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Assessing the Genuineness of *Abhraka Bhasma* by *Namburi* Phased Spot Test

Nisha Kumari P.R.[1*] and Reshma Saokar[2]

[1,2]Dept of RSBK, SDM College of Ayurveda, Hassan, Karnataka, India

Abstract

In the present era, the Standardization of the Ayurvedic formulation is very important to improve the quality of the formulation and maintain the uniformity among the batches of the formulation. The *Rasaushadi* are been widely used by the Ayurvedic Pharmaceutical companies for the preparation of the medicine. It is very important to recognize the quality of the *bhasma* which are procured from the market. Even though certain test is mentioned by ancient scholars for the bhasma, the genuinety of bhasma cannot be assessed through those tests. Namburi Phased spot test is an analytical technique which helps to assess the quality of the final drug .The test depends upon the pattern of the spot which develops after a specific chemical reaction.*Abraka bhasma* and *Gairika* have similar organoleptic characters and hence it is common practice to substitute *abraka bhasma* with *gairika.* In the present study the genuinety of *abhraka bhasma* was assessed by preparing *Abhraka parpati* using three different samples viz., Department *Abraka bhasma*,*Gairika*,Market *Abraka bhasma* undertaken in three batches in Ist batch *Abhraka parpati* was prepared with *Abraka bhasma* procured from the department, IInd batch was prepared from *gairika* instead of *Abhraka bhasma* and IIIrd batch market sample of *Abhraka bhasma* was used to prepare *Abhraka parpati.*

Keywords

Abraka parpati, *Gairika*, *Abhraka bhasma*, NPST

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INTRODUCTION

Ayurveda Pharmaceutics utilizes different drugs of mineral, herbal and animal origin for the preparation of medicines. Among them *Rasaushadhis (*metal/mineral preparations) are considered more potent and effective due to their quick action in very low doses. The growing popularity and increased demand of Ayurvedic medicines creates a challenge for Ayurvedic pharmaceutical companies to produce a standard, genuine and safe drug to meet the demand of the society. Though many standardization parameters are available now days to assess the quality, one has to be very selective in choosing them so as to get an accurate result of the drug being tested. Analytical chemistry has become an easy tool in testing these formulations which give qualitative and quantitative measure of these drugs. "Namburi Phased Spot Test" (NPST) is an analytical technique which gives the accurate assessment of the mineral or metal preparation under test.

In *Rasashastra, Abhraka* is one such mineral which has a wide range of therapeutic benefits and is used commonly by many physicians. The method involved in the preparation of this *bhasma* is tedious as it requires more number of *putas* to obtain good quality *bhasma.* Any variations in the method can lead to improper *bhasma*[1]. *Gairika* is another mineral which is commonly used in various formulations. It is used after *shodhana*(purification) and does not require incineration process like *Abhraka.* It is also cheaper and has somewhat similar properties like *Abhraka.* This makes it a common replacement for pharmaceutical companies to use *Gairika* in place of *Abhraka bhasma* to make more profit. The final product being similar makes it difficult to differentiate both the minerals. NPST is one such analytical tool that makes it easy to differentiate between *Gairika* and *Abhraka*. It uses the technique of chemistry to analyse the complex drugs of *Rasashastra.* In this the spot is observed in three different phases to know the genuinity of the final product. This technique of Namburi Phased Spot test (NPST) was developed and standardized by Dr. Namburi Hanumantha Rao in1970, it has been accepted by CCRAS, New Delhi[2].

Definition of Namburi Phased Spot Test[3]:

When a drop of clear solution of a substance that is under examination is put on one of the chemical reacting papers, a spot with a series of changes in colour and pattern will

appear. It is the study of this spot and colour at three successive phases spreading over three different time intervals in known as the "phased spot test".

These spots is studied in three phases –

- 1st phase (Immediate reaction): Moment of formation of spot to the end of 5th minute.
- 2nd phase (Intermediate reaction): From end of 5th minute to 20th minute.
- 3rd phase (Late reaction): From end of 20th minute to 24 hours

From end of 24 hours to 48 hours

From end of 48 hours to 72 hours

Depending on the substance, specific pattern and colour of the spot is formed. The chain of chemical changes that takes place before the actual chemical reaction is completed is detected by their distinct colour manifestations or changes in the pattern of spot as the case may be, is studied here.

