SHORT NOTES

EVALUATION OF MARKET SAMPLES OF 'MUKTA BHASMA' USING 'NAMBURI PHASED SPOT TEST' (NPST)

ABSTRACT

Mukta Bhasma (calx of Pearl), an unique herbo-mineral preparation used traditionally as an effective antacid, anti-pyretic and anti-ulcer is a compound mainly consisting of calcium carbonate. Many pharmaceutical companies manufacture Mukta bhasma but whether the quality of all remains same or not is always doubtful. This doubt can be cleared by using classical bhasma parikshas like Rekhapurnata, Vaaritara Unama and modern analytical techniques like NPST. Thus, Mukta Bhasma prepared by classical reference in our department along with three market samples were subjected to above tests and the results were compared. There was considerable difference in the bhasma parikshas and NPST spot pattern among all the four samples. The bhasma prepared in our department had nearest results to standard NPST of Mukta Bhasma.

Keywords: Mukta Bhasma, Bhasma parikshas, Namburi phased spot test (NPST)

INTRODUCTION

Mukta (Pearl) is one of the Navaratna (Nine Precious Stones)[1]. Pearls are formed in molluskan bivalves (oysters, mussels) of several species by the secretion of a substance known as Nacre around an irritant foreign object (particles/parasites etc) in between the mantle and the shell of pearl oyster. Nacre is composed of conchiolin and calcium carbonate. Many traditional Ayurvedic formulations contain Mukta (pearl) as an important ingredient. It is used in the form of Bhasma or Pishti. Mukta Bhasma is used in various diseases like diabetes mellitus, dysuria, acid peptic disorder, chronic fever, respiratory disorders etc. For the quality assessment of bhasma, various bhasma pariksha (tests for calx) are mentioned in Ayurvedic classics.

In today's era, cultured pearls are in use for all medicinal purposes due to non-availability of natural Pearls. In cultured pearls, there is human intervention. The oyster shells are opened; a bead of mother pearl is implanted in the shell & is closed again & re-introduced in the water for one to two year. It is very difficult to differentiate cultured pearls and imitation pearls. Cultured pearls can be adulterated with imitation pearls and can be differentiated by EDXRF (Energy-dispersive X-ray fluorescence). EDXRF results showed that the cultured pearls and their beads are basically $CaCO_3$, while the detection of only C and O in the pearl imitations indicates that they are consistent with a polymeric composition. The presence of Si, O, Na and Al in the bead of the pearl imitation is consistent with it being glass[2]. Also there are chances of adulteration of Mukta Bhasma with Shukti bhasma as Shukti bhasma is cheap in price.

Namburi Phased Spot Test (NPST) is the study of spot and colors at three successive phases spreading over three different time intervals. When a drop of clear solution of a substance (Bhasma or Sindura) under examination is put on Whatman paper impregnated with suitable reagent, a spot with series of changes in color and pattern will appear. This test is commonly used in chemistry. It has the advantage of measuring the sensitivity of reactions at different time intervals. This method is used to detect or study continual chemical reactions that take place gradually between two chemical substances on static media at every second. It is used to assess the bhasma qualitatively.

MATERIALS AND METHODS

Done in three stages

1. Procurement of Mukta Bhasma: Three market samples (sample 1, 2 & 3) were procured. Raw Mukta for fourth sample (sample 4) was procured from professional supplier in Karwar, Karnataka and was authenticated by Deccan Institute of Gem Technology, Hyderabad.
2. Mukta Bhasma of sample 4 was prepared and subjected to classical bhasma parikshas in P.G Deparment of Rasashaastra, K.L.E U.'s Shri B.M.K.Ayurveda Mahavidyalaya, Belgaum
3. Subjecting all the samples to NPST.

Preparation of Mukta Bhasma

Raw Mukta of sample 4 was subjected to Shodhana[3] (general purification) by the Swedana method (heating under liquid bath) using Dolayantra in Jayanti Swarasa (fresh juice of *Sesbania Egyptica Pers.*) for 3 hours. After Shodhana, Muktas were made into powder and then subjected to Marana[4] (incineration) process. The powder was given one Bhavana (trituration with liquid media) with Godugdha (Cow's milk) and chakrikas (pellets) prepared. After drying in shade, pellets were kept in earthen casserole, sandhibandhana (sealing) done and subjected to laghu puta (Kukkuta puta). It required four such putas to obtain Mukta Bhasma of straw color and which passed all bhasma parikshas.

Bhasma Parikshas

The Mukta Bhasma prepared in our department (sample number 4) and other three market samples (number 1, 2 & 3) were subjected to various classical bhasma pariksha like Rekhapurna (enters in furrows of fingers),Vaaritara (floats on water), Unama, Jihwa pariksha (Taste) and Nirdhuma (absence of fumes).

