new technique for assessing the quality of a Herbo-mineral compound and is based on the principles of Chromatography that is identification based on the colour and pattern produced as a result of chemical reaction between trial drug, reagent and reacting paper.

PRINCIPLE: - The technique is based on the principle of liquid chromatography. When a drop of a substance under investigation (Bhasma or Sindhura) is placed on specially prepared chemical reacting papers, a spot appears with a series of colour and pattern changes.

AIM: - Identification of bhasma and sindoor by their specific names known in ayurveda by virtue of their quality difference not by their chemical names alone.

NEED: -

- Standardization of Ayurvedic formulation is the burning issue because manufacture has become a lucrative trade for genuine entrepreneur and much more to a corrupt entrepreneur.
- To determine the stability and comparison of quality of bhasma.
- It helps to compare the specific gravity of bhasma and by their comparative lightness or density.
- To compare the quality of bhasma with complete or incomplete parada marana.
- To analyse the appropriate changes that occur in parada during each samskara of astadasha samskara.
- To explore the jarana effect of metals such as swarana in rasa bhasma and parada.
- To determines the number of putas undergone by bhasma

MATERIALS³: -

1. Whatman Paper No.1
2. Test tubes

3. Glass sheets
4. Glass Rod
5. Glass tray
6. Glass Droppers.
7. Ultra-violet bulb with chamber.
8. Chromatographic chamber.
9. Potassium Iodide.
10. Conc. Nitric acid.
11. Alcoholic Extract of Haridra
12. Potassium ferrocyanide A.R.
13. Conc. Hydrochloric acid A.R.
14. Amm. thiocyanate A.R.
15. Nitric acid conc. A.R.
16. Sulphuric Acid conc. A.R.
17. Potassium Chromate A.R.
18. Aqua Distilled

METHOD: -

The process of NPST under three sub headings: -

1. Preparation of Reacting Papers
2. Preparation of Solution
3. Observations

Preparation of Reacting Papers

In this method, Whatman paper No. I is invariably impregnated in a suitable reagent and dried. A suitable impregnated paper (chemical reacting paper) is treated with a drop of the solution of the substance (bhasma or sindura) under examination.

Different types of Reacting Papers in different groups are following⁴: -

Sr.No.	Reacting Paper	Group
1.	5% Pot. Ferrocyanide	Lauha, Sindura, Rajata, Tamra, Parada
2.	10% Pot. Iodide	Rajata, Tamra, Lauha, Garika, Naga, Vanga, Yashada, Suvarna, Parada, Sindura, Talaka.
3.	10% Pot. Bromide	Sindura, Rajata,
4.	Haridra	Sindura, Calcium Group
5.	10% Pot. Chromate	Rajata Group
6.	2.5% Pot. Ferrocyanide	Garika Group

Preparation of Solution: -

The chemicals used for preparation of solution of trail drug is selected based on the solubility of component. eg- Conc. HNO₃, Aqua Regia and HCl is used for the Mercury compound because of its solubility.

Different types of Solution in different groups are following⁵: -

Sr.No.	Solution	Groups
1.	5N HNO ₃	Lauha, Naga, Vanga, Yasada, Suvarna, Rajata, Parada
2.	20% HCL	Tamra,
3.	Distilled water	Calcium, Rajata, Parada
4.	Aqua Regia	Garika, Sindura, Rajata, Talaka
5.	5% HCL	Lauha

6.	Silver Nitrate	Rajata
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Observations: -When the drop encounters the paper a characteristics spot begins to develop and changes with times. The change of colour and pattern of the spot taken at 3 different phases at 3 different time intervals.⁶

- 1st Phase:** The first phase of reaction extends from the very moment of formulation of the spot till the end of 5th minutes. The reaction is also called as **Immediate Reaction**.
- 2nd Phase:** The second phase of reaction extends thereafter up to 20th minute. This method of reaction may be termed as **Delayed Reaction**.
- 3rd Phase:** The Third phase of reaction, also known as **Late Reaction** extends from the end of 20th minute to some hours or days.