Advantages:

- This technique is very helpful for quality assessment of *Bhasmas* as per the standards of Rasashastra.
- The study of differential identification of various *Bhasmas* is made possible by N.P.S.T. This test has an advantage of measuring the sensitivity of reactions at different time intervals.
- This is a method to study or detect continual chemical changes (reaction) that take place gradually between two chemical substances on static media at every second or even at a fraction of a second.
- Some initial (or) intermediate reactions (or) changes which occur before culminating it to a major chemical reaction can be detected by the present technique.
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MATERIALS AND METHODS

1. To prepare Abhraka parpati by 3 different ingredients

2. To assess three samples by using NPST

1. To prepare *Abharka parpati* by 3 different ingredients-

a) Abharka parpati I prepared using department *Abharka bhasma*

b) *Abharka parpati* II prepared using *Gairka*

c) *Abharka parpati* III prepared using marketed *Abharka bhasma*

Procedure[4]:

Kajjali eight grams + Four grams of departmental *abharka bhasma* was taken in pestle and mortar and triturated to obtain homogenous mixture. This mixture was taken in iron ladle which was smeared with

ghee and placed over the mild fire till it attained proper *paka*. Immediately it was poured on banana leaf smeared with ghee, upon this another banana leaf was placed and pressed with a bundle containing cow dung[5]. This was sample I. Same procedure was repeated for sample II where instead of *Abhraka bhasma, Gairika* was used. In sample III marketed *Abhraka bhasma* was used. The results are tabulated in Table 1 and Image 1.

Table 1 Preparation of Abhraka Parpati with 3 different ingredients

Name of sample	Ingredients	Pakalakshana	Final weight
***Abrakaparpati* I**	*Kajjali* eight grams+departmental *abharka bhasma* four grams	*Madhyama paka*	12grams
***Abrakaparpati* II**	*Kajjali* eight grams+four grams *gairka*	*Madhyama paka*	10grams
***Abrakaparpati* III**	*Kajjali* eight grams+ marketed *abharka bhasma* four grams	*Madhyama paka*	12gms

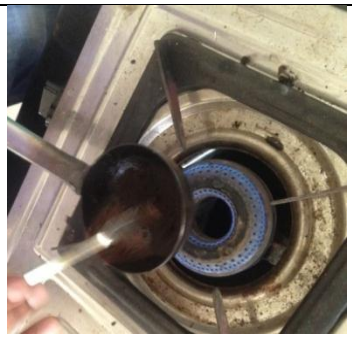
Mixing of ingredients in *Khalwa*	Preparation of *Parpati*	Final product
		

Image No 1: Preparation of *Abhraka Parpati*

2. To assess three samples by using NPST

In the present study, *Gairika* and *Abraka* are belonging to fifth group as mentioned in NPST.

Materials:

Aqua regia –Reagent

1) 10% potassium iodide paper
2) 2.5% potassium ferrocyanide paper
3) Whatman filter paper No 1
4) Test tubes
5) Test sample – 0.5gm
6) Dropper

Procedure:

- The reagent aqua regia was prepared using ratio 3:1 of HCl and HNO_3

- Watman's filter paper were taken and treated with 10% potassium iodide. 10 gm of Potassium iodide was dissolved in 100 ml of distilled water and poured into a tray. Watman's paper no.1 was used .This paper was dipped in the solution and dried.
- 2.5% potassium ferrocyanide paper. 2.5 gms gm of Potassium iodide was dissolved in 100 ml of distilled water and poured into a tray. Paper no.1 was used .This paper was dipped in the solution and dried.
- Preparation of the sample: Here 5gms was dissolved in 1 ml of aqua regia.
- 0.5gm of test sample was taken into test tube and 1ml of aqua regia was added to three set of sample.
- The samples are heated for the minute before treating with the reagent and also for a minute, 30 minutes after treating with the reagent.
- Time allowed to react with the reagent was 20 hrs
- Shake now and then till two hours before they are treated with the chemical reacting paper.
- Then a drop of the solution was added to the respective paper
- Table No 2 shows the standard reaction of spots for *Abhraka bhasma* & *Gairika* on 10% Potassium iodide paper.
- Table No 3 shows the standard reaction of spots for *Abhraka bhasma* & *Gairika* on 2.5% Potassium ferrocyanide paper.
- Table No 4 and Image No 2 shows the actual reaction of spots of *Abrakaparpati I*, *Abrakaparpati II* and *Abrakaparpati III* on 10% Potassium iodide paper.
- Table No 5 and Image No 3 shows the actual reaction of spots of *Abrakaparpati I*, *Abrakaparpati II* and *Abrakaparpati III* on 2.5% Potassium ferrocyanide paper.

