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Evaluation of Market Samples of Lauha Bhasma using Namburi Phased Spot Test (NPST)

Research Article

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Abstract

Introduction: *Lauha bhasma* is a herbo- metallic preparation in Ayurveda; it possesses *ruksha- guru- lekhana guna*, *madhura vipaka*, *sheeta veerya* which is indicated in *kushta*, *kshaya*, *pandu*, *krimi*, etc. disease conditions. Though *bhasma* are prepared by following the classical methods, in this commercialized world its purity and quality is a question. So in this study, classical *bhasma pareeksha* and Namburi Phased Spot Test (NPST) methods were employed on two market samples of *Lauha bhasma* to assess their purity and quality. Materials and Methods: *Lauha bhasma* of both market samples (sample 1 and sample 2) were subjected to classical *bhasma pareeksha* and NPST test methods. Observations and Results: Both samples were subjected to NPST and different test methods then parameters obtained were compared to standard values as per CCRAS guidelines. Discussion: Both samples of *Lauha bhasma* have passed the classical *bhasma pareeksha* suggestive of proper formation of*bhasma* but differed in the time period of changes observed at different phases in NPST test. pH of both samples signifies the alkaline nature of *bhasma*. Conclusion: Both samples have tested for different parameters in which sample 1 showed changes as mentioned in NPST standards on-time compared to sample 2.

Key Words: *Bhasma pareeksha*, *Marana*, *Bhasma*, S*indura*, *Rekhapurnata, Varitara.*

Introduction

Lauha (Iron) is one among the *shuddha dhatu varga* (pure metal), chemically identified as Ferrum (Fe) (1). *Lauha bhasma* possess *ruksha* (rough)- *guru* (heavy)- *lekhana* (scraping) *guna*, *madhura* (sweet) *vipaka*, *sheeta* (cold) *veerya* (2). It is *netrya* (good for eyes), *vajikara* (aphrodisiac), *varnya* (complexion), *medhya* (promotes intellect). Indicated in *kshaya* (pthisis), *kushta* (diseases of skin), *gulma* (abdominal lump), *pliha* (splenic disease), *udaraja krimi* (worm infestation in abdomen), *pandu* (anaemia), *prameha* (increased frequency and turbidity of urine), *arsha* (piles), *shwasa* (asthma), etc. disease conditions (3). In Ayurveda, the process of *marana* (calcination/ incineration) differs with the nature of the substance to be calcinated. Even though the *bhasma* (calx) are prepared by following classical methods, in this commercialized world due to the usage of modernized equipments and other issues the quality of a *bhasma* is always an open question. So many tests can be employed for assessing the quality and purity of a *bhasma* preparation in which classical *bhasma pareeksha* forms the basic parameters mentioned in the classics (4, 5).

A new technique was developed and standardized by Dr Namburi Hanumantha Rao in 1970 which was accepted by CCRAS, New Delhi named as Namburi Phased Spot Test (NPST) to assess the purity and quality of prepared *bhasma* and *sindura* (mercury preparations) (6). NPST test method helps in identifying the *bhasma* and also to know whether the *bhasma* is formed properly or not. Study of the spot at three different time intervals and observation of changes is a special feature of this technique (7). Hence in this study an attempt was made to check the quality assessment on market samples of *lauha bhasma* using NPST test.

Materials and Methods

It is divided into two parts

- Subjecting samples to classical *bhasma pareeksha*
- Conduction of NPST test on both samples

Lauha bhasma of different pharmacies are procured from local market of Hassan, Karnataka and named as sample 1 and sample 2.

Classical *bhasma pareeksha* (8)

Sample 1 and 2 were subjected to various *bhasma pareeksha* like *rekhapurnata*, *varitara*, *unama*, *nirdhuma*, etc.

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- ***Rekhapurnata:*** This was done by rubbing both samples of *bhasma* between thumb and index fingers; if it enters the furrows of the fingers then it is considered to be completely done.
- ***Varitara*:** Both samples of *bhasma* are sprinkled over the surface of stagnant water; if the *bhasma* floats then it is considered to be properly prepared and if it sinks then it is incomplete.
- ***Unama*:** A grain of rice or *dhanya* was placed over *varitara bhasma* then the grain should float on the surface of *bhasma* then it is declared to be properly prepared.
- ***Nirdhuma*:** Both samples were heated in dry test tubes to observe for any smoke on heating; properly prepared *bhasma* should not produce any smoke.
- ***Nischandra*:** *Bhasma* of both samples was rubbed between thumb and index fingers and held in bright light; if any shiny particles are present then the *bhasma* is said to be incomplete.

Evaluation of NPST test (9)

- Quantity of *bhasma*- 0.25g of each sample
- Reagent- 5N HNO_3
- Chemical reacting paper- 10% Potassium iodide paper
- Initially both samples were weighed and 0.25g of each sample was taken in test tubes and heated till bottom appeared red hot using spirit lamp. Then both samples were allowed to cool and treated with 0.5ml of 5N HNO_3. Again both samples were heated for a while and shaken often for first two hours before treating with their chemical reacting paper and allowed to settle for 72 hours. After the time duration, one drop from supernatant layer from both samples were placed over 10% potassium iodide paper and color changes with pattern were observed over three time periods i.e., 0 to 5 minutes- 1st phase, 5 to 20 minutes- 2nd phase and 4 hours after 1st phase- 3rd phase. The changes in the color pattern at different time intervals were compared with the standards given in the NPST book.

