



Research Article

PHARMACEUTICAL EVOLUTION OF LAUHA THROUGH SHODHANA AND MARANA

Punj Ruchika^{1*}, Arya Neha², Metha Ridhi¹

¹PG Scholar, ²HOD & Professor, Dept. of Rasashastra and Bhaishajya Kalpana, Patanjali Bhartiya Ayurvedigyan Evam Anusandhan Sansthan, Haridwar, Uttarakhand, India.

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ABSTRACT

Rasa Shastra is a pharmaceutical science of Ayurveda which deals with conversion of the drugs irrespective of their nature i.e., mineral, metals etc. in an absorbable form. *Kharaliya Rasayana* are the most basic and significant in *Rasa Shastra*. This study outlines the traditional Ayurvedic pharmaceutical preparation of *Lauha Bhasma* utilizing *Hingula* according to the classical text *Rasachandamshu*. Raw iron powder underwent sequential purification (*Samanya* and *Vishesha Shodhana*) via red-hot quenching in specific liquid media and *Triphala Kwatha*. The purified iron was processed through *Bhanupaaka* and *Sthalipaaka* before undergoing *Putapaka* in a *Gaj Puta* for 21 cycles with *Shuddha Hingula* and *Kumari Swaras*, followed by *Amritikarana*. The pharmaceutical process yielded 89gm of final *Lauha Bhasma*, noting a total weight loss of 36% during purification and an 8% loss during the incineration phase. Over 21 *Putas*, the material transitioned from a hard, slate-black texture to a soft, chocolate-brown powder while successfully losing its metallic lustre.

INTRODUCTION

Ayurveda, the medical system in India is seen to be the most systematic and effective of all the systems that are used around the globe.^[1] *Rasa Shastra* is a pharmaceutical science of *Ayurveda* which deals with conversion of the drugs irrespective of their nature i.e. mineral, metals etc in an absorbable form. They function at the molecular level and are regarded as catalytic in action (*Yogavahi*), and they can be utilized to treat diseases that are persistent.^[2] Several types of *Rasakalpana*, such as *Kharaliya Rasayana*, *Parpati Rasayana*, *Pottali Rasayana*, *Kupipakwa Rasayana*, *Bhasma*, *Pishti* etc., are discussed in *Rasa* texts based on several fundamental approaches. *Kharaliya Rasayana* are the most basic and significant of these *Kalpana*. In accordance with classical texts, *Parad Marita bhasma* are traditionally regarded as therapeutically superior to those made with other media, in the present study, *Lauha Bhasma* was synthesized utilizing *Hingula* (cinnabar) as the drug for

Marana (incineration) to achieve optimum physician-chemical properties and therapeutic efficacy, aligning ancient pharmaceutical principles with contemporary standardization.^[3]

Lauha is very essential element of the body system^[4] and *Lauha bhasma* consists of properties like *Panduhar*, *Shoshnashak*, *Aayuvardhak*, *Sutikajwar nashak*, *Garbhashye srav nashak* etc.^[5] In the present work, pharmaceutical *Shodhana* and *Marana* of *Lauha* was done. Raw *Lauha* powder was obtained from an authenticated source.

AIM AND OBJECTIVES

1. To prepare *Lauha bhasma* with *Hingula*.
2. To evaluate *Lauha bhasma* using ancient and modern (analytical and instrumental) parameters.

MATERIAL AND METHODS

Place & Duration of study: The necessary procedures for raw materials processing and preparation were conducted in the pharmacy section of the *Rasashastra* and *Bhaishajya Kalpana* department at Patanjali Bhartiya Ayurvedigyan Evam Anusandhan Sansthan, Haridwar. The present study was carried out in the year 2025.

Procurement of Raw Material

Raw iron powder and *Hingula*, *Tila Taila*, *Kulattha daal*, *Tandula*, *Mulaka* and *Go Dadhi* was

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purchased from an authentic source. *Gomutra* were collected from local *Goshala* in Haridwar. Fresh *Ghrithkumari*, was also collected from the herbal garden of Patanjali Bhartiya Ayurvigyan Evam Anusandhan Sansthan, Haridwar.

Pharmaceutical Processing

Steps involved in the preparation of *Lauha bhasma*

1. *Samanya shodhana* of *Lauha*
2. *Vishesha shodhana* of *Lauha*
3. *Bhanupaaka*
4. *Sthalipaaka*
5. *Putpaka* (Marana)

Samanya shodhana of *Lauha*^[6]

Preparation of accessory drugs: *Takra*, *Kanji* and *Kulattha Kwatha* were prepared as per classics for the process of *Samanya shodhana*.

