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"COMPARATIVE PHARMACEUTICO-ANALYTICAL STUDY OF *LAUHA BHASMA* PREPARED BY TWO DIFFERENT METHODS W.S.R. TO *RASATARANGINI*."

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ABSTRACT

Introduction: The preparation of *Bhasma* comprises of many steps including the purification *(Shodhana)*, *Bhavana* (levigation), *Marana*, *Chakrika* (pellets) making, *Puta* etc. These steps are studied and performed judiciously during the entire process of *Bhasma* making. There is no importance given to *marana dravyas* while using a specific *bhasma* in any *kalpa*. In this particular study the *marana* of *Lauha* has been carried out by *Hingula* and *Manashila*. **Aim and Objectives:** To study comparatively, the pharmaceutico-analytical properties of *Hingula marit Lauha bhasma* and *Manashila marit Lauha bhasma*. **Materials and methods:** Lauha shodhana was performed as per the reference of *rasaratnasammuchaya* and further subjected to *marana* process. *Marana* was done by two processes namely *Hingula marit* and *Manashila marit* as mentioned in *rasatarangini* text. The prepared samples of *bhasma* were subjected to physic- chemical analysis and the properties were compared. **Observations and results:** The results showed only a slight change in properties in analytical testing but there were some pharmaceutical changes in both processes. **Conclusion:** There was a change in the pharmaceutico-analytical properties of *lauha bhasma* prepared by two processes. It can therefore be concluded that the change in *marana dravya* leads to change in pharmaceutico-

analytical properties. However further study can be done to test whether there is change in therapeutic properties due to change in *marana dravyas.*

KEYWORDS: *Bhasma, Hingula marit Lauha bhasma, Manashila marit Lauha bhasma*.

INTRODUCTION

Ayurveda, the science of life has for years been an idealistic and holistic form of treatment. It has served mankind for thousands of years and will continue to do so for years to come. *Ayurvedic samhitas* have gradually undergone many transformations which have led to its progress and proved a blessing to mankind. During this course of time *Rasashastra* also developed, which proved to be a boon to mankind. *Rasashastra and Bhaishajya Kalpana* deals with pharmaceutical processing as well as therapeutic utility of metals, minerals and herbal drugs.

Rasashastra mentions the therapeutic use of metals in a refined form as *bhasma*. *Bhasmikaran* is the process by which metals can be used for therapeutic purposes by converting them from inorganic to organic form with the help of herbal drugs. The use of *bhasmas* not only reduces the quantity of dose administered but also increases palatability, shelf-life of drugs and their absorbility. The preparation of *Bhasma* comprises of many steps including the purification *(Shodhana)*, *Bhavana* (levigation), *Marana*, *Chakrika* (pellets) making, *Puta* etc. These steps are studied and performed judiciously during the entire process of *Bhasma* making.

There is no importance given to *marana dravyas* while using a specific *bhasma* in any *kalpa*. In this particular study the *marana* of *Lauha* has been carried out by *Hingula* and *Manashila*. Although the *Bhasma* prepared by both the methods is labeled as *Lauha bhasma* but both these *bhasmas* can be used in different conditions and different kalpas. However there are not much studies available that shows the impact of *marana* drugs on the physico-chemical properties of the prepared *bhasma*.

AIMS AND OBJECTIVES

AIM: To study comparatively, the pharmaceutico-analytical properties of *Hingula marit Lauha bhasma* and *Manashila marit Lauha bhasma*.

OBJECTIVES

1) Preparation of *Hingula marit Lauha bhasma* and *Manashila marit Lauha bhasma*.

2) Physico-chemical characterization of *Hingula marit Lauha bhasma* and *Manashila marit Lauha bhasma.*

3) Comparative Pharmaceutico-analytical study of *Hingula marit Lauha bhasma* and *Manashilamarit Lauha bhasma.*

MATERIALS AND METHODS

Samanya Shodhana of Lauha

Reference: *(र.र.स.५/२९)*

Materials and Methods

Lauha (iron fillings), Tila taila, Takra, Gomutra, Kanji, Kullatha kwatha.

