ORIGINAL ARTICLE

Evaluation of *Lohanam Maranam Shreshtham*…….in context of *Rasa Bhasma* preparation

Amit Kapila[1], S. P. Abhiram[2], Anu Gupta[3], Chinky Goyal[4], Amandeep Kaur[5], Jadhav Viraj Vilas[6]

[1]Department of Rasa Shastra and Bhaishjya Kalpana, Desh Bhagat Ayurvedic College and Hospital, Mandi Gobindgarh, Punjab, India, [2]Department of Agad Tantra, Shri Dhanwantry Ayurvedic College and Hospital, Chandigarh, India, [3]Department of Bala Roga, Saraswati Ayurved Hospital and Medical College, Gharuan, Punjab, India, [4]Department of Rasa Shastra and Bhaishjya Kalpana, Saraswati Ayurved Hospital and Medical College, Gharuan, Punjab, India, [5]Department of Samhita and Siddhanta, Saraswati Ayurved Hospital and Medical College, Gharuan, Punjab, India, [6]Principal, Saraswati Ayurved Hospital and Medical College, Gharuan, Punjab, India

Abstract

Aims: *Bhasmas* of various metals and minerals that are prepared using *Parada* are considered to be superior to those prepared with *Kashtoushadhis* and *Gandhakaadi dravyas*. *Rasa Bhasma* is one such preparation with indications of hepatic disorders. **Materials and Methods:** The preparation of *Rasa Bhasma* using *Gorvara Puta* as per the reference of *Rasa Chintamani* was explained, including the *Shodhana* of *Hingula*, *Parada Nishkaasana*, *Hingulottha Parada Shodhana*, *the* preparation of *Apamarga Kshara,* and *Bhringaraja Swarasa*. **Results:** The color of *Rasa Bhasma* was found to be grey. The initial weight of *Parada* before puta was 100 g, the final weight of *Rasa Bhasma* was found to be 50 g. **Conclusion:** Preparation of *Rasa Bhasma* using *Gorvara Puta* in *Deepaagni* for 8 h is the simplest and quickest method by which *Rasa Bhasma* can be achieved in a single *puta* with easily available associated drugs. Hence, it can be concluded that *Parada* has to be subjected to *Gorvara Puta* for 8 h for its complete conversion into *Bhasma*as, per the findings of the present research work.

Key words: *Gorvara Puta, Hingula Shodhana, Hingulottha Parada, Rasa Bhasma, Rasa Chintamani*

INTRODUCTION

Rasa Shastra medicines have the most desired actions and can be used in *Alpamaatra* (little quantity). When given internally, they start working on diseases quickly when compared to other kalpas due to their "*RASEEBHAVANTI*" (it gets assimilated into the system very quickly) property. They were found to be very potent and effective as rejuvenating agents, and aphrodisiacs. Among all other metals and minerals, Parada is considered to be the most superior one. To make this liquid metal free from its toxicity and therapeutically potent, eighteen different kinds of Samskaraas (steps or procedures) were explained in the literature of Rasa Shastra. Rasa Granthas has also highlighted the importance of Hingulottha Parada and considered it to be equivalent to the properties of Ashta Samskarita and Sama Guna Bali Jaarita Parada. Rasa Bhasma is one such preparation that can also be used to treat hepatic disorders and which is having most potency among Bhasmas.[1]

MATERIALS AND METHODS

Collection of Raw Materials

Raw drugs, which have similar Grahyalakshanas as mentioned in the text, were collected from the local market. Associate

Address for correspondence:
Chinky Goyal, Department of Rasa Shastra and Bhaishjya Kalpana, Saraswati Ayurved Hospital and Medical College, Gharuan, Punjab, India. Mobile: +91-9815144152.
E-mail: chinkygoyal52@gmail.com

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drugs, viz., Apamarga and Bhringaraja, were collected from Chebbi and used for the preparation.

Drug Preparation

Rasa Bhasma was prepared as per the reference to Rasa Chintamani.[2] The following methods have been adopted for the preparation of Rasa Bhasma:

1. Hingula Shodhana
2. Extraction of Parada from Hingula
3. Shodhana of Hingulottha Parada
4. Preparation of Apamarga Kshara
5. Preparation of Bhringaraja Swarasa
6. Preparation of Rasa Bhasma.

