

NAMBOORI SPOT BIPHASIC TEST - A BRIEF REVIEW

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Article Received on 11/04/2020

Article Revised on 01/05/2020

Article Accepted on 22/05/2020

ABSTRACT

In the flow of time most of important and simple analytical techniques are being neglected unknowingly due to lack of its documentation and literature available. So this review article is small effort to put light on the most important and simple technique for qualitative analysis of *Rasa dravyas*. The technique is invented by Dr Hanumantrao Namboori in 1970 known as NPST or Namburi spot biphasic test. In this technique, the very identical spot of the test drug is formed on chemical reacting paper with different colour and shape with the three successive phases at specific time interval. The detail methodology is described in the review article. This article may provide the basic knowledge regarding NPST technique for qualitative analysis of drugs.

KEYWORDS: NPST, Namburi biphasic test, Spot test, qualitative analysis.**INTRODUCTION**

Herbomineral drugs standardization is need of present era. Namburi test is one of the important test invented for the standardization and identification of *Rasadravyas* and *Rasakalpas*. This test was developed by Dr Hanumanta Rao Namburi in 1970 and has been accepted by CCRAS New Delhi in 1972. The aim of introducing the **Namburi spot test** kit is to enable an Ayurvedic practitioner to test himself whether the contents of the container of *Bhasma* / *Sindura* is the same that is claimed on its label. In other words to verify the quality of the *Bhasma* / *Sindura* that is purchased by him. It is made simple just like a physician examines urine for sugar or albumin in his clinic. This technique is very helpful for quality assessment of *Bhasma* or *Sindura* as per the standards of Rasashastras. The study of differential identification is made possible by the Namburi Phased Spot test. (N. P.S.T.).^[1]

Material and Method

In chemistry the technique of spot test or chromatography is widely used. The new technique "Phases Spot Test" has an advantage of measuring the sensitivity of reactions at different time intervals.

This is a method to study or detect continual chemical reaction that take place gradually between two chemical substances or static media at every second or even at fraction of a second. Some initial or intermediate reactions or changes which occur before culminating into

a major chemical reaction can be detected by the present technique.^[2]

Definition of Namburi spot test:

When a drop of clear solution of the substance (*Bhasma* or *Sindura*) 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 is known as the "**Phases Spot Test**".

Method**Procedure**

Select one of the chemical reacting papers specific for the particular *bhasma* / *Sindura* as indicated, and follow the procedure as given in each case of *bhasma* / *Sindura*.

A drop of the supernatant (clear) solution of the substance that is under examination is carefully put, with the help of dropper, on the chemical reacting paper. No sooner the drop comes in contact with chemical reacting paper, an instantaneous characteristic spot begins to form and changes rapidly and continuously for some time. At this stage, what the examiners has to do is, to be alert and observe and record the changes of colour and the pattern of the spot at three phases or different time intervals as follows

1st Phase: (" Immediate Reaction")

The first phase of reaction extends from the very moment of formation of the spot till the end of 5th minute. This phase is called as "**Immediate Reaction**"

2nd Phase (" Delayed Reaction")

The second phase of reaction extends thereafter up to 20th minute. This phase is called as "**Delayed Reaction**"

3rd Phase (" Late Reaction")

The third phase extends from the end of 20th minute to some hours or days. The duration of 3rd phase varies from substance to substance. This phase is called "**Late Reaction**". Generally, the colour and pattern of spot of only one of above three phases is very characteristic and striking depending upon the given substance.

Table 01: Preparation of Reagents.^[1]

To Prepare	30ml		100ml	
	Conc. Acid	Distilled water	Conc. Acid	Distilled water
5N HNO ₃	10 ml	20ml	35ml	65ml
5% HCL	5ml	25 ml	15ml	85ml
20% HCL	18ml	12ml	60 ml	40ml

Table No. 01 (Note : Always add acid to distilled water with constant stirring)

Preparation of Aquaregia

Mix 3ml of Concentrated Hydrochloric acid with 1ml of Concentrated Nitric acid.

Preparation of chemical reacting paper

The paper that is treated with the solution of the taken Bhasma or sindura is known as Chemical Reacting paper. There are five such different chemical reacting papers suitable to different *Bhasmas* & *Sinduras*:

Table 02: Types of chemical reacting papers.