Lauha was heated to red hot condition and quenching (Nirvapa) was done seven times each into Tila taila, Takra, Gomutra, Kanji and Kullatha kwatha one after other.

Vishesha Shodhana of Lauha in Triphala Kwatha

Reference: *(र.र.स.५/२९)*

- **Type of Procedure** – *Nirvapa* (7 times in *Triphala kwatha*)
- **Media –** *Triphala kwatha*
- **Equipments**

Gas cylinder, thick iron pan, iron vessel with lid, spatula, measuring cylinder, steelvessels (2), measuring mug, weighing machine etc.

- **Ingredients –** *Samanya Shodhita Lauha and Triphala kwatha*
- **Procedure**

Samanya shodhit Lauha was taken in iron pan and was heated on fire upto red hot state. 500 ml of triphala kwatha was taken in stainless steel vessel. The red hot iron turnings were immediately quenched in Triphala kwatha. When iron fillings attained room temperature, it was completely drained and wiped clean. Then again Iron turnings were placed on fire and the same procedure was repeated for 7 times. Each time fresh Triphala kwatha was used. Time taken for each process was also noted. Weight of Lauha and volume of media was noted in each time and all data was recorded.

Hingula marit Lauha bhasma

- Reference – Rasa Tarangini 20/53-55.
- Equipments – Khalvayantra, Spatula, Measuring cylinder, Plastic sheet, Steel tray, knife,

Sharava, Weighing balance, Mulatani clay, Muslin cloth, Cow dung cakes.

- Ingredients –
- Shuddha Lauha = 250 gm
- Shuddha Hingula = 208 gms (total hingula used in the process).
- Triphala kwatha = 250 ml (freshly prepared for each puta and used as required).

Steps involved in Hingula marit Lauha bhasma

a. Preparation of mixture – **1)** Upto 7th puta = Lauha churna + Shuddha Hingula ($1/12^{th}$ part) and bhavana of Kumari swarasa was given. Thereafter chakrikas were made and subjected to gajaputa. **2)** After 7^{th} puta upto 17^{th} puta = Lauha churna was subjected to bhavana with Triphala kwatha. Thereafter chakrikas were made and subjected to Gajaputa.

b. Chakrika (pellets) preparation: 1) The thick paste obtained after bhavana was moulded manually to form small flat circular pellets called Chakrikas. Each chakrika had a diameter of about 2.5 cm and weighted nearly about 25 gms. **2)** These Chakrikas were transferred to a plasticsheet and kept for drying. After drying Chakrikas were used for further processing.

c. Sharava samputa – The chakrikas were placed in a earthenware pot which is called as Sharava. Each Sharava was flat, concave and prepared from clay and roasted in fire. Each Sharava had diameter about 10 inches and thickness about 6mm. Weight of sharava was on average 530 gms and capacity of 500 ml. All the chakrikas were placed without overlapping eachother. Another Sharava was placed in inverted position on previous sharava as a lid. A strip of muslin cloth with mud of Multani clay was wrapped around the joint of two Sharavas to get sealed. The assembly thus formed is called as Sharava samputa. After this process the sarava samputa was kept for drying. The samples were then subjected to Gajaputa for Bhasmikarana.

d. Puta Procedure – Puta procedure was carried out in a specially built underground tank having internal dimensions of about 2 feet x 2 feet x 2 feet height, breadth and length. Circular cow dung cakes of average weight 180 gms, diameter of 10-12 inches and thickness 2.50-3 cm were used for puta. $2/3^{rd}$ of the cow dung cakes were placed systematically in the puta tank in such a way that they don't overlap and some space is left for proper burning. Then Sharava samputa was placed on the heap and remaining $1/3^{rd}$ space was again filled by cow dung cakes. After completion of burning, the Puta was allowed to cool by its own (swangashita). Next day Chakrikas were collectedand were utilized for further procedure. It

took 3 days to complete one puta. This process was repeated till Lauha bhasma fulfilled Bhasma parikshas.

