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# STANDARDIZATION OF LOHA BHASMA

**Dr. Jadhao Ujwala Ashokrao***

Assistant Professor, Department of Ras-Shastra & B. K. Govt. Ayurved College, Nanded, Maharashtra. India.

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***Corresponding Author**
**Dr. Jadhao Ujwala Ashokrao**
Assistant Professor, Department of Ras-Shastra & B. K. Govt. Ayurved College, Nanded, Maharashtra. India.

## ABSTRACT

Metals and minerals are being used as a medicine since *Vedic* era. They are being used in the form of *Churna, Ayaskruti and Bhasma*. *Bhasma* is prepared by the process of *maran* i.e. process of incineration. Before the process *maran*, process of purification i.e. *shodhan* is to be done. *Loha* is one of the metallic *bhasma* commonly being used in various disorders like *Kamla, Pandu, Sthaulya, Prameha, Netravikar* and *Shotha* etc. *Loha shodhan* was done as per texual reference. *Shodhit loha* was mixed with *shuddha Hingula* and triturated with *kumari swaras*. Chakrika were prepared and *Gajaputa agni* was given for *maran* process. *Maran* was done for 7 times. Prepared *bhasma* was subjected to physiochemical analysis and obtained results were compaired with the standard values given in Ayurvedic Pharmacopoeia of India. The present research work provides the information about pharmaceutical process of *Loha shodhan and Loha maran* as well as physiochemical analysis of Loha bhasma. The information provided in this article may prove beneficial for future research work on pharmaceutical and anaylytical aspect of Loha bhasma.

**KEYWORDS**: *Loha bhasma, Loha Maran, Loha shodhan,* Standardization *of Loha,*

## INTRODUCTION

Rasashastra is one of the most important branch of Ayurveda apart from *Ashtanga Ayurved*, which mainly deals with the metals, minerals and herbomineral compounds. The most important features of *Rasayoga's* are faster in action, very small dose required, does not cause any type of inconvenience, and does not create bitter taste. Metals and minerals are nonabsorable, heavy and toxic substances but having medicinal properties. Metals are being used as a medicine since from *Samhita* period in the fine powder known as "*Ayaskruti*".

Metal undergoes various process before being used as a medicine. *Shodhan* is a process of purification of metals. After *shodhan* the process of *maran* done, in which the physical structure of raw metal is completely changed. *Maran* is the process in which the metal gets converted into very fine powder. The inorganic metal gets changed into organic form which can be easily absorbable by the human body. To asses the quality of prepared *bhasma*, Standardization should be done by different analytical methods. Standerdization of metallic drug is todays burning issue, So multidimetional approch is essential for standardization of *bhasma*. Standerd is a numerical value which quantify the parameters & thus denotes quality and purity of material. *Loha bhasma* is one of the common metallic preparation being used in various disorders like *Kamala, Pandu, Udar, Shotha, Netravikar* and *Prameha* since ancient time.

So the present study Standardization of *Loha bhasma* was undertaken to understand the basic idea about the *Bhasma kalpana*,& standardization methods for *Loha bhasma*, as per modern analytical methods as well as Ayurvedic texual parameters.`

This study was carried out in following three parts

1. Raw material standardization
2. Process standardization
3. Finish product standardization

Standardization was done by Ayurvedic parameters of *Loha Bhasma pariksha* with refferance to *Ras tarangini*.(2/53-57.) And modern analytical methods like Atomic absorption spectrophotometry Microscopic study of *Loha bhasma*, Ash value, loss on drying, loss on heating, ph value, Namburi spot biphasic test etc. were used to standardize *Loha bhasma.*[4]

**AIMS:** Preparation and Standerdization of *Loha bhasma.*

**OBJECTIVES**

1. Loha dhatu shodhan (purification)
2. Maran of Loha dhatu (Incineration)
3. Standerdization of Loha bhasma. (Analysis)

**MATERIAL AND METHODOLOGY**

There are different of procedures mentioned for preparation of *Loha bhasma* in various texual referrences, but the method selected for this work from *Ayurved prakash.*[3]

The gross methodology of preparation is as follows.