Observations and results

Classical *bhasma pareeksha* and NPST analysis were carried out on both samples of *lauha bhasma* given in Table 1 and 2.

Table 1: Classical *bhasma pareeksha* analysis of both samples of *Lauha bhasma*

Parameters	Sample 1	Sample 2
Color	Dark red	Dark red
Odor	Absent	Absent
Taste	Absent	Absent
Touch	Smooth	Fine
Rekhapurnata	Positive	Positive
Varitara	Positive	Positive
Unama	Positive	Positive
Nirdhuma	No smoke	No smoke
Nishchandrata	No luster	No luster
pH	7.43	7.12

Table 2: NPST analysis of both samples of *Lauha bhasma* (10)

Criteria		Sample 1	Sample 2
Changes on heating	**Liberation of fumes**	Nil	Nil
	Charring	Nil	Nil
	Odor	Not specific	Not specific
Spot, color and fading time at different phases	**At 1st phase (0-5 minutes)**	A deep blue central solid spot surrounded by brown margin formed immediately	A deep blue solid central spot formed immediately with delayed brown margin
	At 2nd phase (5-20 minutes)	A deep blue central solid spot surrounded by a blue area with brown margin expanded	A deep blue central solid spot surrounded by a light blue area with brown margin
	At 3rd phase (4 hours after 1st phase)	A deep blue central solid spot surrounded by a narrow light blue area with only a brown margin encircled this	A deep blue central solid spot surrounded by a light blue area with brown margin formation was a littledelayed comparatively

Fig 1: Weighing of sample 1

Fig 2: Weighing of sample 2

Fig 3: Heating of sample 1

Fig 4: Heating of sample 2

Fig 5: Settling of solutions

Fig 6 (a to f): NPST evaluation

Fig 6 (a): Sample 1 at first phase	Fig 6 (b): Sample 2 at first phase	Fig 6 (c): Sample 1 at second phase

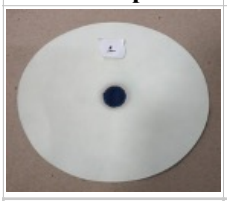
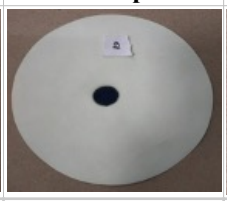
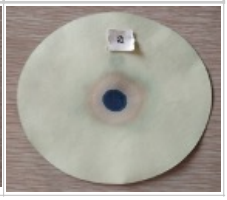

	

Fig 6 (d): Sample 2 at second phase	**Fig 6 (e): Sample 1 at third phase**	**Fig 6 (f): Sample 2 at third phase**
		

Discussion

Lauha bhasma is one among the herbo- metallic preparation in Ayurveda. Due to the influence of its properties it mainly acts on *kshaya*, *kushta*, *gulma*, *pliha*, *udaraja krimi*, *pandu*, *prameha*, *arsha*, *shwasa*, etc. disease conditions. In this commercialized world, assessing the quality and purity of *bhasma* before administration is very essential. Though many techniques have been quoted for the quality assessment, in this study classical *bhasma pareeksha* and NPST are employed over two market samples to check the purity and quality of *lauha bhasma*.

pH of both samples suggestive of alkaline nature of the *bhasma* which may have been influenced by the *bhavana dravya* used (11). Color of both samples is dark red, odorless with no taste and sample 1 is smooth whereas sample 2 is fine to touch describes the texture of *bhasma*. Both samples of *lauha bhasma* have passed the classical *bhasma pareeksha* suggestive that the *bhasma* are properly prepared. *Rekhapurnata* tested entered the furrows of the fingers. *Varitara* and *unama* tests showed positive for both samples as the *bhasma* was unable to break the surface tension of water that made the *bhasma* to float as it is light (12). *Nirdhuma pareeksha* produced no smoke on heating of both samples and both were luster free when tested for *nischandra* test as the *bhasma* loses its luster when subjected to *marana*; all these are suggestive of appropriate prepared *lauha bhasma* (13).

NPST is a unique technique to differentiate between properly processed and unprocessed *bhasma* and *sindura* based on chemical reaction which also helps in identification of the *bhasma* and *sindura* (14). The test can be conducted with minimum requirements and it is easy to carry out. Observations of both samples were drawn at three different time intervals to assess *bhasma* quality and purity of market samples. Sample 1 showed exact changes in the pattern of spot that was observed at three intervals of time duration where as sample 2 also showed similar changes but with delayed formation of brown margin at the periphery which is the characteristic feature to identify the quality of *lauha bhasma* and also sample 2 showed light blue color in surrounding area comparatively. This variation could be because of the chemical changes that occurred in both samples which could be influenced by the duration and number of *puta* (quantum of heat) given for the preparation of *bhasma* and also the use of *bhavana dravya* and influence of modernized equipments used for the preparation by the pharmacies (15).

Conclusion

In this study, both samples were subjected for *bhasma pareeksha* explained in treatise of *Rasashastra* and NPST test methods to assess the purity of quality of market samples of *lauha bhasma*. Both samples passed all *bhasma pareeksha* and resulted in the changes as prescribed in standards related to NPST. Sample 1showed exact changes at the right duration as mentioned in the NPST assessment criteria in comparison to Sample 2. The study conducted on both market samples proved the purity and quality of *lauha bhasma*.

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