

A COMPARATIVE PHARMACEUTICAL AND ANALYTICAL STUDY OF LOHA BHASMA WSR TO CLASSICAL AND FOLKLORE METHOD

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ABSTRACT

Rasashastra is a science which deals with metals & minerals. Bhasma is considered to be one of the most effective & important preparations. It is obtained by incineration of Metals & Minerals. Loha is a very essential element of the body for the management of various diseases. Lohabhasma is the main ingredient of Kshayakesari rasa, Dhatri Lauha, Vatakantakarasa etc. Loha is a hard metal hence marana of the Loha is difficult & lengthy process, it consumes more time & energy, however folklore practitioners have been preparing Lohabhasma by easier methods & they are also obtaining desired results from the same.

Result & Conclusion: Classical method of prepared Loha Bhasma passed all the bhasma pareeksha, Puta having a major role in the reduction of the particle size of the Bhasma. Folklore methods of Loha bhasma preparation used in the present study do not yield the bhasma.

KEYWORDS: Shodhana, Bhanupaka, Sthalipaka, Marana, Puta, Loha Bhasma.

INTRODUCTION

Rasashastra (Ayurvedic Pharmaceutics) is a part of Ayurveda, devoted for the preparation of herbo-mineral and metal containing formulations. It aims at designing novel drugs with better therapeutic attributes at minimum doses. Due to lack of standardization, quality control and chemical characterization, the herbo-mineral or metallo-mineral formulations were overlooked and a lot of chaos was made pertaining to their toxicity.

In the current era, Rasaushadhis became a complete novel health care system. The innate qualities like quick action, lesser dose, tastelessness, prolonged shelf life, better palatability of Rasaushadhis have helped them to conquer the demand of patients as well as pharmaceutical properties. Among the Rasaushadhis, Bhasmas are used mostly and occupy the highest attention.

Lauha is grouped under shuddha Loha which has a high therapeutic utility in the treatment of Pandu, Shotha, Kamala etc.^[1] Many important Ayurvedic formulations like Kshayakesari rasa, Lohaparpati, Pradarantakaloha, Chandraprabhavati, Dhatri Lauha, Vatakantaka rasa etc contains Lohabhasma as an ingredient. Loha is a hard metal hence Marana of Loha is difficult & lengthy process, it consumes more time & energy, however folklore practitioners have been preparing Lohabhasma by easier methods & they are also obtaining desired results from the same.

Hence the present study was carried out to prepare Loha bhasma by various easier methods and to compare them on pharmaceutical and analytical parameters with classically prepared Lohabhasma.

MATERIALS AND METHODS

Procurement of Raw materials

The authenticated raw materials; Lauha were collected from the Venkatesh Engineering Works, Gandhi Square, Mysuru, Hingula was collected from Amruta Kesari Bengaluru. Tila taila, Triphala were collected from Govindaraj shetty & Sons Mysuru, Kulattha & Kalinga phala (Watermelon) were collected from local market and Gomutra was collected from dairy farm Mysuru.

Methods

The preparation of Lauha bhasma was carried out in Pharmacy, Department of Rasashastra & Bhaishajya kalpana JSSAMC Mysuru. By following the procedure described in the Ayurvedic classics. It involves the following major steps; Samanya shodhana, Vishesa shodhana, Trividhapaka that is, Bhanupaka, Sthalipaka and Putapaka. Lauha bhasma was subjected to various organoleptic and physico – chemical analysis such as colour, taste, texture, ash value, acid insoluble ash and water soluble ash. Modern analytical instruments such as EDAX, SEM & DLS were employed to determine the elemental composition and particle size respectively.

Samanya shodhana

In Samanya shodhana process, 600 gm of raw material (Iron turnings) was heated upto redhot and quenched in 600 ml of each liquid medium viz Tila taila, Takra, Gomutra, Kanji and Kulattha kwatha and kept for self-cooling at room temperature. This process was repeated for seven times consecutively in tila taila followed by seven times consecutively in Takra, Gomutra, Kanji and Kulattha kwatha by using fresh media every time.^[2]

Vishesha shodhana of Loha

Vishesha shodhana of loha was done in Triphala kwatha. Samanya shodita Lauha was heated upto redhot & quenched in a prepared Triphala kwatha. This process was repeated for 7 times with fresh Triphala kwatha each times.^[3]

After the Samanya shodhana & Vishesha shodhana Lauha was made into churna and churna was subjected for Puta.

