



Research Article

STANDARD MANUFACTURING PROCEDURE OF SHADGUNA BALIJARITA MAKARADHWAJA BY ADOPTING TRADITIONAL METHOD - A PRELIMINARY STUDY

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ABSTRACT

Introduction: *Gandhaka Jarana* is intermediate procedure for the therapeutic mercurial preparations in Ayurveda Rasashastra. For *Gandhaka Jarana* numerous procedures were mentioned in the classical texts of Rasashastra. Here, *Shadguna Balijarita Makaradhwaja* prepared in classical *Valuka Yantra* by adopting one of the method of *Gandhaka Jarana*.

Objective: To prepare *Shadguna Balijarita Makaradhwaja* by traditional method of preparation by *Valuka Yantra* and to standardize its heating pattern.

Materials and Methods: *Shodhana* of each ingredient was done followed by *Kajjali* preparation. Levigated and dried *Kajjali* was filled in *KachpKupi* and intermittent increasing heat was given in *Valuka Yantra*. Sublimed *Shadguna Balijarita Makaradhwaja* was obtained from neck of glass of glass bottle.

Observation and results: For 16 hours heat was provided in *Valuka Yantra*. Average 12.77% i.e. 32.33 g yield of *Makaradhwaja* was obtained from all three batches of *Shadguna Balijarita Makaradhwaja*.

Conclusion: *Shadguna Gandhaka Jarana* for *Makaradhwaja* prepared in the classical heating device *Valuka Yantra* by adopting addition of parts of *Shuddha Gandhaka* during ongoing process method; requires intermittent heat heating pattern i.e. 4:30 hours mild heat (30- 500°C), 1:30 hours moderate heat (500- 650°C), and 10 hours strong heat (650-840°C).

KEYWORDS: *Balijarana, Gandhaka Jarana, Kupipakwa Rasayana, Mercury sulfide, Shadguna Makaradhwaja.*

INTRODUCTION

Gandhaka Jarana or *Balijarana* is one of the important procedure in the mercurial preparations^[1] in which processed mercury (*Shuddha Parada*) is treated with processed sulfur (*Shuddha Gandhaka*) in presence or absence of heat. In this *Gandhaka Jarana* mercury is treated with sulfur in different ratio like equal quantity *Samguna Gandhaka Jarana*, double amount of sulfur to mercury termed as *Dwiguna Gandhaka Jarana*. Though classical texts have mentioned numbers of operating procedures for *Gandhaka Jarana* but very few of them are in practice. Increase in the quantity of *Gandhaka* in *Jarana* of mercury found difficult to prepare it. *Makaradhwaja* is a popular gold containing mercurial aphrodisiac and rejuvenator preparation used in the Indian system of medicine Ayurveda. *Makaradhwaja* is a popular gold containing mercurial aphrodisiac and rejuvenator preparation used in the Indian system of medicine Ayurveda.^[2] It was observed safe for therapeutic use^[3-4]. Its anti diabetic^[5], anti-hyperglycemic^[6], immunomodulatory activities^[7] are established. *Makaradhwaja* may be divided into three sub types according to its mercury and sulfur proportion as per *Gandhaka Jarana*. As sulfur (*Gandhaka*) and mercury (*Parada*) were found in the ratio 2:1 i.e. *Dwiguna Balijarita Makaradhwaja*, 3:1 *Triguna Balijarita Makaradhwaja* and 6:1 *Shadguna Balijarita Makaradhwaja*^[8]. According to classical texts of

Rasashastra *Shadguna Balijarita* mercurial preparation was found more potent than among other^[9]. Though the Six times sulfur treated mercurial preparation is more therapeutically potent but its preparation is also more tedious than other. Many times failure during preparation of *Kupipakwa* medicines was observed at the equal proportion of sulfur and mercury (*Samaguna Balijarita*). The chances of failure often increase with the increase in proportion of sulfur to mercury. It means Six times of sulfur to mercury found more difficult to prepare than twice, thrice etc. However, considering rational thinking behind six times sulfur treatment to mercury this challenge of pharmaceutical preparation of SBM was accepted and attempt was made to standardize its pharmaceutical parameters.