Manashila marit Lauha bhasma

- Reference – Rasa Tarangini 20/64-71.
- Equipments – Khalvayantra, Spatula, Measuring cylinder, Plastic sheet, Steel tray, knife, Sharava, Weighing balance, Mulatani clay, Muslin cloth, Cow dung cakes.
- Ingredients –

- Shuddha Lauha = 125 gm.
- Shuddha Manashila = 549 gm (1st puta=125 gm, 2nd=196 gm, 3rd=353 gm).
- Shalimoola swarasa = 250 ml (only for 1st puta).
- Triphala kwatha, Ardraka swarasa, Chitraka moola kwatha, Bhringaraja swarasa, Surana kanda swarasa, Kulattha kwatha, Snuhi ksheer, Bhallataka kwatha (bhavanadravyas).

Steps involved in Manashila marit Lauha bhasma

a. Preparation of mixture: 1) For 1st puta = Shodhit Lauha churna (125 mg) + Shuddha Manashila (125 mg) and bhavana of Shali moola swarasa (250 ml) given to it. It took 2 hrs 56 min for complete drying of the mixture. No Chakrikas were made and the mixture was thus subjected to gajaputa as it is. 2) For 2nd and 3rd puta = Lauha bhasma + Shuddha Manashila (in equal amount) was added and bhavana of Shali moola swarasa was given. Thereafter the mixture was subjected to gajaputa. 3) 4th puta onwards upto 17th puta = Lauha bhasma + Bhavana of Triphala kwatha, Ardraka swarasa, Chitraka moola kwatha, Bhringaraja swarasa, Surana kanda kwatha, Kulattha kwatha, Snuhi ksheer, Bhallataka kwatha was given. Then the mixture was subjected to gajaputa.

b. Vastra gaal (refining through cloth): 1) After 1st puta the obtained mixture is refined through cloth. About 50% mixture passed through it. This mixture was then subjected to further putas. 2) Vastra gaal (refining through cloth) was done upto 3rd puta. After3rd puta almost whole mixture passed through cloth.

c. Sharava Samputa: The mixture was placed in a earthenware pot which is called as Sharava. Another Sharava was placed in inverted position on previous sharava as a lid. A strip of muslin cloth with mud of Multani clay was wrapped around the joint of two Sharavas to get sealed. The assembly thus formed is called as Sharava samputa. The samples were then subjected to Gajaputa for Bhasmikarana.

d. Puta Procedure: Puta procedure was carried out.

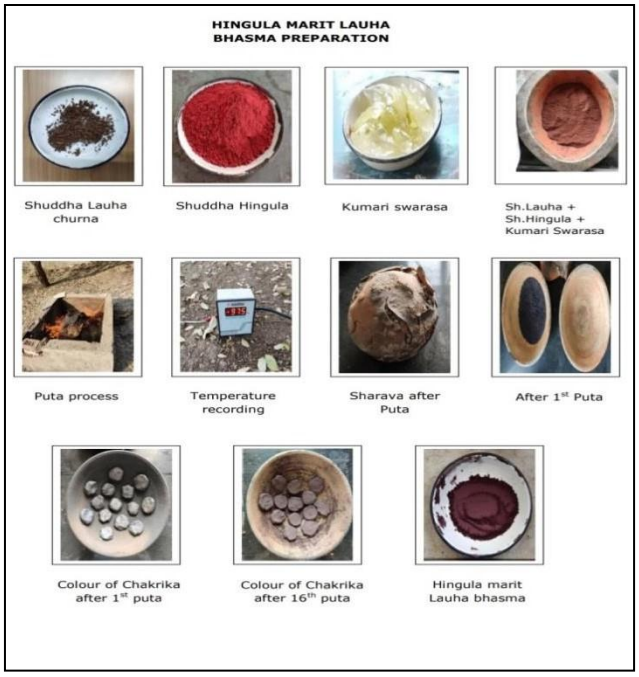

Fig. 1: Hingula Marit Lauha Bhasma Preparation

Fig. 2: Manashila Marit Lauha Bhasma Preparation

OBSERVATIONS AND RESULTS

A) Preparation of Hingula marit Lauha bhasma (Table No.1)