Sr no	Types of chemical reacting papers
1	10% Potassium Iodide paper
2	10% Potassium Bromide paper
3	5% Potassium Ferro cyanide paper
4	2.5% Potassium Ferro cyanide paper
5	Haridra paper

Procedure for the preparation of chemical reacting papers^[1]

1. There are different grades of Whatman papers. The Whatman paper no. 1 is suitable for this purpose. The full sheet of paper is to be cut into small pieces of size 14 × 8cm. While cutting with a sharp knife the paper should be handled very carefully so much so no folds or wrinkles are formed.
2. Prepare the solutions according to the specific percentage given to the different papers & keep the solutions in wide mouth glass stoppered white bottles. It is convenient to prepare 50ml or 100ml of these solutions.
3. To prepare Haridra paper, take 50gms of Haridra tuber (*curcuma longa*). The mother tuber is to be selected. The mother tuber is one that is replanted for growing the plant. Now a day the hybrid variety is being grown by the agriculturists for easy & bulk production. When the original variety mother tuber is cut into pieces vertically the inside of the pieces

become deep brick red colour where as it is not so in the hybrid variety.

4. Take the hybrid variety / original crush in to coarse pulp in a glass or porcelain mortar, preferably the glass mortar. Take the pulp into a 150 ml wide mouth glass stoppered glass bottle & add 100 ml alcohol or rectified spirit which is free from formaldehyde. Allow the pulp to soak for 5 to 6 days the solution may be filtered through Whatman paper no. 01 or decant it carefully into another glass stoppered bottle and keep it for use. It is better if the solution is kept in amber coloured bottle with narrow or wide mouth.
5. Take about 40 to 50 ml of the required solution into a plastic, glass or stainless steel tray just over size to the paper which is to be impregnated (soaked). Then put one paper at a time in the solution and allow it to soak for one minute and afterwards reverse it and allow it to soak for another one minute. Thus impregnate as many papers as required.
6. While pulling or lifting the paper from solution, use only two fingers of each hand and slowly spread it on a clean glass piece. See no wrinkles or air bubbles are formed in between the spreading paper and glass sheet.
7. A good number of such impregnated papers can be kept one after one on the glass sheet and allow them to dry in a closed drawer.
8. After the papers are dried put them in a card or plastic box over which a thick glass piece of sufficient size is kept to serve as paper weight to prevent folds or wrinkles.
9. The remaining solution may be taken back and add to the original solution.
10. The prepared papers can be preserved for four or five years. Each variety of paper should be kept in separate boxes.

Table 03: Details about NPST technique as per specific substance.^[1]

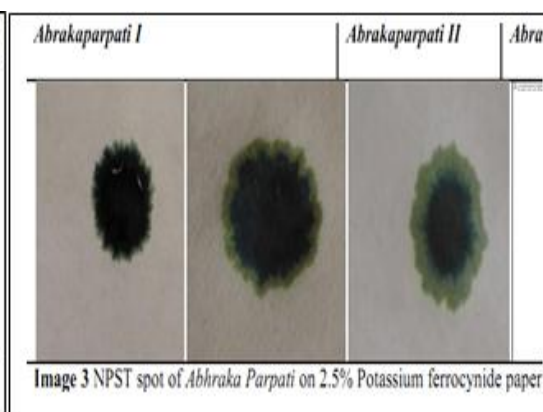
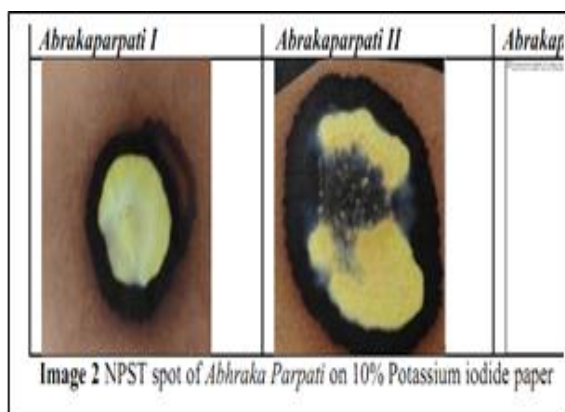
Sr no.	Substance	Solvent (reagent)	Chemical Reacting Paper	Colour display on chemical reacting paper
1.	<i>Rajata Bhasma</i>	Conc. HNO ₃	10% Potassium Iodide paper	Cream to yellow
2.	<i>Tamra Bhasma</i>	20% HCL 5N HNO ₃	5% Ferro cyanide paper	Chocolate
3.	<i>Sudha varga</i>	Distilled water	Haridra Paper	Pink
4.	<i>Loha Group</i>	5N HNO ₃	5% Ferro cyanide paper	Blue
5.	<i>Abhrak Bhasma</i>	Conc. HCL	2.5% Potassium Ferro cyanide paper, 10% Potassium Iodide paper	Blue Deep brown
6.	<i>Gairik</i>	Conc. HCL	2.5% Potassium Ferro cyanide paper, 10% Potassium Iodide paper	Blue Partly brown and Partly cream respectively
7.	<i>Kajjali</i>	5N HNO ₃	10% Potassium Iodide paper	Brick red
8.	<i>Sindur</i>	Conc. HNO ₃ Aquaregia	10% Potassium Iodide paper	Brick red, Brick red
9.	<i>Gold</i>	Aquaregia	Haridra paper, 10% Potassium Iodide paper , 10% Potassium Bromide paper	Purple Yellow Yellow
10.	<i>Ras Karpoor</i>	Distilled water	10% Potassium Iodide paper	Pink colour ad Crystals
11.	<i>Sauveeram</i>	Distilled water 5N HNO ₃	10% Potassium Iodide paper	Brick red, Brick red