Hingula Shodhana (R.R.S. Ch.No.152-153)

Material: Ashodhita hingula, 1000 g, and Nimbu Swarasa, 1200 mL.

Procedure: 1000 g of hingula was taken and powdered in Khalvayantra. The required quantity of Nimbu Swarasa was extracted from the lemons with the help of a juice extractor. For the first Bhavana, 160 mL of Nimbu Swarasa was added to Hingula to immerse it completely. The mixture was subjected to continuous and cautious Mardana until the liquid content dried up, indicative of the completion of the first Bhavana. The daily 8 h of Mardana were done at a rate of 20–25 strokes per minute. It took 3 days to completion the first Bhavana. The same process was repeated for another 6 times; thus, a total of 7 Bhavanas were given. After the completion of 7 Bhavanaas, Hingula was taken out of Khalwa Yantra and washed thoroughly with warm water.

Extraction of Parada from Hingula (Rasa Ratna Samucchaya)

Material: 20 Chakrikas of Shuddha Hingula (total weight–200 g).

Damaru Yantra: Two equal-sized pots with a wide mouth measuring 8 inches in diameter and 6 inches in depth were taken. The Chakrikas of Hingula were placed in a lower earthen pot, and it was closed inversely with another pot. Sandhi Bandhana was done properly using Gopi Chandana Lepita Vastra and dried under sunlight.

Procedure: The weight of dried chakrikas was 200 g. These Chakrikas were placed in the lower pot of Damaru Yantra and subjected to Teevragni (350°–450°C) for 8 h. The upper pot was kept cold by repeatedly replacing it with a cold cloth pad. After shwangasheetala, on the next day, SandhiBandhana was carefully removed by keeping the pots horizontally. Two pots were separated, and Parada and its globules were collected from the upper pot by scraping with a cloth. Then Parada was filtered with two layers of cloth, and washed with warm water, and filtered through a double layer of cloth to get clear Parada.

Hingulottha Parada Shodhana (Rasa Tarangini 5/27-2)

Materials: Hingulottha Parada - 130 g, Nisthusha Lasuna - 130 g, Saindhava Lavana – 65 g.

Procedure: Nishtushalashuna and Saindhava Lavana were taken into the khalwayantra and triturated well to prepare its kalka. Then Hingulottha Parada was added to Khalvayantra, and Mardana was done carefully. As Mardana continued, Parada disintegrated into small globules. Initially, it was easy for trituration, but on the 2nd day, the paste became very sticky in nature and turned a gray color and Parada got completely mixed with Kalka. The Kalka was dry for further trituration; hence, kanji was added to facilitate the mardana procedure. On the 3rd day again, a small quantity of kanji was added to facilitate trituration. Which was continued till the paste became black in color. On the 4th day, the mixture was washed carefully with hot water, repeatedly, to separate Parada from Kalka. Then it was filtered through a double-layered cloth, weighed, and stored in a clean glass bottle.

Preparation of Apamarga Kshara (Sharngadhara Samhita M.K. 11/102-104)

Materials: Dried Apamarga Panchanga- 70 kg.

Procedure: Completely mature Apamarga panchangas were collected, cleaned well, and dried. Properly dried Apamarga Panchangas were burned in an iron pan. The gray-colored ash was collected after complete self-cooling and was devoid of mud, stones, and charcoal. The total volume (5 kg) of this ash was mixed with 4 times of water (20 L) and left overnight. The next morning, supernatant fluid was collected, discarding the dark-colored sediment in the vessel. The supernatant fluid thus obtained was filtered using a clean cotton cloth repeatedly 21 times to obtain clear filtrate (Ksharajala). Ksharajala was then heated over a steel vessel in Teevragni with intermittent stirring till water gets evaporated completely. It took 2 days for complete evaporation of liquid portion. Each day, 8 h of Teevragni were given. On the 2nd day, after complete evaporation of the liquid portion, Shwetavarna Kshara was collected and stored in an airtight container.

Preparation of Bhringaraja Swarasa

Freshly collected 2 kg of Panchanga from Bhringaraja was taken and cleaned well. Then it was cut into pieces, put in a Khalwayantra, and pounded into Kalka. This kalka was then collected in a clean cloth, and then it was squeezed well to obtain fresh swarasa. This swarasa was collected in a container and is used.