Puta No.	Wt. before	Wt. of Hingula Added	Wt. after	Max.temp	Duration	No ofcow dung cakes	Colour of bhasma	Consistency
1	250 gms	30 gms	220gms	1030°C	8 hrs	120	Blackish	Hard
2	220 gms	27 gms	228gms	1045°C	8 hrs 15mins	120	Blackish	Rough
3	228 gms	27 gms	242gms	1080° C	8 hrs 9mins	120	Blackish brown	Rough, pellets hard
4	242 gms	29 gms	256gms	1004°C	7 hrs 36mins	100	Brown	Slightly Rough
5	256 gms	31 gms	262 gms	1015° C	7 hrs 42 mins	100	Dark brown	Slightly Soft, pellets hard
6	262 gms	31 gms	274gms	950° C	7 hrs 30mins	90	Dark brown	Soft, pellets fragile
7	274 gms	33 gms	286gms	960° C	7 hrs 35min	90	Dark brown	Soft
8	286 gms	-	273gms	940° C	7 hrs 48min	90	Dark brown	Soft
9	273 gms	-	270gms	970° C	7 hrs 42min	90	Dark brown	Soft
10	270 gms	-	267gms	965° C	7 hrs 29min	90	Dark brown	Very soft, pellets hard
11	267 gms	-	266gms	750° C	7 hrs 5 min	75	Reddish brown	Very soft, pellets fragile
12	266 gms	-	261gms	780° C	7 hrs 12min	75	Reddish brown	Very soft
13	261 gms	-	255gms	765° C	7 hrs 15min	75	Reddish brown	Very soft
14	255 gms	-	246gms	680° C	6 hrs 56min	60	Reddish brown	Very soft
15	246 gms	-	239gms	635° C	6 hrs 38min	60	Brownish violet	Very soft
16	239 gms	-	228gms	604° C	5 hrs 46min	40	Brownish violet	Very soft
17	228 gms	-	219gms	572° C	5 hrs 25min	30	Brownish violet	Very soft

Results of Hingula marit lauha bhasma procedure

- Initial weight of Lauha = 250 gms
- Final weight of Lauha = 219 gms

- Loss in weight of Lauha = 31 gms
- Percentage loss in weight = 12.4 %

B) Preparation of Manashila marit Lauha Bhasma (Table No.2).

Puta No.	Wt. before	Wt. of Manashila added	Wt. after	Max. temp	Duration	No ofcow dung cakes	Colour of bhasma	Consistency
1	250gms	250 gms	386 gms	1105°C	8 hrs	120	Blackish	Hard
2	386gms	250 gms	459 gms	1045°C	8 hrs 15mins	120	Blackish	Rough
3	459gms	250 gms	603 gms	1080°C	8 hrs 10mins	120	Blackish brown	Rough
4	603gms		569 gms	1004°C	7 hrs 40mins	100	Brown	Slightly Rough
5	569gms		529 gms	1015°C	7 hrs 45mins	100	Dark brown	Slightly Soft
6	529gms		496 gms	950° C	7 hrs 30mins	90	Dark brown	Soft
7	496gms		465 gms	960° C	7 hrs 35min	90	Dark brown	Soft
8	465gms		438 gms	940° C	7 hrs 48min	90	Dark brown	Soft
9	438gms		403 gms	970° C	7 hrs 40min	90	Brownish red	Soft
10	403gms		389 gms	965° C	7 hrs 30min	90	Brownish red	Very soft
11	389gms		362 gms	750° C	7 hrs 5 min	75	Brownish red	Very soft
12	362gms		328 gms	780° C	7 hrs 12 min	75	Brownish violet	Very soft
13	328 gms		305 gms	765° C	7 hrs 15 min	75	Brownish violet	Very soft
14	305 gms		286 gms	680° C	6 hrs 56 min	60	Brownish violet	Very soft
15	286 gms		259 gms	635° C	6 hrs 38 min	60	Brownish violet	Very soft
16	259 gms		227 gms	604° C	5 hrs 46 min	40	Brownish violet	Very soft
17	227 gms		198 gms	572°	5 hrs 25 min	30	Brownish violet	Very soft

Results of Manashila marit lauha bhasma procedure

- Initial weight of Lauha = 250 gms
- Final weight of Lauha bhasma obtained = 198 gms
- Loss in weight of Lauha = 52 gms
- Percentage loss in weight = 20.8 %

C) Comparison of Organoleptic evaluation of Hingula marit Lauha bhasma and Manashila marit Lauha bhasma (Table No.3).