Review of privious research work done regarding NPST- in brief

1. Qualitative evaluation of marketed Ayurvedic red tooth powder by Namburi phased spot test.^[3] Satadru palbag, varun kumar sing. Faculty of Ayurveda institute of medical science BHU Varanasi 221005. IRJP 2013,4(3) ISSN 2230.8407, www.irjponline.com.2013,4(3)

2. Assessing the genuineness of Abharak bhasma by NPST by Nisha kumari P.R. deppt of RSBK, Hassan ayurved college, Karnatak, India. IJAPC-2016Vol 5 issue 3.

Conclusion: NPST analysis of all samples showed slight difference s with respect to colour in all the phases. This is the simple and cost effective test which helps to know the quality of the bhasma.^[4]

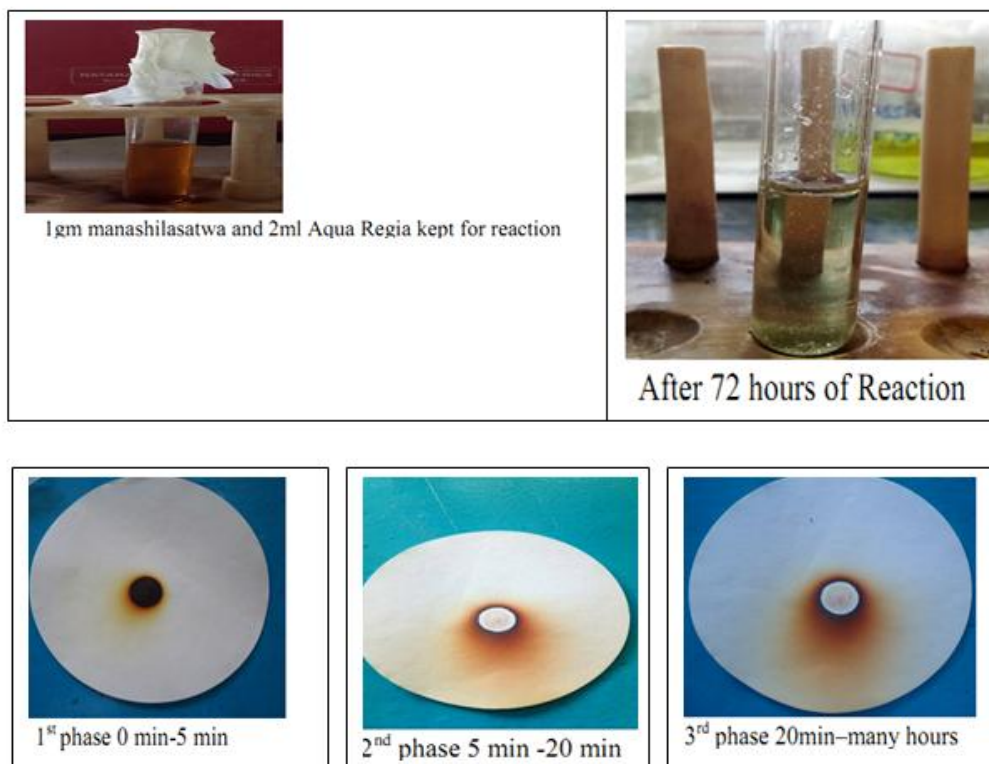


NPST Analysis of Manshila Formulation by Shriniwas Kamle, Dept Of RSBK, Ayurved college, Inchal, Belgavi, Karnataka. IAMJ: Volume 2, Issue 6, August - September, 2018 1342