Process of *Shodhana*

Samanya shodhana

Table 1: Ingredients used during *Samanya shodhana*

Main drug	Quantity
Raw iron powder	150 gm

Table 2

Accessory drugs	Quantity
<i>Tila Taila</i>	2000 ml
<i>Takra</i>	2000 ml
<i>Gomutra</i>	2000 ml
<i>Aranala</i>	2000 ml
<i>Kulattha Kwatha</i>	2000 ml

Apparatus: *Pithara Yantra*, LPG gas cylinder, lighter, *Darvi Yantra*, measuring beaker, weighing machine, and S.S. vessels and fire gun.

Procedure: Raw *Lauha* was taken on ladle and was heated with fire gun up to red hot and immediately quenched sequentially in specific liquid media (*Til tail*, *Takra*, *Gomutra*, *Aranala* and *Kulattha Kwatha*) 7 times which was taken in a stainless-steel vessel.

Vishesha shodhana^[7]

Table 3: Ingredients used in *Vishesh shodhana*

Ingredients	Quantity
<i>Triphala</i>	1050 gm
Water	16 L

Procedure

Coarse powder of overnight soaked *Triphala* was boiled along with above mentioned quantity of water and reduced to $\frac{1}{4}$ to the original volume of water 4lt *Kwath* was obtained.

Then, the *samanya Shodhita lauha* was heated with fire gun up to red hot and quenched into *Triphala Kwatha* for 7 times.

Hingula shodhana^[8]

Table: 4 Ingredients used during *Hingula shodhana*

Ingredients	Quantity
<i>Ashuddha Hingula</i>	150 gm
<i>Nimbu Swaras</i>	20ml x 7 times =140ml

Procedure

Hingula was made into fine powder. Extracted lemon juice was poured in *Khalva Yantra* till the whole powder of *Hingula* gets immersed. Then *Hingula* was levigated by this juice continuously till *Subhavita Lakshanas* was seen. This process was repeated for 6 more times. After 7th *Bhavana*, *Prakshalana* procedure was done, clean, filtered water was added above mortar and the material was well combined, stirred with a pestle, and then let to settle. After sedimentation, the water at the top was carefully decanted and the fine *Hingula* powder sediment at the bottom was dried.

Marana of Lauha

Marana of *Lauha* was done according to *Rasachandamshu*. *Marana* of *Lauha* involves 3 steps: *Bhanupaaka*, *Sthalipaaka* and *Putpaka*.

Bhanupaaka^[9]

Triphala kwatha was prepared by heating equal quantity of *Triphala* and reduced to $\frac{1}{4}$ of original volume. Purified iron powder is mixed with *Triphala kwatha* and left to dry under sunlight. The mixture is kept in the sun until all the moisture evaporates. This process is repeated 3 times.

Sthalipaaka^[10]

Coarse powdered of *Triphala* is done and then soaked overnight in filtered water. Water was taken in a big stainless-steel vessel and coarse powder of *Triphala* was poured into the vessel. Both were mixed and boiled till the liquid part was reduced to $\frac{1}{4}$ th i.e., 1.8lt, it was strained by clothes and used for *Shodhana*.

Putpaka^[11]

Shuddha Lauh and $\frac{1}{12}$ *Shuddha Hingula* were mixed together, and was levigated continuously for 6 hr. by adding *Kumari Swaras*. Small amount of levigated mass was made into *Chakrikas* (pellets) of uniform size. The prepared *Chakrikas* were kept for sun drying. After proper drying the saucer was covered by another earthen saucer and junction was sealed by double folded mud smeared cloth and again allowed for complete drying. This *Sharawa Samputa* was subjected to *Putapaka* in the *Gaj Puta*. After the completion of *Putapaka* it was left for *Swangasheeta*. These processes were repeated for 21 times.

Amritikarana of Lauha^[12]

Table 5: Ingredients used during Amritikarana

Ingredients	Quantity
Lauha Bhasma	89 gm
Triphala Kwatha	200 ml

Procedure

The above-mentioned quantities of ingredients are taken in an iron vessel and heated over the stove until *Triphala Kwatha* was completely evaporated.