Marana of Lauha (Loha bhasma 1)**Bhanupaka**

Triphala kwatha was prepared by boiling equal quantity of Triphala yavakuta churna which was equal to the quantity of vishesha shodita lauha churna with 2 parts of water and it was reduced to 1/4th of original volume^[4]

Vishesha shodita lauha churna was taken in a steel vessel & added the Triphala kwatha to it, stirred well & kept under sunlight until the complete evaporation of the kwatha. This process was repeated for 7 times each time fresh triphala kwatha is used.^[5]

Sthalipaka

In this step, triphala kwatha was prepared by taking Triphala 3 times of lauha obtained after bhanupaka and 16 times of water was added to it. The whole material was boiled and it was reduced to 1/8th of original volume.^[6] Lauha obtained after bhanupaka was washed with water and placed in a sthali (vessel), to which above freshly prepared triphala kwatha was added & tivragni until the complete evaporation of the kashaya. after the complete evaporation again Triphala kashaya was added and subjected to heat. The process was repeated for 7 times.^[7]

Putapaka

In classical literature, the process of puta refers to controlled heating of herbo – mineral preparations and allowing the preparation to cool to room temperature. According to Ayurveda Prakasha Sthalipaka processed Lauha churna was added to 1/12th part Shodhita Hingula triturating with Kumari swarasa for 6 hours, made an chakrikas, dried & subjected for Puta.

Sthalipaka processed Lauha, 1/12th part of Shodhita Hingula was taken in a Khalwa yantra & sufficient quantity of Kumari swarasa was added to it & triturated for 6 hours. The paste formed during this trituration was made into chakrikas. It was kept in a sarava and covered with another sharava & sandibandhana was done with multani mitti smeared cloth. After this, it was subjected for the gaja puta with 1000 vanopalas. Allow it for self-cooling, the next day, pellets were collected from sarava & again triturated with Kumari swarasa. Same process of puta was repeated for 10 times to obtain Lauha bhasma of desired quantity.^[8]

Marana of Lauha (Loha bhasma 2) Folklore method

Pakwa (Ripened) Kalinga Phala (Watermelon) was taken, Made a hole using knife & Remove some part of pulp. The shodhita Lauha churna was kept within the Pulp and again closed the phala. This was kept for undisturbed for 15 days. After 15 days Cut the phala & scraped the pulp, collect the Lauha churna from the pulp and washed the Lauha with water⁹.

OBSERVATION AND RESULT

Samanya Shodhana of Lauha was carried out as per Rasa Ratna Samuchhaya where the sequential quenching process was done in different media by following conventional order. Metallic luster was lost after quenching in Tila taila and prominent cracks were seen after quenching in Takra and Gomutra. At the end of Samanya shodhana. It was observed that, the hard shining Fe metal was converted into blackish brown coloured, lusterless powder of brittle material. After the process of vishesha shodhana, weight of Lauha decreases and the dark black colour brittle Lauha was obtained. During the process of bhanupaka while adding triphala kwatha to shodhita Lauha churna, colour changes from greenish brown to black. The product obtained after Bhanupaka was more brittle in nature and big particles of Lauha churna were converted into fine particles. In Sthalipaka, during heating Lauha was adhering to the surface of the vessel and fumes increased with the duration of heating at the end of sthalipaka the color changes from black to jet black in color and lauha churna spongy in nature. Various observations during bhanupaka and sthalipaka are tabulated in Table 1. In

putapaka initial 2 putas metallic luster was observed on the surface of the pellets. Later it was disappeared. After putapaka the colour of pellets changed from black to brown with bluish ting other observations of each puta are tabulated in table 2.



Fig. 1: Ashodita Loha. Fig. 2: Loha catches fire after the nirvapa in taila. Fig. 3: Vishesha shodita Loha.

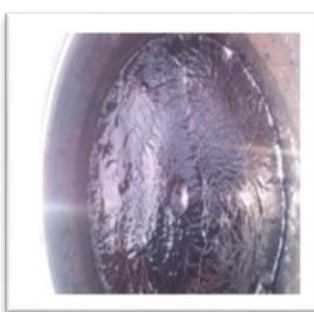


Fig. 4: Bhanupaka of Loha. Fig. 5: Bhamupaka processed loha. Fig. 6: Sthalipaka of Loha.



Fig. 7: Mardana of Loha with Sh. Hinguta.

Fig. 8: Loha bhasma 1 Sample.

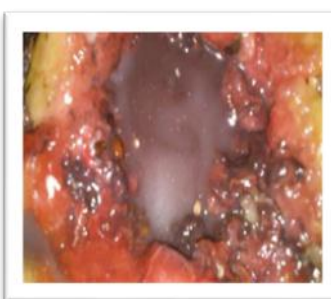


Fig. 9: Loha bhasma filled in Kalinga phala. Fig. 10: After 15th day Loha churna in Kalingaphala. Fig. 11: Loha bhasma 2 Khalinga phala In Kalinga phla.