Preparation of Rasa Bhasma (Rasa Chintamani)[3]

Materials: Shodhita Hingulottha Parada - 100 g; Apamarga Kshara- 100 g; Bhringaraja Swarasa- 400 mL

Procedure: The whole procedure was divided into three phases.

1. Poorva Karma
2. Pradhana Karma
3. Paschat Karma.

Poorva Karma: The following procedures were carried out in this phase of the study:

- Placing of materials (Apamarga Kshara, Shodhita Hingulottha Parada Bhringaraja Swarasa) into Sharava
- Preparation of Sharavasamputa
- Placing of Sharava in Putayantra.

Filling of material into Sharava: Two deep earthen saucers (Sharava) of equal size (6 inches in diameter, and 3 inches in depth, and 1–1.5 cm thickness) were taken.

- 100 g of Apamarga Kshara was filled into Sharava, a pit was made, and Shodhita Hingulottha Parada was placed in it, and then Bhringaraja Swarasa was added.

Preparation of Sharavasamputa: The Sharava, which was filled with material, was closed with another Sharava of same size and Sandhibandhana was done using Gopichandanaliptavastra in 3 layers and was dried properly.

Gorvara Puta: Gorvara puta was used for the preparation of RASA BHASMA. The following dimensions were taken for the preparation of Gorvara Puta:

- An iron container of 15 inches in length, 10 inches in breadth, and 12 inches in depth was taken and kept ready.

Pradhana karma: It was performed as follows:

- The Sharava, which was prefilled, was kept in Putayantra
- Putayantra was initially filled with well-dried 400 g of Gorvarachurna in the 2/3rd part of the container
- Then Sharavasamputa was placed over it, and the remaining 200 g of Gorvarachurna was filled
- Then the fire was lit, and constant uniform heat was given for 8 h by adding Gorvarachurna when required.

Paschat karma

- The next day, after Swangasheetala, the Sharava was taken out
- The layers were removed carefully, and the lid was opened
- Then gray-colored RASA BHASMA was collected and tested for Bhasma siddhi lakshanasviz, Vaaritaratwa, Nischandratwa, and Rekhapoornatwa
- It was collected and stored in an airtight container.

OBSERVATIONS AND RESULTS

Observations during Hingulashodhan

- The color of AshudhaHingula was dull red, with glistering white lines
- After half an hour of Mardana, the shining particles disappeared
- As Mardana continued, the particles of Hingula were more disintegrated, and it was very sticky in nature
- With the succeeding Bhavana, the color of Hingula has become brighter
- After the completion of 7 Bhavanas, Hingula was removed from the Khalva, and later it was washed thoroughly in a steel vessel with warm water and allowed to settle
- During Prakshalana Karma, Hingula was settled at the bottom of the vessel after 6 h, and then water was decanted cautiously, minimizing the manual loss of Hingula
- Totally it took 15 days for Hingula Shodhana
- The average weight gain of 5 g was noticed in each Bhavana, which may be because of the addition of solid contents of Nimbuswarasa.

Observations during the Extraction of Parada from Hingula

1. After 2 h, the bottom of the lower pot appeared red hot
2. The wet cloth pad was kept for cooling the upper portion of the upper pot to facilitate the condensation process, which was frequently changed as it got hot during the procedure
3. The temperature was maintained at around 450°C, and the duration of Agni given was 8 h
4. When the Sandhi Bandhana was opened after the Swangasheetala, the Parada globules were found in the central portion of the upper pot
5. Parada was procured after repeated prakshalanas with water.

Observations during Shodhan of Hingulottha Parada

- After the 2 h of trituration, the parada splits into small globules, the color of Kalka has become gray, and the Ugragandha of Lashuna was observed
- On the 2nd day, the Kalka has become sticky in nature, and Parada has completely mixed with the Kalka, which was diluted with kanji to facilitate Mardana
- On the 3rd day, the color of Kalka changed from gray to black color.