Table 2 NPST of *Abaraka bhasma* and geniue *Gairika* on 10% potassium iodide paper

Name of drug	First phase	Second phase	Third phase
Abhraka bhasma	Deep brown solid spot	Deep brown spot fades with small white spot in centre	Colourless spot at the centre
Gairika	Deep brown solid spot	Deep brown spot fades with small yellow spot at centre	Yellow spot at the centre

Table 3 NPST of Abaraka bhasma and geniue gairika on 2.5 % potassium ferrocyanide paper

Name of drug	First phase	Second phase	Third phase
Abhraka bhasma	Deep blue solid spot	Deep blue spot fades with small light blue margin	Blue periphery turns to dark blue with deep blue spot at centre
Gairika	Deep green solid spot	Deep green spot with green margin	Deep green spot turns deep blue solid spot with dark blue

periphery.

Table 4 Spot reaction of the 3 samples on 10% of potassium iodide paper

Sample	First phase	Second phase	Third phase
Abrakaparpati I	Deep brown solid spot	Deep brown spot fades with small white spot in centre	Colourless spot at centre
Abrakaparpati II	Deep brown solid spot	Deep brown spot fades with small yellow spot at centre	Yellow spot at centre
Abrakaparpati III	Deep brown solid spot	Deep brown spot fades with yellowish white spot at centre	Whitish Yellow spot at centre

Table 5 Spot reaction of 3 samples on 2.5% of potassium ferrocyanide paper

Sample	First phase	Second phase	Third phase
Abrakaparpati I	Deep blue solid spot	Deep blue spot fades with small blue margin	Blue periphery turns to dark blue with dark blue central spot
Abrakaparpati II	Deep green solid spot	Deep green spot with green margin	Green spot to Blue solid spot with light blue periphery.
Abrakaparpati III	Deep greenish blue solid spot	Deep greenish blue spot with light greenish blue margin	Light greenish blue periphery turns dark blue.