Classical Parameters	Results for Hingula marit Lauha bhasma	Results for Manashila marit Lauha bhasma
Shabda (sound)	No sound produced during chewing.	No sound produced during chewing.
Sparsha (consistency)	Smooth, Course particles not felt.	Smooth, Course particles not felt.
Rupa (colour)	Rakta kamala varna (Brownish violet)	Pakva Jambuphala varna (Brownish violet)
Rasa (taste)	Tasteless	Tasteless
Gandha odour	No specific	No specific

D] Comparison of Bhasma pariksha of Hingula marit Lauha bhasma and Manashila maritLauha bhasma: (Table No. 4)

Bhasma pariksha	Results Obtained for Hingula marit Lauha bhasma	Results Obtained for Manashila marit Lauhabhasma
Nishchandratva	No metallic luster	No metallic luster
Rekhapurnatva	Fills the space between fingers when rubbed between thumb and index finger.	Fills the space betweenfingers when rubbedbetween thumb and index finger.
Varitaratva	Floats on water	Floats on water
Apunarbhava	No recurrence of Lauha dhatuon heating with mitra panchaka.	No recurrence of Lauhadhatu on heating with mitra panchaka.
Niswadu	Tasteless	Tasteless
Niramla	No change in colour.	No change in colour.

E) Modern Parameters

Comparison of results for the physico-chemical characterization of Hingula marit Lauha bhasmaand Manashila marit Lauha bhasma are as follows.

(Table No.5)

Physico-chemical Parameters	Hingula marit Lauha bhasma	Manashila marit Lauha bhasma
Moisture Content (%) (Loss on Drying)	0.002 %	0.17 %
Ash value (%) (Loss on ignition)	97.03 %	98.11 %
Acid insoluble ash (%)	84.4 %	87.9%
Solubility in HCl (%)	90.54 %	92.27 %
Solubility in water (%)	3.33 %	2.77 %
Determination of Fe (%)	56.57 %	59.23 %
Particle Size	800nm-5000nm	600nm-1000nm

(Table No. 6) TLC of Hingula marit Lauha bhasma TLC of Manashila marit Lauha bhasma.

	Sr. No.	RF Value	Colour	Sr. No.	RF Value	Colour
Eye observed	1	0.062	Yellow	1	0.060	Yellow
254 nm observed	1	0.062	Yellow	1	0.060	Yellow
365 nm observed	1	0.062	Yellow	1	0.060	Yellow
	2	0.28	Yellow	2	0.28	Yellow
Iodine Chamber	1	0.062	Yellow	1	0.060	Yellow
	2	0.28	Yellow	2	0.28	Yellow