Table 1: Observations during Bhanupaka and Sthalipaka.

Paka	Wt of the loha before paka	Colour	Triphala kashaya utilised	Wt of loha after paka	Specific observations
Bhanupaka	200 gm	Black	824 ml for 7 times	320 gm	Stcky layer was formed on the upper surface of the vessel, difficulty for scrapping
Sthalipaka	320gm	Jet black	27.97 lit	1210 gm	White colour foam was seen over the surface

Table 2: observations of each puta.

Put a No	Wt of Loha in (gm)	Wt of Sh.Hingula in (gm)	Wt of Chakrika before puta in (gm)	Wt of Chakrika after puta in (gm)	Chakrika on touch	Colour
1	1230	103	1330	750	Brittle	Black
2	750	63	895	570	Powdery	Black, Brown
3	570	48	680	400	Brittle, Powdery	Brick red
4	400	34	450	310	Brittle, Hard	Brownish with Purplish ting
5	310	26	370	270	Brittle	Brown
6	270	23	325	250	Very brittle	Chocolate
7	250	21	285	240	Hard	Brownish black
8	240	20	265	240	Brittle	Brownish black
9	250	20	280	250	Breaks on force	Brownish black
10	250	21	275	220	Hard	Brownwith bluish ting

Folklore method of Loha Bhasma preparation (Loha bhasma 2), Till 7th day there was no change in the Phala, after 15 th day colour of the Loha churna changed from black to brown. other observations should be tabulated in a table. 3.

Table 3: Observations during the loha bhasma 2 preparation.

Duration (in days)	Specific observations
Upto 7 days	No changes in the colour, odour and consistency of the phala
On 9 th day onwards	Upper part of the fruit was soft
On 10 th day	Discharge from the phala and fungus growth was observed
After 15 th day	Foul smell was perceived, fruit was decomposed, powder was smooth to touch.

Lauha bhasma 1 & Loha bhasma 2 was passed by various classical bhasma pariksha (table 4). The results of various physico chemical parameters color, taste, texture, ash value, acid insoluble ash, water soluble ash, particle size and elemental composition are tabulated in table 5

Table 4: Various classical bhasma pariksha.

Bhasma pariksha	Loha bhasma 1	Loha bhasma 2
Rekhapurnatwa	+ (4 th Puta)	+ve (Bit fine)
Varitaratwa	+ (7 th Puta)	+ve
Unnama	+ (5 th Puta)	+ve
Nischandratwa	+ (3 rd Puta)	-ve
Apunarbhava	+ (8 th Puta)	-ve
Niruttaha	+ (10 th Puta)	-ve

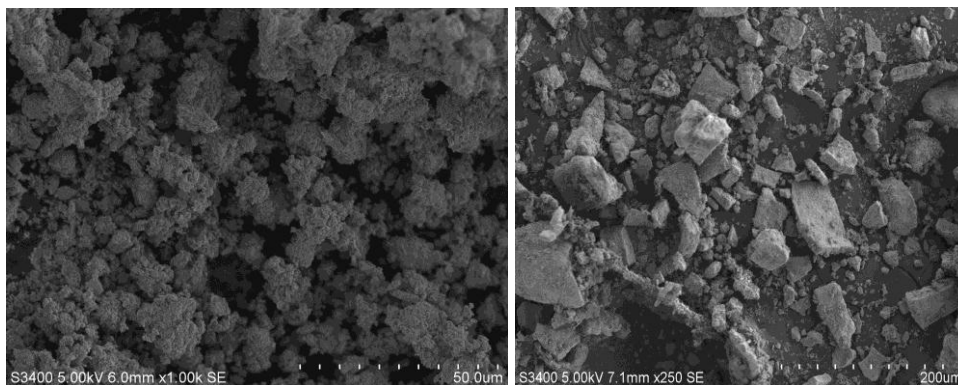
Table 5:

parameters	Loha bhasma 1	Loha bhasma 2
Colour	Brown with bluish ting	Brown
Taste	Tasteless	Tasteless
Texture	Smooth, no perceptible coarse particles	Bit fine
Ash value	95.46	99.83
Acid insoluble ash	29.92	0.99
Water soluble ash	27.84	0.14
Particle size	1673 – 675 nm	2466- 132 nm