1. *Seclection & authentification of crude drugs, as per ancient and modern parameters.*
2. *Shodhan of crude drugs i.e. Loha shodhan, Hingula shodhan.(Ras Tarangini)*
3. *Loha bhasma preparation as per Ayurved Prakash.(3/262-263)*

**Methods For Shodhan Of Raw Materials**

**Loha shodhan**[1] Ref: - Rasatarangini-20/18

- Materials:- Crude iron powder - 1 kg
- *Triphala* bharad - 500gm
- Water – 8 lits
- *Gomutra* - 2 lits

**Equipments:** Weighing machine, iron pan, *kadhai*, cotton cloth, Gas stove, spoon etc.

**Procedure**

First *Thriphala kwath* was prepared by taking 500 gm *Triphala bharad* which mixed with 8 lits of water & boiled upto 2 lits. Then 2 lits of *Gomutra* was mixed with 2 lit *Triphala* decoction. 1kg Iron powder was heated in iron pan upto dark reddish colourt & then the red hot iron powder was poured into *Triphala* and *Gomutra* decoction. Same procedure is repeated for seven times. Every time the decoction taken was different.

**Observation & Precautions**

1. After completion of *shodhan* process colour of Iron powder was changed from gray siver to dark black in colour.
2. After *shodhan* weight of iron powder was increased by 75 gms due to oxidation.
3. The *Triphala* decoction required for *shodhna* is near about 750 ml per cycle.
4. Total time required for one cycle of *shodhan* was near about 25 mins.
5. Colour of *Triphala* decoction changes from yellow to dark black after poring the red hot iron powder in it.
6. After pouring iron powder in *Triphala* decoction, the slight explosion was occurred with sound.

**Results**: Purified Iron was obtained

**Hingula shodhan:**[2] Ref: *Ras Tarangini 9/ 12*

**MATERIALS**

1. *Ashudha Hingula* – 500gm
2. *Ardrak swaras* (ginger juice) – as per requirement

**Equipments:** Weighing machine, utensil, Mixer, *khalwa yantra*, cotton cloth, spoon. Etc.

**METHOD**

First 200 gm *Ardark* was washed and 50 ml juice was obtained. The crude *Hingula churna* was triturated with *Ardrak swaras* in *khalwayantra* upto soft mass and *mardan* was done uptill the mixture gets dry. Same procedure was repeated for 7 times.

**Observation & Precautions**

- Colour of *Hingula* becomes dark reddish orange colour.
- Weight of *Hingula* was reduced after shodhan by 10 gms may be due to removal of impurities.

**Results**: Purified *Hingula* was obtained

**Preparation of Loha Bhasma**[3] Ref:- *Ayurved prakash*-3/262-263

**Materials**: Ingredients required for preparation of *Loha bhasma* is as follows

1. Purified Iron powder – 500gm
2. Purified *Hingula* – 40gm
3. *Kumari Swaras* – As per requirement

**Equipments**: Weighing machine, *kalwa yantra*, earthan *sharav samputa*, knife, *multani mitti*, cotton cloth, utensils, mixer and *wanyopala* etc.

**METHOD**

First 500gm Iron powder was grinded in *khalwayantra* then 40 gm of *Hingula* was mixed with it & triturated with *kumarai swaras* upto homoginious mixture for six hours. Then pellets of 3 cms in diameter 0.3 cms in thickness was made & kept in shade upto 48 hrs for drying. Then dried pellets kept in *sharawa samputa & sandhibandhan* made, dried for two days in shade.

*Gajaputa (1m*1m*1m*) was filled with cow dung cakes 2/3, then *samputa* were kept on it & again filled with remaining cow dung & *agni* was ignited. Approximately 100 cow dung

required for each *puta*. Temperature was recorded after every hour to know temperature flow. Maximum temparature of *Gajaputa* reached upto 1160$^0$C. Next day after self cooling observation of *bhasma* done for colour, cosistancy and weight. Same way seven *gajaputa* given to obtained disiered qulity of *bhasma*.

**Observation & Precautions**

- Total 7 *puta's* were given
- Cow dung required for each *puta* is approximately 100.
- Heighest temperature of *Gajaputa* recorded 1160 $^0$ C.
- Time taken for one puta was approximately 10 hrs.
- Colour changes after each *puta* from brown to dark brown violet.
- Weight of *bhasma* was noticed to reduce after each *puta*.
- Hardeness of pellets decrised after subsequent *putas*.