CONCLUSION

This technique is very helpful for quality assessment manashila satwa gave results in accordance to NPST of manashila satwa as per the standards of Rasashastra. It is a simple test that it can be carried out with minimum set up and requirements. CCRAS has also accepted the

monograph of NPST, and the quality of manashila satwa can be checked before being used therapeutically.^[5]



1. Qualitative analysis of Praval bhasma by namburi, by Dr. Suman Lata Assistant Professor in Department of Rasa-Shastra, Ayurved college Hariyana.^[6]



2. Namburi Phased Spot Test Analysis (Npst) of Rasasindura (Herbomineral Preparation) by Dr. Veena B Kupati, PG Scholar, Department of Rasashashtra, KLEU,

Shri BMK Ayurveda Mahavidyalaya, Belgaum, Karnataka.^[7]

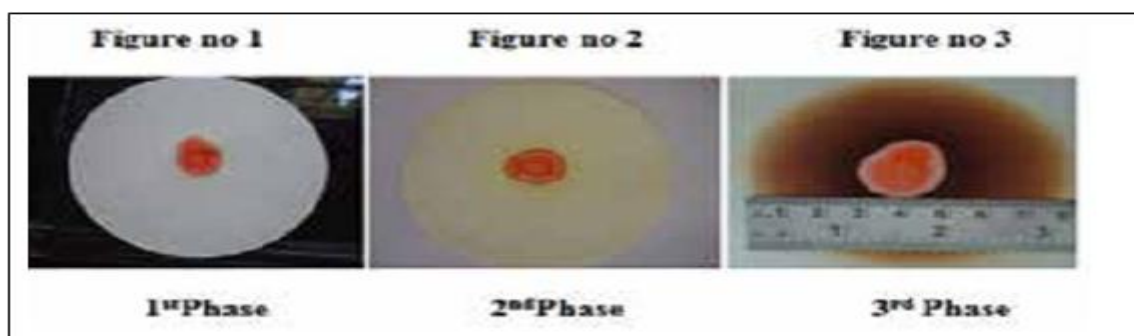
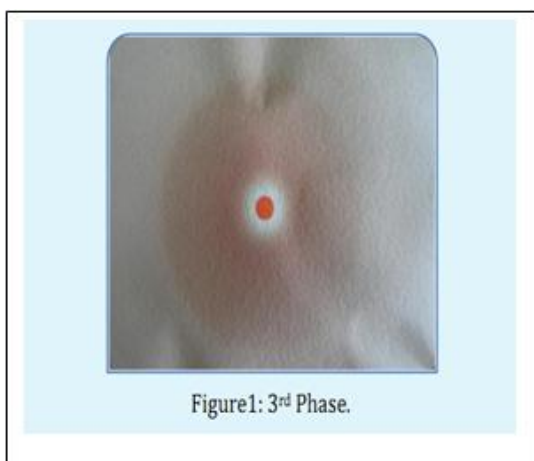


Table No.:1 NPST Analysis of Rasasindura (red sulphide of mercury)

S.No	Phase	Observation
01	1st	Brick red solid spot with dark brown periphery was seen
02	2nd	Dark brown periphery was fades away slowly
03	3rd	Dark brown periphery which was fades away slowly with great extent

3. Analysis of Rasasindura Employing Namburi Phased Spot (NPST) by Patil Rohan, Veena BK, Dindore Pallavi and Skandhan KP, Ayurveda Mahavidyalaya, A