Observations during the Preparation of Apamarga Kshara

- From 70 kg of dried Apamarga Panchangas, 5 kg of ash was procured, which makes up 7.1% of the yield
- Ash, which was mixed with 20 L of water, was kept overnight so that all the Ksharamsha was dissolved in water and the residue was sedimented down at the bottom of the vessel

- The Ksharajala obtained after repeated filtering 21 times (i.e., for 2 days) was very clear, and its pH was measured as 9
- Then the Ksharajala was subjected to boiling, which took 16 h, and the whole process was completed in 2 days with 8 h of boiling per day
- Teevragni, i.e., around 200°C, was maintained throughout the procedure
- Kshara obtained was white in color, and its pH was 11.

Observations during Bhringraja Swarasa Nirmana [Table 5]

1. A well-grown Bhringaraja was taken
2. Kalka was dark green in color
3. After complete squeezing, the swarasa obtained was dark green
4. The residue left, i.e., the kalka, was nissatwa, which ensures the complete extraction of swarasa.

Observations during the Preparation of Rasa Bhasma

Totally 1000 g of Gorvarachurna were used for the procedure, in which 600 g of Gorvarachurna were initially kept, and to maintain deepaagni, another 400 g of Gorvarachurna were added to maintain heat during the procedure. The puta was done for 8 h continuously in Deepaagni, and the following observations were noted:

- 1000 g of Gorvarachurna was taken for the intended procedure
- The initial temperature was 32°C when the puta started
- The fire was spread uniformly to all sides
- Temperature was noted every hourly
- Peak temperature (viz., 175°C) was obtained after 3 h of initiation of Agni
- It has lasted for half an hour, and after that, gradually, the temperature has been maintained
- The whole process was completed in 8 h, and after that, the sharava was left for Shwanga Sheetala
- A gradual decrease in temperature was observed
- It took 12 h for self-cooling.

Initial quantity of Asuddha Hingula – 1000 g
Final quantity (After shodhana) – 1036 g
Quantity gain – 36 g

DISCUSSION

Hingula is the chief ore of Parada, which is available naturally and can be prepared artificially. There are 3 types of hingulas that were described in the classics.[4] Of them, Hamsapaada Hingula is considered to be the best and hence was chosen for this study. Metallic preparations have occupied a significant place in Ayurvedic pharmacopoeia and are routinely being practiced in different parts of the Indian subcontinent since time immemorial. *Parada*is an inseparable part of *Rasa Shastra* and is used in preparations of *Rasaushadhies*.[5]

Hingula Shodhana

Hingula Shodhana using Nimbuswarasa as Bhavanadravya was done in this study as it helps in the detoxification of Hingula. Nimbuswarasa contains a complex of organic acids like citric acids and mallic acid, which reacts with unwanted materials and forms a complex soluble in water, which is removed by the process of Prakshalana with water. The Sodhana was done seven times, and it took a total of 15 days to complete the procedure. An increase in the weight of Hingula, as mentioned in Table 1, was observed after the complete process of Shodhana, which is because of the solid organic contents present in Nimbuka. The Bhavana procedure helps in reducing the size of the Hingula particles into a finer state, which helps in the extraction of the maximum quantity of Paarada from it as more surface area of Hingula was exposed during Satwapaatana, which depicts the importance of the Bhavana procedure.

Extraction of Parada from Hingula

The extraction of parada from hingula was done using the Urdhvapatana procedure (Damaru Yantra), as it is an easy method to obtain parada in optimum quantity where loss is very minimal. On the basis of the results obtained, as mentioned in Table 2, the average yield of parada was around 65%. Loss may be due to pancha Parada Gati, viz., Dhuma, Jala, Hamsa, Mala, and JeevaGati. The maximum temperature maintained during the procedure was between 350° and 450°C for 8 h, which was required for the complete sublimation of Parada. A wet pad on top of the upper pot helps with the proper condensation of Parada. The Prakshalana process (with Kanji) plays a very important role in the separation and collection of parada from the inner surface of the upper pot. Repeated Prakshalana was done to procure a complete sublimated parada with minimal loss. Thus obtained, Parada was very bright and lustrous in its appearance. During Satwapaatana, hingula is reduced to mercury and sulfur dioxide in the presence of oxygen. Traces of adultrants like Naaga and Vanga have high boiling points; they remain at the bottom, and Mercury sublimates and condenses at the inner side of the upper pot. This is an example of an auto reduction reaction.

$$HgS + O_2 \rightarrow Hg + SO_2$$

Hence, Parada obtained by this method is considered to be equivalent to Asthasamskarita Parada and is devoid of Naga, Vanga and other doshas.