**Results:** Dark brown coloured fine *Loha bhasma* was obtained.

**Observation table: Showing changes in weight of *Bhasma* (Table No: I).**

| NO. of *puta* | Before *puta* wt. of *loha* + *hingula* | After *puta* wt. of *bhasma* |
|---|---|---|
| **1.** First *puta* | 500+40=540 gms | 480 gms |
| **2.** Second *puta* | 480+40=520 gms | 465 gms |
| **3.** Third *puta* | 465+40=505 gms | 450 gms |
| **4.** Fourth *puta* | 450+ 40=490 gms | 440 gms |
| **5.** Fifth *puta* | 440+40=480 gms | 428 gms |
| **6.** Sixth *puta* | 428+40=458 gms | 410 gms |
| **7.** Seventh *puta* | 410+40=450 gms | 380 gms |

**Observation table: Showing changes in physical properties of bhasma *(*Table No: II).**

| NO. of *puta* | Colour | Luster | Weight | Touch |
|---|---|---|---|---|
| 1.First *puta* | *Eshtika varna* | No luster | Heavier | Hard |
| 2.Second *puta* | Saffron colour | No luster | Heavy | Hard |
| 3. Third *puta* | Saffron colour | No luster | Heavy | Hard |
| 4. Fourth *puta* | Reddish brown | No luster | Light | Smooth |
| 5 Fifth *puta* | Dark brown | No luster | Light | Smooth |
| 6. Sixth *puta* | Violet brown | No luster | Light | Soft |
| 7. Seventh *puta* | Violet brown | No luster | Light | Soft |

**Analytical study: - Standerdization -**This study we can divided into two parts

- Ancient Ayurvedic methods of analysis
- Modern methods of analysis

**Ancient Ayurvedic methods of analysis**

- Raw material Standrdization: Raw materials are standerdised by *panchabhautik prikshan* i. e. physical characters, apperence, colour size, shape, cosistancy, smell, weight, shining etc. as per texual *grahya grahyatwa lakshanas*.
- Process Standrdization: All processes done as per texual references i. e. *Loha shodhan, Hingula shodhan* as per *Ras Tarangini*, *Loha maran* as per Ayurved prakash. All observations were recorded as per stepwise.

- **Finished Product Standrdization**

*Loha bhasma* was standardized as per *Bhasma pariksha* given in *Ras Tarangin i. e. Varitaratwa, Rekhapurnatwa, Unam, Niruthatwa, Apunarbhava, Bhasma varna, Gata rasatwam, Mrudutwam, Shlakshnatwam, Nirdhumatwa, Niruthatwa.*

**Observation table: Showing Organoleptic observations of *Loha Bhasma* (Table No: III) *Panchabhautic parikshan.***

| | | |
|---|---|---|
| **1** | *Rupa* | *Ishtika varna* |
| **2** | *Sparsh –* | *sukshma* |
| **3** | *Shabda* | *dantagre – nati kachkach* |
| **4** | *Ras* | *Gat rastwam* |
| **5** | *Varitaratwa* | present |
| **6** | *Rekhapurnatwa* | present |
| **7** | *Nichandratwa* | present |
| **8** | *Nirdhumatwa* | present |
| **9** | *Mrudutwa* | present |

**Modern view of Standardization**

*Loha bhasma* was analysed in B- PHARMA LAB worli, Mumbai & herbal drugs analysis done at Anchrome lab Mulund east. Mumbai. Following tastes were done

1. Atomic Absorption Spectrophotometry
2. Determination of ash value
3. Determination of ph value
4. Determination of acid insoluble ash
5. Contents of Iron
6. Acidity / Alkalinity
7. Ph value
8. Microscopic study for *loha bhasma*
9. Namboori phased spot test for *loha bhasma.*

Result obtained from analysis are compared with the standards given in pharmacopial standards of Ayurveda.[4]

**Table showing Analysis results (Table No IV).**

| **Analytical Tests** | ***Loha bhasma*** |
|---|---|
| Description | Reddish brown powder |
| Acidity /Alkalinity | Aciditic to litmus |
| PH of 1% sol$^{n}$ | 4.41 |
| Acidity | 2.892 ml $^{N}$/100 Naho reqd |
| Contest of iron | 64.01 % |
| Ash value | 99.38 |
| Acid insoluble ash | 80.88 |
| Microscopic stucture | Irregular shape |
| Particle size | 11 micron |
| Namboori phased spot test | Deep blue coloured central solid spot with light blue coloured thin priphary which denotes *loha bhasma* |

**AAS: Atomic absorption spectrophotometry**

In this technique the sample is introduced into flame using a nebulizer when the inorganic atoms get excited & emits light of specific wavelength, it is proportional to their concentration.