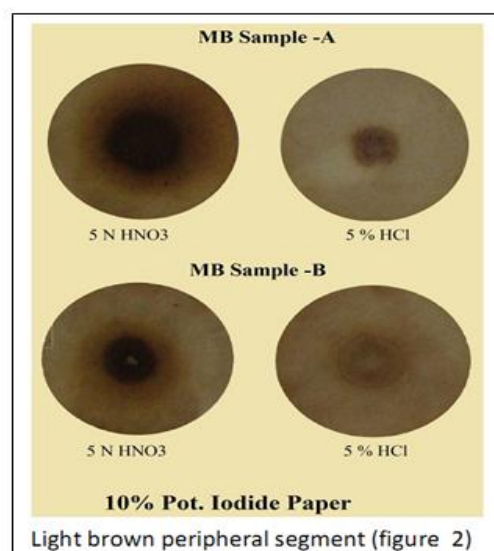
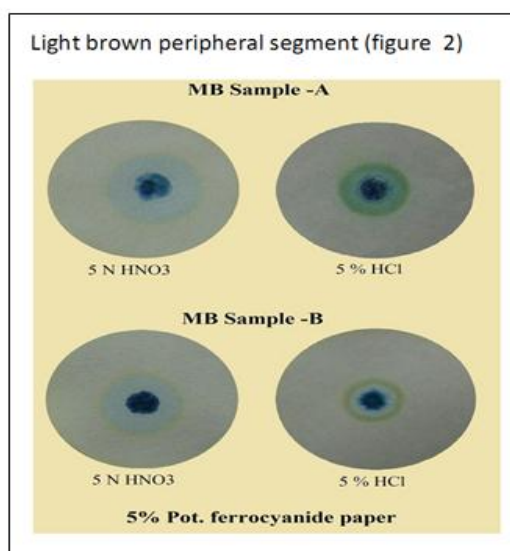
Constituent unit of KLE Academy of Higher Education and Research, Belagavi, India, Journal of Natural & Ayurvedic Medicine.^[8] Volume 2 Issue- 5, July 06, 2018.



Sample	Solution	Paper	Observation	
Rasasindura	0.25 gm Rasasindura + 0.5 ml Aqua regia	10% KI	Phase 1	Brick red solid spot
			Phase 2	Brick red solid spot with brown periphery slowly fades to away
			Phase 3	Brick red solid spot with dark brown periphery

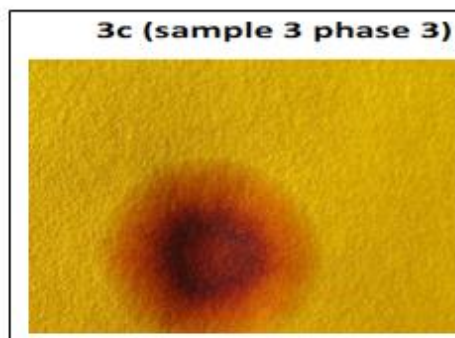
Table 1: Results of NPST analysis.

4. Analysis Of Mandura Bhasma By Namburi Phased Spot Test by A. Agarwal Banaras Hindu University, IJPRNK Vol3(1) Article March 2014.^[9]



5. Comparative 'Namburi' Namburi Phased Spot Test' Analysis Samudraphena (Cuttlefish Bone) by Dr. PRAMODKUMAR, Dr.P.G. JADAR, Dept of

Rasashastra .K.L.E. University's Shri BMK Ayurveda Mahavidyalaya, Shahapur, Belgaum. IJPRBS, 2013; Volume 2(1).^[10]



Standard NPST result of Samudraphena⁵

Phase I	Phase II	Phase III
A thin pink circle forms on a wide wet spot	Starts fading away	The entire circle fades away by 24 hours

6. Evaluation of market Samples of 'Mukta Bhasma' using 'Namburi Phased Spot Test (NPST) by poornima B. t., Santhosh B.and Jadar, shri B.m.k.ayurveda

mahavidyalaya, Shahpur, Belgaum. INDIAN DRUGS 49(11) November 2012.^[11]



Table III: Standard NPST result of Mukta Bhasma

Phase I	Phase II	Phase III
A wide wet periphery forms followed by a purple circle in the centre of the spot.	Central purple circle begins to fade away by the end of II phase.	-

Image – Namboori Spot Test

DISCUSSION AND CONCLUSION

Namboori phase spot test, the technique is invented by Dr Hanumantrao Namboori in 1970 known as NPST or Namburi spot biphasic test. In this technique, the very identical spot of the test drug is formed on chemical reacting paper with different colour and shape with the three successive phases at specific time interval. The above review work can conclude the following important points.

CONCLUSION

- NPST test is firstly discovered by Dr Hanumantrao Namburi in 1970 and has been accepted by CCRAS New Delhi in 1972.
- NPST is the simple and cost effective test which helps to know the quality of the bhasma.

- It consists of study of series of changes in colour and pattern of spots after three successive phases, at different time interval so called as phased spot test.
- Five types of chemical reacting papers (whatman paper no 01) are needed to perform this test.
- This test provides very identical spot on chemical reacting paper with series of changes in colour and pattern of the test drug.
- Selection of chemical solvent and chemical reacting paper depends upon test sample.
- Keen time bounded observation and dedication is needed to get the accurate result of this test.
- It is a simple test that it can be carried out with minimum set up and requirements.
- This test is very useful for qualitative analysis for the herbomineral drugs.
- One can do the future research work on practical observations of NPST.

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