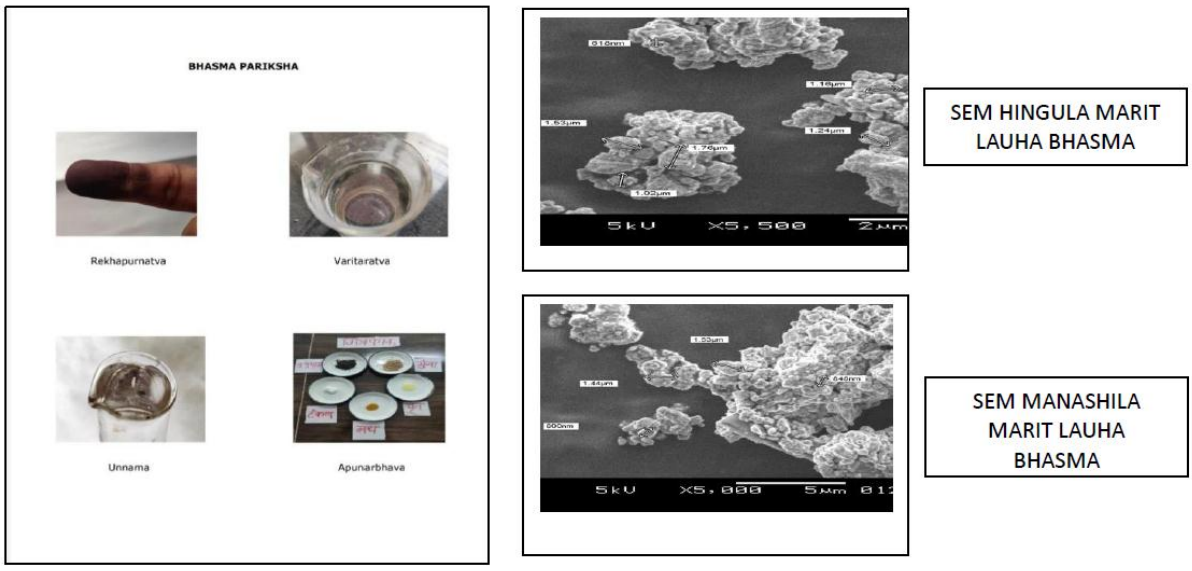

Fig. 3: Bhasma Pariksha.

DISCUSSION

In the present study, *Samanya Shodhana* of *Lauha* was conducted as mentioned in *Rasaratnasamucchaya* and *Vishesha Shodhana* was conducted as mentioned in *Rasa Tarangini*. 500 gm (10 pala) of lauha was subjected to shodhana procedure. The obtained shodhit Lauha was then subjected to preparation of *Hingul marit Lauha bhasma* and *Manashila marit Lauha bhasma*. The prepared *Lauha bhasma* was then subjected to analytical study and a comparison ofphysico-chemical properties was conducted to draw the conclusions.

Discussion on Pharmaceutical observations

A] *Samanya Shodhana of Lauha*

1) Liquid media used for *Shodhana* process were a mixture of weak acids and weak bases. The concept behind using such a variation may be the removal of impurities from a drug by the action of specific acidic or alkali media. Also the alternate heating to red hot condition and then quenching several times in acidic and basic media leads to corrosion of metals and the removalof impurities. 2) After heating *Lauha* to red hot condition, the oxidation process takes place converting the iron to ferrous or ferric oxide due to reaction with atmospheric oxygen. 3) It was also noticed that the *Lauha* particles became more friable as the process proceeded. The bonds between the molecules became loose due to constant heating to red hot condition and quenching in liquid media. 4) **Weight:** Average gain in weight of *Lauha* was observed during quenching in *Tila taila* and *Takra* which might be due to the residue of *taila* and *takra* remaining in the material. While quenching in *Gomutra*, *Kanji* and *Kullatha*

kwatha there was some loss due to increased fineness of *Lauha* particles and flying of particles during quenching. 5) **Time of Quenching:** It was observed that with the advancement of process, the time required for *Lauha* to get red hot was comparatively less. 6) **Colour:** During *Shodhana*, colour of *lauha* was turned to *black*. This may be due to the conversion of red hot iron to ferrous-ferric oxide. 7) **Particle size:** With each step of *Shodhana*, a progressive increase in surface area and reduction in particle size due to heat treatment is observed.

B] *Vishesha Shodhana* of *Lauha*

1) Role of Triphala in Lauha bhasma preparation: The chemical constituents of *Triphala* are tannine, gallic acid, ascorbic acid (vitamin C) and phenolics. The bioavailability of iron increasesdue to ascorbic acid by the conversion of Fe^{3+} to Fe^{2+}. *Triphala* is a mild laxative and therefore it opposes the constipating property of iron.

2) Assessment of different parameters after completion of Vishesha Shodhana of Lauha: 5.3 % gain in weight was noted. A part of *Lauha* may have converted to ferroso-ferric oxide (Fe_3O_4) during red hot state. This formation of compound may have caused increase in weight. The increase in weight may also be due to the absorption of some extract of *Triphala* during the *Vishesha shodhana* of *Lauha*.