PROCEDURE: -

- Whatman paper No. 1 is impregnated with a suitable reagent and thoroughly dried on a clean sheet of glass.
- Next, 0.25gms. of the substance (Bhasma or Sindura) is placed in a micro test tube and a suitable reagent is added. The solution is slightly heated before being allowed to settle for 24 hours, shaking vigorously every now and then.
- Using a dropper, carefully place a drop of this supernatant solution on the above impregnated Whatman paper (chemical reacting paper).
- Must be alert and record the colour change and pattern of the spot at three different phases or time intervals.

Condition Required⁷: -

- Paper: - Whatman No 1 paper required
- Temperature: - 25 to 28°C
- Volume: - 2 to 3 drops/ 0.05 ml
- Light: - Natural Light or Ultra-violet light
- Photography: - Camera with colour film

DISCUSSION: -

NPST is a simple, economic, rapid test which can be performed at basic laboratory setup without requiring skilled person. The classical tests like bhasma Pariksha are based on physical qualities and do not specify bhasmas chemically, but in NPST, as the test is chemical reaction-based, specific bhasmas are denoted even chemically. The wide range of colour and pattern difference are observed in different compound based on the component present in them. NPST test also helps in assessing proper formation of bhasmas as the colour and pattern of any bhasma will differ with type of puta used and number of putas given.

Room temperature is critical because the rate of drying should be slower than the rate of reaction of the wet spot after treating the drop with the static reacting medium. It is preferable to develop the spots at even lower temperatures to avoid rapid evaporation of the drop placed on the paper and allow the reaction to proceed slowly.

The chemicals used for preparation of trail drug is selected based on the solubility of component. eg- Conc. HNO₃, Aquaregia and HCl is used for the Mercury compound because of its solubility.

Rasasastra uses three tests to determine the Bhasma's quality like Varitava, Rekhapuritatwa and Apunarabhava. Varitava and Rekhapuritatwa are two of them, as was already mentioned. The first is used to determine whether the prepared bhasma is lighter than water, and the second is used to determine how fine it is. The latter evaluation, which looks at organoleptic qualities of Bhasma in accordance with the proforma used by the Drug Standardization Units and particle size as determined by sieve analysis. Despite appearances, particles of all sizes are not necessarily lighter. Even though a particle is small, it may be heavy, and vice versa. Therefore, Bhasma's density and fineness should be the same.

Any Bhasma that is said to have been properly produced should have a lower density and smaller, more microscopic particles. Rasasastra uses the varitaratwa & Rekhapurita tests to evaluate these factors. But when a Bhasma's varitaratwa is compared to those of Bhasmas with the same dhatu but different formulae, no mechanism is provided in Rasasastra to determine how much a Bhasma is varitaratwa. In these situations, determining the specific gravity of various substances (Bhasma) and comparing them to one another would aid in figuring out the Varitararwa that various formulations would experience. Therefore, the "Descending Chromatography Technique" is used in the current study to compare the specific gravity of the Bhasma and by their relative lightness or density.

NPST identifies compound as per the specific name mentioned in the classics. e.g- Kajjali marita Tamra Bhasma. In rasa shastra, marana of rasa dravyas are performed by using any of four medias namely, kashta aushadis, Arilohas, Gandhaka, Rasa or compounds of rasa. Among these, bhasma prepared with mercury or compounds of mercury are Shrestha as per classics. The reason behind this is mercury used for marana will help in the finer disintegration of the particles, helps in improving Pharmacodynamics and pharmacokinetics of the drug, reduction in number of putas and its residue will not be present in the final product. In some market sample under the label of kajjali marita tamra bhasma, other media will be used may be for the commercial purpose, as the price of mercury is high. In NPST the color and pattern obtained for kajjali marita tamra bhasma and with other media will be different which confirms the product as genuine.

Nearly, 30 bhasmas and sindura are studies are mention in Application of Standardised Namburi Phase Spot Test in Identification of Bhasma and Sindura Preparation of Ayurveda which was based on this technique and suitable criteria are established for their identification and quality. Monographs of NPST has also accepted by CCRAS.

CONCLUSION: -

- NPST is also known as Chromatography. This technique observed during the experimental work on various substances however complex or simple they are a visible chain of chemical changes which can be easily detectable, by their distinct color manifestation or changes in the pattern of spot.

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