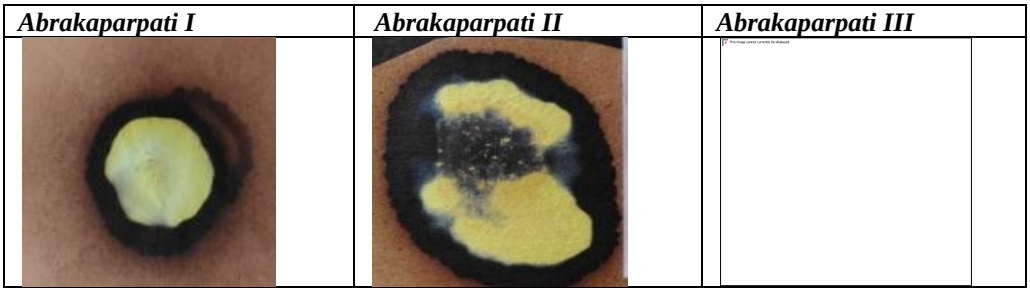


Image 2 NPST spot of *Abhraka Parpati* on 10% Potassium iodide paper

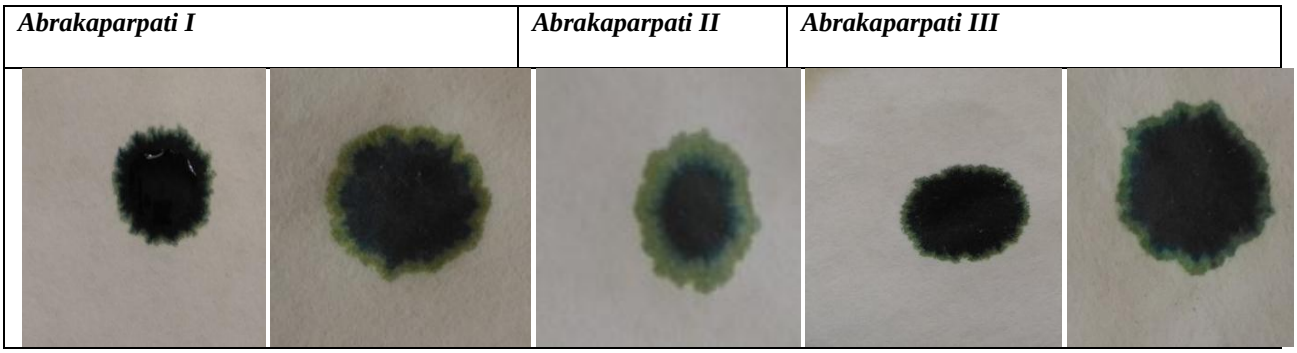


Image 3 NPST spot of *Abhraka Parpati* on 2.5% Potassium ferrocynide paper

DISCUSSION

- *Abraka parpati* is a preparation which is used in *Kasa*, *swasa* and *atisara* and is widely sold in the market. It is very important to know the quality of ingredients which are used in the preparation. NPST is very simple test which gives assurance about the quality of bhasma used. There is no reference where *gairika* is used in the preparation of *Abhraka parpati* but *gairika*

was used in this preparation just see what changes would be seen.

- During the preparation of *Parpati* all the three *parpat* is attained *madhyama paka* with more loss of final product in sample III
- In *Abhraka parpati* I the development of spot on potassium iodide paper was deep brown solid spot in 1st phase, in 2nd phase the deep brown spot faded away and few drops of distilled water was put over the spot at the end of its 2nd phase which washed away the brown colour leaving behind a colourless space. This was in accordance with the spot reaction mentioned for genuine *Abhraka bhasma*
- In *Abhraka parpati* II the development of spot on potassium iodide paper was deep brown solid spot in 1st phase, in 2nd phase the deep brown spot faded away and in 3rd phase the brown spot faded away leaving behind deep yellow spot at the centre. This was in accordance with the spot reaction mentioned for genuine *gairika.*
- In *Abhraka parpati* III the development of spot on potassium iodide paper was deep brown solid spot in 1st phase, in 2nd phase the deep brown spot faded away and few drops of distilled water was put over the spot at the end of its 2nd phase which washed away the brown colour leaving behind a whitish yellow space. This was not in accordance with the spot reaction mentioned for genuine *Abhraka bhasma* but moreover the spot reaction was similar to both *gairika* as well as genuine *Abhraka bhasma*. As sample III was a market sample it may have been adulterated with *gairika.*
- In *Abhraka parpati* I the development of spot on potassium ferrocyanide paper was deep blue solid spot in 1st phase, in 2nd phase the deep blue spot with light blue margin,3rd phase light blue periphery changes to dark blue .This was in accordance with the spot reaction for genuine *abhraka.*
- In *Abhraka parpati* II the development of spot on potassium ferrocyanide paper was deep green solid spot in 1st phase, in 2nd phase the deep green spot with light green margin, 3rd phase the green soild spot turns to dark blue spot and light green periphery changes to light blue periphery. This was in accordance with the spot reaction for genuine *gairika.*
- In *Abhraka parpati* III the development of spot on potassium ferrocyanide paper was deep spot in 1st

phase, in 2nd phase the deep greenish blue solid spot with light greenish blue margin,3rd phase light greenish blue periphery changes to dark blue and dark greenish blue spot to dark blue spot. This was in accordance with the spot reaction for genuine *gairika* and *Abhraka.*

- It is evident from the above discussion that the sample of *Abhraka* and *Gairika* used for preparation of *parpati* I & II are genuine, but the *abhraka* used for preparation of *parpati* III showed a spot reaction which was a mixture of *Abhraka* and *Gairika.* It was more evident in the spot reaction shown on potassium iodide paper than on potassium ferrocynide paper. This may be because of *Abhraka bhasma* in *parpati* III(market sample) may have been adulterated with *gairika.*

CONCLUSION

NPST analysis of all the samples showed slight differences with the respect to colour in all the phases. This is a simple and cost effective test which helps to know the quality of the bhasma which are used in the preparation. Sample I & II of *Abraka parpati* showed the correct colour changes as of geniue *Abhraka bhasma* and *Gairika* respectively where as sample III showed a spot reaction which was a mixture of both *Abhraka* and genuine *gairika.* In many of the preparations of *Rasashastra* which requires the use of expensive drugs and tedious procedures there are high chances of the formulation being replaced with cheaper drugs and less tedious processes. In such cases NPST plays a very important role to bring about the genuinety of such formulations.

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