Image 1
Raw Lauha



Image 2
Til Tail and Raw Lauha



Image 3
Takra and Raw Lauha



Image 4
Gomutra and Raw Lauha



Image 5
Aranala and Raw Lauha



Image 6
Kulattha kwatha and Raw Lauha



Image 7
Red Hot Stage



Image 8
Fire Caught



Image 9
After 2nd Nirvapa in Til Tail



Image 10
Lauha after Samanya shodhana



Image 11
Triphala Ingredients



Image 12
Triphala Kwath



Image 13
p.H of Triphala Kwatha



Image 14
Samanya Shodhita Lauha and Triphala kwatha kwatha



Image 15 & 16
Nirvapa in Triphala



Image 17
Shodhita Lauha Placed under sunlight



Image 18
Shodhita Lauha during Sthalipaak



Image 19
Lauha ready for Putpaka



Image 20
Hingula and aloe vera gel



Image 21 & 22
Bhavana



Image 23
Chakrikas



Image 24
Sharawasputa



Image 25
Gajputa



Image 26
Lauha Chakrikas after Puta



Image 27
After 19th Puta



Image 28
After 21th Puta



Image 29
Lauha bhasma and Triphala Kwatha
(for Amritikarana)



Image 30 & 31
During Amritikarana



Image 32
After Amritikarana



Image 33
Varitar



Image 34: Unama



Image 35: Rekhapurnata

Table 6: Observations during Samanya shodhana

Til tail	Takara	Gomutra	Aranala	Kulattha kwatha
Colour of <i>Lauha</i> became greyish to black.	Colour of <i>Lauha</i> became black to blackish grey.	Colour of <i>Lauha</i> became blackish grey to brown.	Powder of <i>Lauha</i> accumulated together during heating.	Some powder flew away from the vessel due to vapor of decoction during quenching
Metallic lustre of <i>Lauha</i> was lost.	<i>Lauha</i> took 8.38 minute (avg.) to get complete red hot.	<i>Lauha</i> took 9.9 minutes (avg.) to get complete red hot	It took 11.57 minutes (avg.) to get complete red hot.	It took 12 minutes (avg.) to get complete red hot.
<i>Lauha</i> got fire during first phase of heating after first quenching. This resulted in greater loss.	Smell of burning of milk was coming out during Quenching	Colour of <i>Gomutra</i> Became yellowish to brownish.	<i>Aranala</i> became more viscid and slimier after <i>Shodhana</i>	<i>Kulattha kwatha</i> consistency became thicker.

Table 7: Observations during *Lauha Marana*

No. of Puta	Weight after each Puta	Peak temp. during Puta	Colour	Touch	Chandrika	Varitar	Rekhapurnata
1	97 gm	600°C	Black	Hard	+ve	-ve	-ve
4	97 gm	650°C	Slate black	Firm	-ve	10%	10%
8	95 gm	600°C	Dark brown	Firm	-ve	30%	40%
15	90 gm	700°C	Dark chocolate brown	Soft	-ve	60%	80%
21	89 gm	650°C	Chocolate brown	Soft	-ve	100%	100%

RESULTS AND DISCUSSION**Table 8: Weight loss of *Lauha* during *Shodhana* procedures**

Procedures	Initial weight	Final weight	Weight loss %
<i>Samanya shodhana</i>	150 gm	104 gm	30%
<i>Vishesh shodhana</i>	104 gm	95 gm	6%

Table 9: Weight loss during *Hingula shodhana*

Ingredient	Initial weight	Final weight	Weight loss %
<i>Hingula</i>	150 gm	120 gm	20%

Table 10: Results of *Lauha Marana*

Ingredients	Quantity
<i>Shuddha Hingula</i>	147 gm
<i>Ghritkumari Swarasa</i>	1050 gm
<i>Shuddha Lauha</i>	97 gm
Total <i>Lauha bhasma</i> obtained	89 gm (8 %loss)

Analytical and Instrumental Results**Table 11: Physicochemical values of *Lauha Bhasma***