Table 1: Results during Hingula Shodhana

No. of Bhavanas	Days	Qty of swarasa (in mL)	Time taken (in hours)	Result	Gain
1	3	160	8	1004	4 g
2	4	160	8	1010	6 g
3	6	160	8	1017	7 g
4	8	160	8	1022	5 g
5	10	160	8	1026	4 g
6	12	160	8	1030	4 g
7	14	160	8	1036	6 g

Table 2: Results of Parada extraction from Hingula

Initial quantity of Hingula	Quantity of extracted Parada	Yield of Parada (%)
200 g	130 g	65%

Table 3: The result of Hingulottha Parada Shodhana

Initial weight of Hingulottha Parada	Weight of Parada Obtained after Shodhana process	Loss of Parada during Shodhana process
130 g	110 g	20 g

Table 4: Results of Apamarga Kshara

Weight of dry Apamarga	Total ash obtained	Kshara obtained	Yield
70 kg	5 kg	840 g	7.1%

Table 5: Results of Bhringraja Swarasa

Weight of Bhringraja	Swarasa obtained
2 kg	400 mL

Table 6: Temperature chart of Rasa Bhasma

S. No.	Time	Temperature
1	9:30	32°C
2	10:30	136°C
3	11:30	175°C
4	12:30	173°
5	1:30	170°
6	2:30	170°
7	3:30	167°
8	4:30	165°
9	5:30	163°

Table 7: Shwanga sheetala temperature of Rasa Bhasma

S. No.	Time	Temp
1	6:30	158°C
2	7:30	145°C
3	8:30	138°C
4	9:30	130°C
5	10:30	125°C
6	11:30	118°C
7	12:30	110°C
8	1:30	95°C
9	2:30	80°C
10	3:30	60°C
11	4:30	45°C
12	5:30	30°C

Table 8: Result during Rasa Bhasma preparation

Colour	Gray
Initial weight of Parada before puta	100 g
Total weight of Rasa Bhasma	50 g

Parada Sodhana with Lashuna Kalka [Table 3]

To perform further purification, Hingulottha Parada was subjected to mardana with Nishtusha Lashuna and Saindhava Lavana. In this step, garlic played an important role. Allyl disulfide present in garlic reacts with mercury, producing the blackish color of the product. In the process of triturating Hingulottha parada with Lashuna, a reaction occurs between the Alicen organic sulfur present in garlic and mercury. This is a redox process where both oxidation and reduction processes take place. The electron changes in oxidant and reductant form the basis of the ionic electron method for balancing ionic equations. Saindhava Lavana helps in increasing the rate of reaction.

Apamarga Kshara [Table 4]

Kshara is a derivative of a plant. The salt obtained from Panchanga Bhasma in the form of solutions, powders, or crystals, all of which have the basic quality of being alkaline in nature, is called Kshara. The prepared drug substance is called Kshara because it causes Ksharana (the destruction of tissue) in Mamsa and other Dhatu. Acharya Sushruta defines

the Kshara as the substance possessing Ksharana and Kshanan (destruction) properties and says that the Kshara has Chedana (excision), Bhedana, and Lekhana (scraping) properties and also has Tridoshahara (equilibrium of Vaata, Pitta, and Kapha) properties. Apamarga Kshara is well known among the Kshara preparations and widely mentioned in classical literature. Apamarga Kshara is incorporated in many formulations for the treatment of Swasa, Kasa, Gulma, Udararoga, Adhaman, Arsha, Karnaroga, etc. It is also used in the preparation of the Kshara Sutra. Chemically, Apamarga Kshara is composed of sodium, potassium, chloride, sulfate, carbonate, bicarbonate, calcium, magnesium etc. Alkalis, or caustics, have been in use in Indian medicine since very early times. In the present study, mature Apamarga panchanga was collected, cleaned, and dried. This dried apamarga was then reduced to ashes. The total ash obtained was 5 kg, which is 7.1% w/w, which indicates the complete reduction of the plant. This ash was utilized for the preparation of Kshara. Only ash was soaked in four times of fresh water. The soaking time was over night. The Ksharajala was then filtered through a three-folded cloth to obtain a clear liquid that was free from minute ash particles that may affect the potency of medicine. After complete filteration, the Ksharajala was then subjected to moderate heat (100°C–160°C) to obtain Kshara. Moderate heat was given to maintain the boiling point of Ksharajala, and the medicine can be prepared with minimal loss. The whole process of boiling Ksharajala was done in 2 days, or 8 h per day, as the quantity of Ksharajala was high (30 L). After complete evaporation of the water content, clear, white-colored sediment was observed at the bottom of the vessel, which indicates the completion of medicine. This was then scrapped, collected, and stored in an airtight container for further use. As Kshara can absorb atmospheric moisture easily, it is stored in an airtight container.