C] *Hingula marit Lauha bhasma* preparation

1) Weight: Loss of 12.4 % in weight was observed as compared to the original volume of *Lauha*. This might be due to the burning of *Kumari swarasa* and *Triphala kwatha* residues and also due to loss while performing different procedures. **2) Number of Putas:** It was observed that 17 putaswere required for the bhasma to pass all the tests. Although according to the reference of the commentary of Dharmanand Shastri 7 putas were said to be given but it took 17 putas for the bhasma to pass all the classical tests. This also proves the point of author Sadanand Sharma that more putas (max 40) should be given for preparation of *Hingula marit Lauha bhasma*.

D] Manashila marit Lauha bhasma preparation: 1) Weight: Loss of 20.08 % in weight was noted as compared to the original sample of *Lauha*. This might be due to the burning of various *bhavana dravya* residues used during the process and also due to the loss while performing different procedures. **2) Number of *Putas*:** It was observed that it took 16 *putas* for *bhasma* to pass all the tests. No information regarding the number of *putas* is stated in the

text. It required less number of *putas* as compared to *Hingula marit Lauha bhasma* which may be due to more number and time of *bhavanas* used in the process. ***3) Vastragaal* (filtering through cloth):** The *lauha* powder was subjected to *vastragaal* i.e. filtering through cloth for first three *putas*. It was observed that by 3rd *puta* almost 98% passed through the cloth. The addition of this process may also have contributed to the less number of *Putas* as compared to *Hingula marit Lauha bhasma*.

Assessment of Modern Analytical Parameters

1) Assessment of Loss on Drying (Moisture content): Loss of drying value is suggestive of moisture content or amount of volatile content of given sample. Smaller values of loss of drying of *bhasma* indicates presence of little amount of moisture. **2) Assessment of Loss on Ignitation (Ash value):** Loss of ignition value is indicative of presence of organic content of *Bhasma*. Very high value of loss on ignition indicates presence of very high organic content. **3) Assessment of Acid insoluble Ash:** Test for acid insoluble ash was carried out to evaluate the percentage of insoluble inorganic content of the *Bhasma* in dilute acid. It is intended to provide a step towards the evaluation of the physiological availability of the *Bhasma*. **4) Assessment of Water solubility:** This test was carried out to evaluate the water-soluble principles of the sample. **5) Assessment of Iron percentage (Fe %):** Both *Hingula marit* and *Manashila marit Lauha bhasma* were subjected to assay of iron and it was found that *Hingula marit Lauha bhasma* contained 56.57% of Fe and *Manashila marit Lauha bhasma* contained 59.23% of Fe. **6) Assessment of Particle size by SEM:** The less the particle size, the more is the bioavailibilty of the *bhasma*. The size of both *Hingula marit* and *Manashila marit Lauha bhasma* was nano sized. However it was found that particle size of *Manashila marit Lauha bhasma* was finer than *Hingula marit Lauha bhasma*. It may be due to the more number of *bhavana* and *mardana* for a longer time in case of *Manashila marit Lauha bhasma*. **7) Assessment of TLC:** Phytochemical evaluation by TLC revealed that in *Hingula marit Lauha bhasma* spot Rf 0.62 with yellow colour more developed as compared to *Manashila marit Lauha bhasma* spot Rf 0.62 (yellow) due to alteration in solvent system towards high polarity. When comparing two different compounds under identical chromatography conditions, the compound with larger Rf is less polar.