**IMPORTANCE:** It is used for the quantitative analysis of elements specially metals.

**Namboori phased spot test for loha bhasma**: This is special test developed by Dr. Hanumant rao Namburi for spot identification of Ayurvedic *bhasma.* When a drop of clear solution of a substance, *Bhasma or Sindura*, that is under examination is placed on one of the chemical reacting paper, a spot with a series of changes in colour & pattern will appear. It is the study of this spot & colour at three successive phases, spreading over three different time intervals is known as the “Phased Spot Test”.

**Observation of NPST of *Loha bhasma***

First phase: Deep Blue coloured central solid spot with light blue colour thin periphery.

Second phase: All spots fades off.

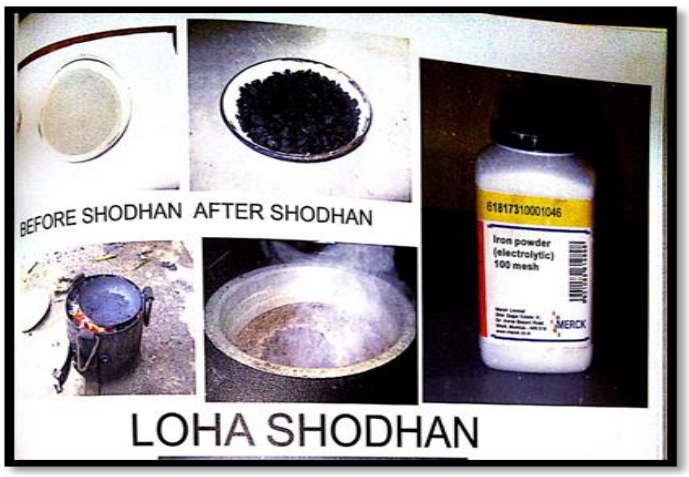


**Figure 1: Loha Shodhan.**

**Fig. 2: Hingula Shodhan.**

**Figure 3: Loha + Hingula + Kumari Bhavan.**

**Fig. 4: Loha Chakrika.**

**Figure 5: Sharava samputa.**

**Fig. 6: Chakrika after Puta sansakr.**

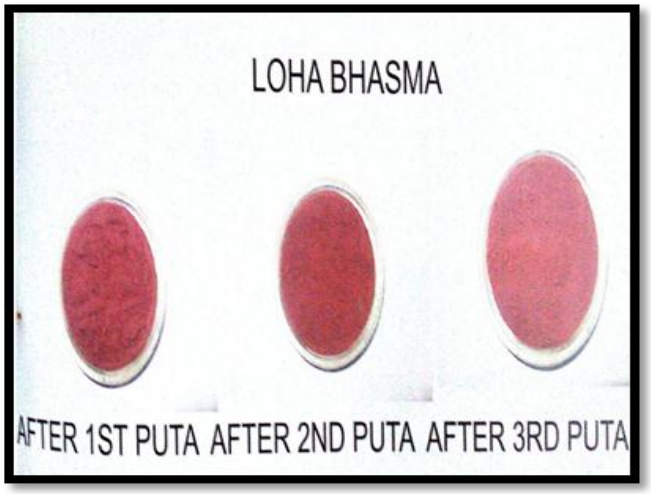


**Figure 7: Bhasma varna.**


**Fig. 8: bhasma varna.**

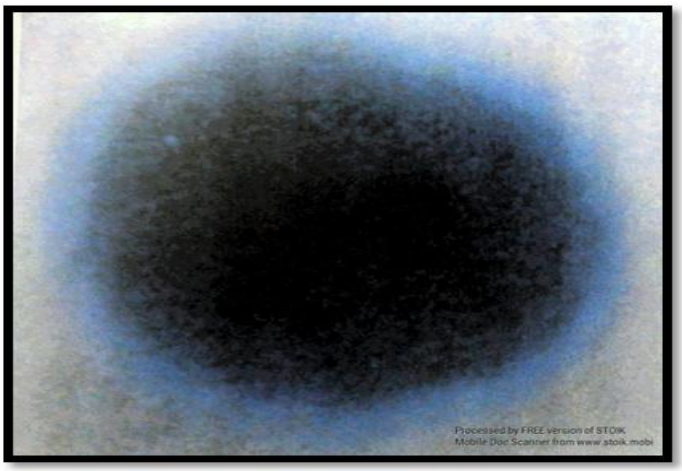

**Figure 9: Namboori test for Loha bhasma.**

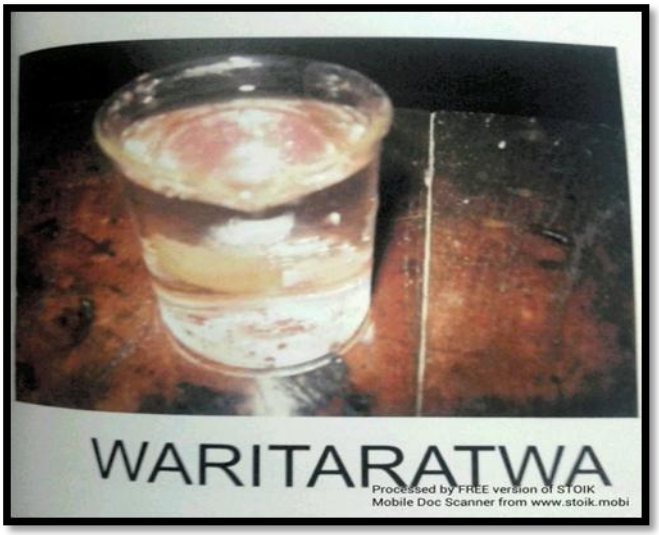


**Figure 10: Varitaratwa of loha bhasma.**

## DISCUSSION AND CONCLUSION

According to desired effects and to nullify the hazardous effects of any drug, it needs to subject to various *sansakaras. Sansakars* hold key to potentiate the action of the drug, make it suitable for administration and remove ill effects to make it most suitable for human body. *Maran* (incineration) is one of the important *sanskar* done on metallic drugs before using it for treatment purpose. In present study *loha bhasma nirman* was done by using method of *Ayurved prakash.* After *maran* the quality control analysis was done by standardized analytical tests. Standerdization is a very important aspect of every pharmaceutical preparation. In this research work standardization was done in following steps 1) Raw material standardization 2) Process standardization & 3) Finished product standardization.