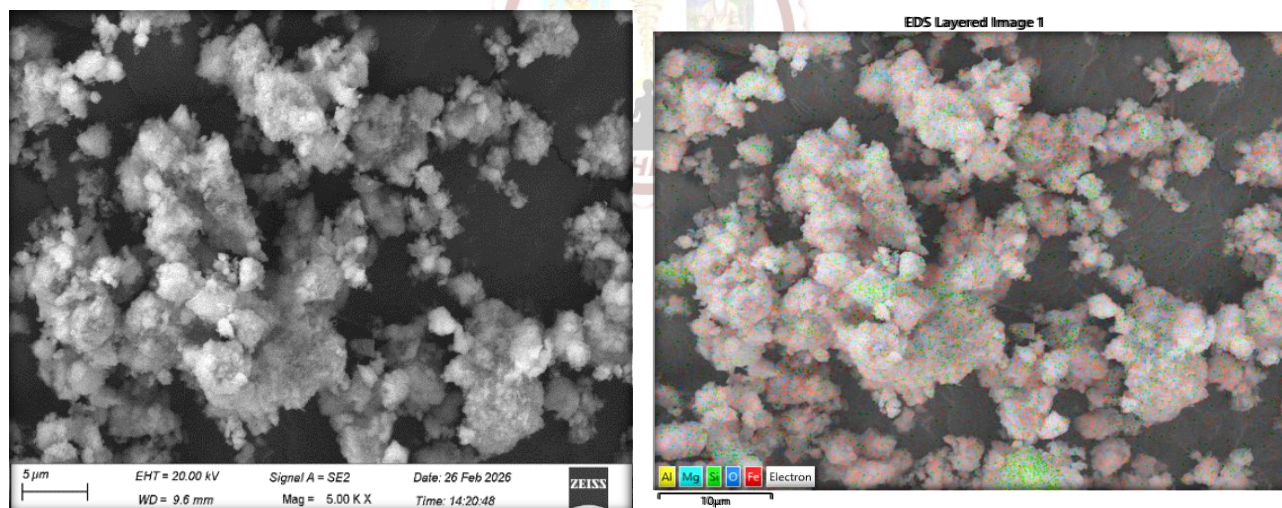
Parameter	Values in %w/w
pH (1% aqueous solution)	7.18
LOD at 105°C	0.68
Sulphated ash	92.56
Total ash	94.50
Acid insoluble ash	71.91
Water soluble extractives	1.37
Alcohol soluble extractives	0.48

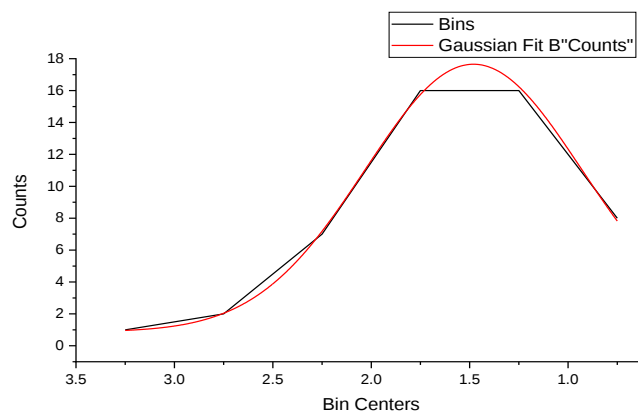
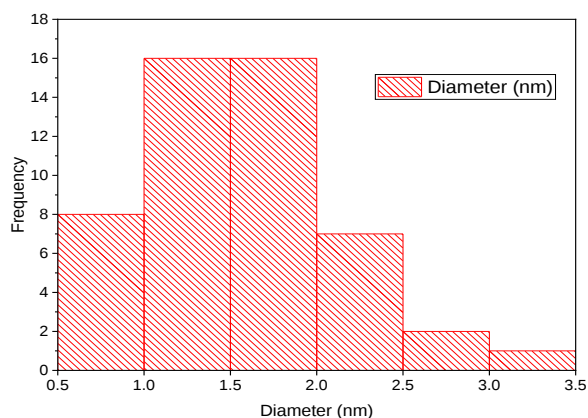
Table 12: XRF of Lauha Bhasma

Component	Unit	Result
Mg	Mass%	2.270
Al	Mass%	1.938
Si	Mass%	8.395
P	Mass%	0.699
S	Mass%	1.135
Cl	Mass%	0.324
K	Mass%	2.719
Ca	Mass%	3.003
Fe	Mass%	78.18
Cu	Mass%	0.119
Kr	Mass%	0.444
Sn	Mass%	0.313

Oxide value of iron ash (<i>Lauha bhasma</i>): Fe_2O_3	111.78%
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Image: 36 & 37 shows (IRON Ash) *Lauha bhasma* SEM (scanning electron microscopy) scan