Elemental analysis of Loha bhasma 1 & Loha bhasma 2

Element	Loha bhasma 1		Loha bhasma 2	
	Wt %	Atom %	Wt %	Atom %
C	10.80	18.64	7.83	15.15
O	45.29	58.71	44.48	64.60
Na	3.22	2.91	-	-
Mg	2.32	1.98	0.76	0.73
Si	2.16	1.59	-	-
P	0.81	0.54	-	-
S	1.61	1.04	-	-
Cl	4.38	2.56	-	-
K	4.68	2.48	-	-
Ca	2.48	1.28	-	-
Fe	22.25	8.26	46.93	19.53

SEM



SEM image of Loha bhasma 1 SEM image of Loha bhasma 2

DISUSSION

Bhasma preparations involve the conversion of the metal into its oxide form. Loha is hard metal hence the marana of the loha is difficult and lengthy process it takes more time to prepare Bhasma. There are references of preparing Loha bhasma without using Puta (heat) like Rasendra Chudamani, Rasa Yoga Shataka etc. samanya and vishesha shodhana makes the loha brittle and removes the doshas. Trividhapaka of the loha is only mentioned in the Rasendra Sara Sangraha and Rasa Tarangini book. After Bhanupaka, the weight was increased significantly from 200gm to 320gm, Which indicates there must a deposition of Triphala kashaya residue over the Lohachurna. In sthalipaka process Intially it took 1 hr 10 mins for complete evaporation of the Kashaya & gradually the time of evaporation increased upto 5 hr 40 mins. Therefore, a higher gain in weight nearly 6 times to that from the original weight was observed. After the Sthalipaka, Loha churna changed its texture. During the Putapaka Intial 2 putas showed metallic lustre on the surface of the pellets later it disappeared because Lustre is the physical character of metal, when the metal transforms to compound form then its lustre is lost. Appearance of lustre after first 2 putas indicates Loha was still persist in metallic form, later on it completely transformed to Lustreless compound. In classical reference 7 putas are mentioned to prepare the Loha bhasma. After 7th puta Rekhapurnatwa, unnama and varitartawa bhasmapareeksha's are positive but didn't passed the Apunarbhava test. Hence the Putapaka procedure was continued. The Loha bhasma was obtained after 10thPutas. Colour change was observed after each puta, initially black colour was seen later brown and finally brown with bluish ting colour was observed. The colour of Lohabhasma is Brown with bluish ting. Lohabhasma may be considered as a mixture of Ferrous oxide, Ferroussulphide, Ferric oxide and other trace elements, Ferrous oxide and Ferrous sulphide are black in colour and Ferric oxide is red in colour. Combination of all these compounds makes the Lohabhasma brown with bluish ting in colour. The weight of

shuddhaLoha was increased upto 10% after Marana. Iron combines directly when heated with Sulphur (dissociation product of hingula) to form ferrous sulphide (FeS). During red hot state some part of Loha may be oxidized to ferroso- ferric oxide. These compounds may cause increase in weight. Inorganic contents of Kumari Swarasa also may cause increase in weight of Loha Bhasma. Loha bhasma 2 is prepared According to the reference of Rasa Yoga Shataka. Shudda lohachurna was filled in a Kalinga Phala and kept it undisturbed for 15 days. Till 7th day there was no change in the Phala, after 15 th day loha chuna was collected from the phala. Loha churna was continues contact with the juice of the fruit, The content of fruit juice like Pectin and Citruline may react with Lohachuna. The Iron cover by a layer of hydrated ferric oxide it is nothing but the rust iron. The colour of the Lohachurna changed from black to brown. It may be considered as mixture of ferric oxide (Fe₂ O₃) and other trace elements, presence of maximum portion of ferric oxide makes the churna brown in colour. The same was seen in case of Mandura. It passed Rekhapurnatwa, unnama and Varitaratwa bhasmapariksha. SEM images of the samples showed particles which were not uniform in size and shape which may be due to manual grinding. Particle size of the Loha bhasma 1 was smaller than the loha bhasma 2. it indicates the significance of Bhavana and Putapaka as measures of size reduction. Both Loha bhasma samples are having dominant in the elements Fe, O with other in very negligible quantity.

CONCLUSION

The study reveals that Lohabhasma prepared by classical puta method is proven as better compared to other method when it is subjected to Analytical parameters. Bhanupaka & Sthalipaka process makes the Loha brittle and facilitates the marana procedure. Puta having a major role in the reduction of the particle size of the Bhasma. Analytically Lohabhasmas contains maximum quantity of Fe when compared to Sulphur& other trace elements. Folklore methods of Loha bhasma preparation used in the present study do not yield the bhasma

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