CONCLUSIONS

1) Preparation of Lauha bhasma includes Lauha shodhana (both samanya and vishesha), Shodhana of marana dravyas (Hingula and Manashila) and bhasmikarana process which

includes puta. **2)** In order to manufacture a good quality of bhasma it is very essential to follow all the procedures as per Texts and API guidelines. **3)** It took 17 putas for preparation of Hingula marit Lauha bhasma and 16 putas for preparation of Manashila marit Lauha bhasma. It can therefore be concluded that the change in pharmaceutical process results in change of various parameters like duration, change in physical properties, change in analytical properties etc. **4)** The loss during preparation of Hingula marit Lauha bhasma was found to be 12.4 % and that of Manashila marit Lauha bhasma was found to be 24.48%. **5)** With the advancement of putas, there was reduction in particle size and metallic luster disappeared. **6)** However not much difference in colour of Lauha bhasma was observed in both the processes. The Pakwa jambu varna of Manashila marit Lauha bhasma became prominent earlier as compared to Hingula marit Lauha bhasma. **7)** Varitaratva test of both Hingula marit and Manashila marit Lauha bhasma indicates that the bhasma became Laghu i.e. Lighter than water. It was observed that Manashila marit Lauha bhasma became Varitara earlier as compared to Hingula marit Lauha bhasma. **8)** *Rekhapurnatva* test indicates that the particle size of both *Hingula marit* and *Manashila marit Lauha bhasma* was so fine that it accumulates in furrows of fingers. The particle size determination by SEM confirmed that both the bhasma were nanosized. **9)** Both *Hingula marit* and *Manashila marit Lauha bhasma* passed *Nishchandratva* i.e. absence of metallic luster and *Niswadu pariksha* i.e. absence of any other organic matter. **10)** Though both *bhasmas* passed all the classical tests, it was observed that *Manashila marit Lauha bhasma* passed all the classical tests earlier as compared to *Hingula marit Lauha bhasma*. **11)** The reports of analytical tests of both samples show that both the prepared *bhasmas* are of standard quality but their physico- chemical properties are different. **12)** There was a notable difference in pharmaceutical procedures of both samples. Subjecting *Chakrikas* to *puta* was the feature of *Hingula marit Lauha bhasma* whereas the *Vastragalana* process was the feature of *Manashila marit Lauha bhasma*. **13)** The study concludes that there is a difference in the pharmaceutico-analytical properties of *Hingula marit Lauha bhasma* and *Manashila marit Lauha bhasma*. This means that though the end product of both processes is labeled as *Lauha bhasma* but the change in process results in the change in the physico-chemical properties of *bhasma*. **14)** Though the study reflects the importance of *marana dravya* in the preparation of *Lauha bhasma* based on the pharmaceutico-analytical properties, there is a scope for studying the therapeutic importance of *marana dravyas* in the preparation of *bhasma*.

REFERENCES

1. Vagbhatacharya, ‘Rasaratnasamucchaya’ edited by Ambikadatta Shastri, 5/29, ChaukhambaAmarabharati Prakashana, Varanasi, ninth edition, 1995; 103-106.
2. Sharma Sadanand, Kashinathshastri, Rasa tarangini, 20th tarang /15, Delhi, Motolal banarasidas, 11th edition, 2004; 77-78.
3. Sharma Sadanand, Kashinathshastri, Rasa tarangini, 20th tarang /53-55, Delhi, Motolal banarasidas, 11th edition, 2004, p.507-511.
4. Sharma Sadanand, Kashinathshastri, Rasa tarangini, 20th tarang /64-71, Delhi, Motolal banarasidas, 11th edition, 2004; 511-512.
5. Anonymous, The Ayurvedic Formulary of India (part B, volume I), edition 2011.
6. Anonymous Ayurvedic Pharmacopia of India, part1 volume 1, monography 31, p 80.
7. Singh Neetu, Reddy K.R.C - Pharmaceutical and Analytical study of Lohabhasma (Dept. ofRasashastra, Faculty of Ayurved, Institute of Medical Research, BHU, Varanasi), 2010.
8. Rajendraprasad M.L, ShrutiShekhar - Pharmaceutical and analytical study of Lohabhasma(Dept. of Rasashastra, JSS Ayurveda Medical College, Mysore, Karnataka), 2010.
9. MuleyGeeta - Comparative study of Physiochemical characteristics of Lauhabhasma and SaptamrutaLauha (Dept. of Rasashastra and Bhaishajyakalpana, GAC Osmanabad), 2014.