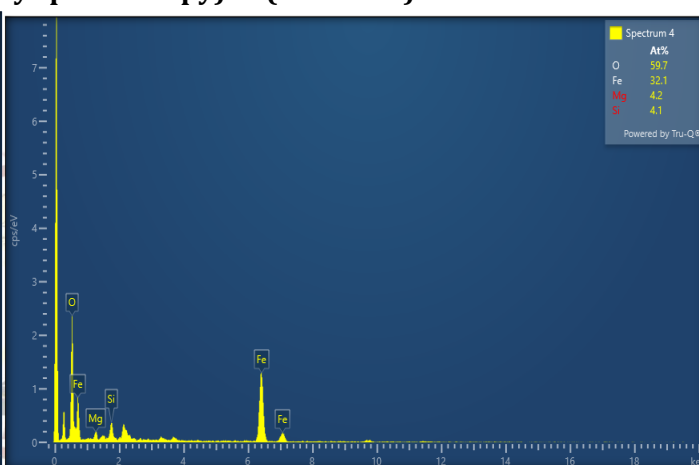
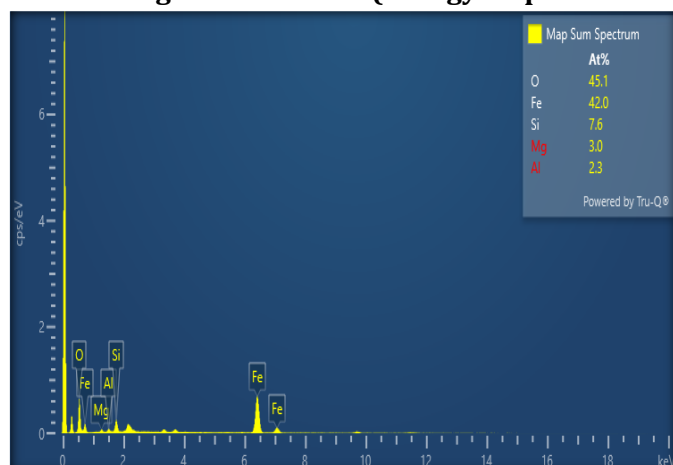




The histogram illustrates that most particles fall within a narrow size range, indicating relative uniformity.

The Gaussian distribution curve indicated that the mean particle size of *Lauha bhasma* is 1.4nm, confirming its Nano scale nature.

Image 38 & 39: EDS (Energy dispersive X-ray spectroscopy) of (IRON Ash) *Lauha bhasma*



The spectrum confirms that the sample is predominantly composed of oxygen and iron, suggesting the formation of iron oxide material, most likely FeO_2 .

The relatively high oxygen content supports the presence of an oxidized phase rather than pure metallic iron.

DISCUSSION

Samanya Shodhana of *Ashuddha Lauha* (impure iron) was conducted by repeatedly heating the metal to a red-hot state and quenching (*Nirvapa*) it seven times in five distinct liquid media (*Tila Taila*, *Takra*, *Gomutra*, *Aranala*, and *Kulattha Kwatha*) sequentially. The rapid contraction and expansion cause the metallic bonds to weaken, leading to brittleness.

***Tila Taila* (Sesame Oil):** The *Lauha* caught fire during the first phase of heating after the initial quenching in oil. This occurred because residual oil on the iron reached its flashpoint during reheating, contributing significantly to the overall material loss.

***Takra* & *Aranala*:** The acidic nature of lactic acid in *Takra* and organic acids in *Aranala* helps in removing

surface impurities (like iron oxides) through weak chemical etching.

***Gomutra*:** Being alkaline and rich in urea and mineral salts, *Gomutra* altered the color of the iron from blackish-gray to brown, signifying the formation of iron chemical complexes

***Kulattha Kwatha*:** The thick consistency of the decoction after quenching is due to the evaporation of water content and the concentration of astringent polyphenols and proteins, which help bind and reduce the particle size of the iron

The average time taken to reach a red-hot state increased progressively across the media, ranging from 8.38 minutes in *Takra* up to 12 minutes in *Kulattha Kwatha*. This increasing time lag can be attributed to the changing physical form of *Lauha*.

This significant loss can be practically explained by three major experimental observations:

1. Combustion in oil: The burning of *Lauha* during the reheating phase after *Tila Taila* quenching.
2. Vapor Evaporation Loss: During the *Kulattha Kwatha* stage, the intense vapor pressure

generated during sudden quenching caused fine *Lauha* powder to fly away from the vessel.

3. Handling and Scraping: Fine iron powder sticking to the *Darvi* (ladle) and the walls of the quenching vessels during quenching inevitably leads to mechanical loss.