Bhringaraja Swarasa

Swarasa contains all the volatile and active principles that can be obtained. In this study, 2 kg of fresh Bhringaraja Panchanga was collected, washed, cut into pieces, and then made into paste so that it became easy to get the maximum quantity of Swarasa. 400 mL of swarasa was procured which was dark green in color and was used immediately for further preparation of Rasa Bhasma. After the extraction of Swarasa, Kalka was nissatwa, which ensures complete extraction. It contains main chemical constituents like wedelolacetone and demethylwedelolactone, which will help exert hepatoprotective effects. Bhringaraja contains a large amount of iron, which helps in the Baddha of Parada. Because of this, it helps in the conversion of Parada into Bhasma.

Rasa Bhasma

Rasa Bhasma is prepared in the present study as mentioned in Rasa Chintamani. It is said to perform procedures in deepagni in the media of Apamargakshara and Bhringaraja Swarasa. The whole preparation of Rasa Bhasma was carried out in 3 steps, viz., Poorva karma, Pradhana karma, and Paschat karma. In Poorva karma, preparation of all the ingredients, like Apamarga Kshara, Bhringaraja Swarasa, Preparation Sharava, and Gorvaraputa, was done. Then, while filling the sharava, Apamarga Kshara was filled at first, a pit was made, and Paarada was filled inside it, followed by the filling of Bhringaraja Swarasa, which was done, and the sharava was sealed and kept ready for the procedure. Gorvaraputawas performed for Maarana of Parada, as it is mentioned in the classics, to give Deepaagni, which can be achieved through it. Then the Sharava was kept for performing Pradhana Karma, i.e., Marana Samskara. Deepaagni was maintained continuously for 8 h by adding Gorvara Churna. In total, 1000 g of upalas powder was added, and the procedure was done. Agni plays an important role in this preparation because parada is liquid in nature and readily evaporates at low temperatures. One more factor was that the sharava was filled with Bhringaraj Swarasa; the high intensity of Agni would have increased pressure inside the sharava, and there was a possibility of a burst of sharava. Hence, Deepagni seems to be apt for the proper formation of Rasa Bhasma. Temperature was recorded every 1 h to maintain uniform Agni throughout the procedure [Tables 6 and 7]. The peak temperature obtained was 175°C, which lasted for 15 min. The next day, after Swaangasheetala, which took 12 h, the Sharava was taken out, the sealing was carefully removed, and *Shweta Varna* Rasa Bhasma was collected and stored as per the results depicted in [Table 8]. ApamargaKshara in the preparation may enhance the rate of reaction. In the Rasa classics, Ksharas are used to process with Parada (Ashtadasha Samskara) to increase its Bhubhukshata. Bhringaraja Swarasa gets badha with paradaholding parada without evaporating, and thereby facilitates in the formation of Bhasma of Parada in the presence of low temperature.

CONCLUSION

Rasa Bhasma is a unique preparation mentioned in Rasa Chintamani prepared using Gorvara Puta in Deepaagnifor 8 h. This method is simple and not time-consuming, as Rasa Bhasma can be achieved in a single puta with easily available associated drugs. Apamarga Kshara, which was taken equally to the quantity of Parada, has a definite role in the conversion of Parada into Bhasma. Much importance was given to the Marana procedure as Parada is liquid in nature and evaporates readily even at Moderate temperatures, so classics have mentioned Deepaagni for the preparation of Rasa Bhasma. Hence, the conclusion was drawn from our observation that Parada has to be subjected to Gorvara Puta for 8 h for its complete conversion into Bhasma in this procedure.

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