**Raw material standardization**: Raw material taken for this study was purchased from local market & authentified from laboratory. 1 kg of *Loha churna* was purchased from Merk company which shows specification assay fe > 95%. Here we can conclude that it is better to use directctly iron powder than iron foils or iron solid masses because it makes the further *marana* procedure easy.

**Process standardization**: The process for *Loha shodhan* from *Ras tarangini* (20/18) i.e. *shodhan of Loha dhatu in triphala gomutra* decoction for seven times. After *shodhan* it is observed that weight of *loha* increased by 75 gms, it may be due to oxidation & colour changes from silvery shining to dull dark black colour. *Shodhan of Hingula* done as per reference from *Ras Tarangini* text 9/12. *Hingula* was triturated with juice *of ardrak* for 7

times. There are many methods described for *loha bhasma* in text, but this method from *Ayurved prakash* is most effective because it contents *Hingula* which is most important mercury ore, and the *bhasma* made by using mercury or mercury ore are very best quality bhasma which do not because any harmful effect on human body. This concept is mentioned in *Ras tarangini i.e. Lohanam Maranam shreshtam sarvesham Ras bhasmanam so paradmarit bhasmas* are more potent than any other method.(*Ayurved prakash 3 /262-263*). In this method 12$^{th}$ part of *Hingula* was mixed with *shudhha loha churna* & triturated with *kumara swaras* for 6 hrs. & then *Gajaputa* was given colour, weight touch of *bhasma* was observed & recorded. Same way seven *Gajputa* given. After 7 puta's colour of *bhasma* chages from light brown to dark brown in colour. & touch changes from hard to very soft, fine powder & there was reduction in weight of *bhasma* after every *puta.* Observations during preparation of drug were recorded timely.

**Final product standardization:** Prepared *loha bhasma* was observed for its orgaleptic as well as time parameter's. Final product physiochemical study was done & reports were compared with standared values. All results found were in normal limits with accordance to pharmacopial standards.

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