Lauha vishesha shodhana

The process of *Vishesha Shodhana* was executed by quenching red-hot *Lauha* into a decoction of *Triphala*. This step is strategically employed to utilize the astringent properties of the medium, which helps in the reduction of metallic lustre and promotes the brittleness required for the subsequent '*Bhasmikiranana*' phase.

Bhanupaak

The three-day *Bhanupaak* processing of *Lauha Churna* with *Triphala Kwatha* was successfully executed with a cumulative solar exposure of 11 hours and 45 minutes. The resulting transformation into an ultra-fine, dark black powder validates the successful synthesis of organic iron complexes and a significant reduction in particle size. This alters the mechanical hardness of the iron and optimally prepares the material for subsequent Incineration (*Marana*).

Sthalipaak

While *Bhanupaak* relies on mild solar energy, *Sthalipaak* introduces controlled, intense direct thermal energy (*Agni*) to rapidly drive chemical reactions between the iron powder and *Triphala Kwatha*. By adding freshly prepared *Triphala Kwatha* in measured batches of 250ml, a continuous supply of fresh tannins, gallic acid, and polyphenols is introduced to the active metallic surface. A notable increase in weight was observed between the purification and processing stages. The weight of the purified iron powder (*Vishesha Shodhita Lauha*) increased from 97gm to 100gm after undergoing *Bhanupaak* (sun-drying) and *Sthalipaak* (high-heat cooking). This net gain of 3gm happens.

Marana of Lauha

The *Marana* of *Lauha* was successfully executed according to the classical parameters of *Rasachandamshu*. The pharmaceutical preparation of *Lauha Bhasma* (incinerated iron) through 21 sequential *Gaj Putas* demonstrates a highly effective structural and chemical transformation of iron, aided by the synergistic action of *Shuddha Hingula* (purified cinnabar) and *Ghrithkumari Swarasa* (*Aloe vera* juice). The daily wet-grinding (*Bhavana*) consistently required 5.5 to 6 hours to achieve *Subhavita Lakshanas*, ensuring an incremental reduction in particle size before each heating phase. Mechanistically, *Hingula* acts as an oxygen-carrier and an internal catalyst during heating; as the *Putas* reached

peak temperatures between 550°C and 720°C within approximately 40 minutes, the sulfide matrix of *Hingula* breaks down, promoting the rapid conversion of elemental iron into its stable, non-magnetic ferric oxide form and also was utilized during the processing of *Lauha* to leverage the unique properties of mercury-assisted calcination. It is established in *Rasashastra* that *Parada-marita Bhasmas* possess the highest quality standards.

This deep chemical transition is clearly mapped by the steady organoleptic changes in the material. The pellets shifted from a hard, metallic-lustrated black and slate black in *Putas* 1–4, transitioned to a firm dark brown by *Putas* 5, and finally settled into a soft, homogeneous dark chocolate brown to rich chocolate brown from *Putas* 10 through 21. Traditional *Bhasma Pariksha* quantitatively validates this progressive refinement: while *Rekhapurnata* (entering finger ridges) was achieved at 50% by the 3rd cycle and reached 100% by the end, the *Varitar* (floating on water) percentage rose systematically from a minor 10% at the 4th *Putas*, to 50% at the 10th *Putas*, and ultimately attained a perfect 100% success rate by the 21st *Putas*. The process concluded with a final yield of 89gm of *Lauha Bhasma* from an initial 97gm. This marginal 8% total weight loss over 21 extensive processing cycles confirms high mechanical efficiency, minimal handling waste, and the successful standardization of this classic *Marana* procedure.

CONCLUSION

Based on pharmaceutical study, it is concluded that utilization of *Hingula* as a *bhavana drug* enhances the quality and efficacy of *Lauha bhasma*. During initial heating cycles *Lauha* remain hard however the successive cycles with *Hingula* and *Kumari Swarasa* break down the hardness and *Bhasma* become very soft and free from metallic lustre. Final *Amritikarana* with *Triphala* acts as stabilizing phase increasing its nectar like properties and remove leftover doshas. Ultimately *Hingula Marita Lauha bhasma* is highly reliable and authentic method.

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***Address for correspondence**

Dr. Punj Ruchika

PG Scholar,

Dept. of Rasashastra and Bhaishajya
Kalpana

Patanjali Bhartiya Ayurvigyan Evam
Anusandhan Sansthan, Haridwar

Email: ruchipunj18@gmail.com

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