Namburi Phased Spot Test

Materials

a. Distilled water

b. Haridra paper: Whatman Paper No.1 impregnated and dried in an alcoholic extract of *Curcuma longa Linn.*

c. Test tubes: Four

d. Mukta Bhasma (Sample 1 to 4)

Procedure[5]:

All the four samples were subjected to NPST. Initially 0.25g of bhasma was put into test tube and heated on spirit lamp till the lower end of the test tube becomes red hot. Heating was stopped once the charred smell starts to be emitted. The test tube was allowed to cool. Then 0.5 ml of distilled water was added to all the test tubes, shaked well and allowed to settle for 24 hours. Then one drop of clear solution of each sample was put on Haridra paper and observed for spot pattern in the following three phases:

Table I: Analysis of Mukta Bhasma samples

Test	Sample 1	Sample 2	Sample 3	Sample 4
Colour	White	White, shiny	White, shiny	Creamish white
Odour	Nil	Nil	Nil	Nil
Rekhapoorna	Positive	Positive	Positive	Positive
Vaaritara	Positive	Positive	Positive	Positive
Unama	Positive	Positive	Positive	Positive
Jihwa pariksha	Kshariya (alkaline)	Tasteless	Tasteless	Tasteless
Nirdhuma	Positive	Negative	Negative	Positive

- 1st phase: 0 to 5 min
- 2nd phase: 5 min to 20 min
- 3rd phase: 20 min to 1 day

Observations of NPST

There was lot of difference in the spot pattern of all the four samples when compared to standard NPST of Mukta Bhasma (Table III).

DISCUSSION

Sample 1, 2 and 3 are white in colour but Sample 4 is creamish white which may be due to the difference in bhavana drug used (Cow's milk). Sample 2 and 3 showed fumes on heating viz.,Nirdhuma (absence of fumes) test was negative which indicates the improper formation of bhasma or the bhasma is consisting of some organic components which may be added as

Table II: NPST observations of Mukta Bhasma samples

Stages	Sample 1	Sample 2	Sample 3	Sample 4
Heat treatment:				
i. Liberation of fumes	Nil	Present	Slight fumes	Nil
ii. Odour	Charred(+)	Charred(++)	Charred(+)	Charred(+)
iii. Change of color	Light grey	Blackish grey	Light grey	Light grey
Wet treatment:				
i. Exothermic/ Endothermic	Exothermic	Nil	Nil	Exothermic
ii. Color of solution	Light straw	Brownish	Clear	Light straw
iii. Adsorption	Normal	Normal	Normal	Normal
iv. Settling time	Rapid	Rapid	Rapid	Rapid
NPST Observations: I phase (0-5 min)	Wet periphery forms followed by a thick purple circle in the centre of the spot. But wet spot was not much wide.	Wet periphery appears followed by light pinkish stain in the centre.	Wet periphery appears followed by light pinkish circle in the centre.	Wide wet periphery forms followed by a purple circle in the centre of the wet spot. Same on the other side of haridra paper.
IInd Phase (5-20 min)	Wet periphery faded with reduction in the brightness of purple circle.	Wet periphery became light pink at the end of II phase.	Wet periphery faded away in this phase.	Wet periphery started to fade by the end of II phase.
IIIrd Phase (20 min- 1 day)	Purple circle faded away with reduction in the thickness of ring and became pinkish on the other day.	Wet periphery and pink circle faded away.	Pink circle faded away on the other day.	Purple circle faded on both sides of paper with reduction in thickness of purple ring. It became light pink on the other day.

Table III: Standard NPST result of Mukta Bhasma

Sample name	Phase I	Phase II	Phase III
Mukta Bhasma	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.	-

adulterants or as the remainants of bhavana materials. Sample 2 showed blackish fumes with blackish discolouration of bhasma on heating. Sample 1 and 4 showed exothermic reaction on adding distilled water which was missing in sample 2 and 3.This raises the question on the purity of bhasma. Usually calcium compounds bhasma should be Tasteless. But Sample 1 is Kshariya (alkaline) which suggests that it is not completely transformed to bhasma form.

In sample 1, the NPST spot pattern was accordingly seen but the wide wet periphery spot was not prominent as seen in sample 4. The desired accurate NPST results were observed in sample 4 prepared in our department. Sample 2 showed different spot pattern which resembles as that of Shukti (Pearl oyster) bhasma spot pattern (i.e.,wet periphery becomes light pink by the end of second phase)[6]. So this may indicate that there is adulteration of Shukti bhasma with Mukta Bhasma which is of low price. In sample 3, there was light pink spot; the purple circle was not observed. In all the four samples, there is difference in the spot pattern when compared to standard NPST. Probable reason may be the usage of cultured pearls instead of natural pearls.

CONCLUSION

NPST is a chemical reaction based test helpful for quality assessment of bhasma. In all these four samples, sample 4 showed results nearer compared to standard NPST, which indicates the genuinity of the sample.

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(Received 03 April 2010) (Accepted 19 October 2012)