For *Shadguna Gandhaka Jarana* three types of procedures were mentioned in the contexts of *Kupipakwa Rasayana*.^[10] One of them is add six part of *Shuddha Gandhaka* to *Shuddha Parada* and triturate it to prepare *Kajjali*. Use this *Kajjali* for the *Gandhaka Jarana* by the mean of *Kupipakwa Rasayana*. Likewise, one more method was mentioned, in this method from the equal amount of *Parada* and *Gandhaka Rasasindura* should be prepared by *Kupipakwa* method. Then this *Rasasindura* should be distilled through *Patana Yantra* to procure mercury. Mercury procured from this method should again

assimilate and triturated with the equal quantity of *Shuddha Gandhaka* and procedure of *Kupipaka* should be repeated for the *Rasasindura* preparation. The whole procedure should be repeated for four times more to achieve *Shadguna Balijarana*. Another method was mentioned like, *Kajjali* prepared by adding equal quantity of *Shuddha Parada* and *Gandhaka* followed by *Kupi Paka* in *Valuka Yantra*. During the *Kupi Paka* procedure add the one part of *Shuddha Gandhaka* to *Kupi* after cessation of flame. Repeat the addition of *Shuddha Gandhaka* for four times similarly. Here in this study the last procedure of *Gandhaka Jarana* was adopted and carried out for the preparation of *Shadguna Makaradhwaja*^[11] preparation to standardize its manufacturing procedure.

Materials and Methods

Piece of pure Gold biscuit of 24 carat (*Swarna*) was collected from local authenticated hallmark certified jeweler of Jamnagar. Cinnabar (*Hingula*), sulfur (*Gandhaka*), Cow ghee (*Goghrita*), Sesame oil (*Til taila*) and *Dolichos biflorus* Linn (*Kulatha*) were procured from pharmacy of Gujarat Ayurved University, Jamnagar. *Citrus medica* Linn (*Nimbu*) and Cow Milk (*Godugdha*) was procured from local market of Jamnagar. Cow urine (*Gomutra*) was collected from local cow shed. *Aloe Vera* (*Kumari*) and flowers of *Hibiscus Racemosa* (*Japakusuma*) were collected from herbal garden of Gujarat Ayurved University, Jamnagar. All the herbal medicinal plants were identified and authenticated in the pharmacognosy lab of the IPGT & RA, Gujarat Ayurved University, Jamnagar.

Swarna Shodhana

General purification (*Samanya Shodhana*) of gold was done as per the text^[12]. The gold flakes heated on gas blower and dipped in to prescribed liquid media. Process was repeated for twice. After purification of gold flakes, foils of gold (*Swarna Varkha*) were prepared in the gold market of Ahmadabad.

Gandhaka Shodhana

For the purification of sulfur it was melted along with cow ghee and poured in cow milk and heated (*Swedana*) in same for three hours. At the end of process sulfur was collected, washed with hot water for seven times, dried and stored in glass bottle for further use.^[13]

Hingulottha Parada

Purification of cinnabar (*Hingula*) was done by levigating it with *Citrus medica* Linn Juice for three times. At the end it was washed and dried and collected in glass Jar. Mercury (*Parada*) was extracted from the cinnabar by *Naad Yantra* Method. Equal weighing cotton cloth was taken and fine powder of cinnabar was spread over it. The cotton cloth was wrapped and burnt under round clay pot. Evaporated mercury was observed on inner side of pot. Mercury was collected by rubbing the inner side of pot. Collected mercury was washed with hot water and filtered through four folded cotton cloth. This filtered mercury was used for the preparation of *Makaradhwaja*.^[14]

Swarna Pishti Preparation

Amalgamation of 30 g gold foils and 240 g mercury procured from cinnabar was prepared in granite mortar and pestle^[11] (Table 1 and 2).

Kajjali Preparation

Black sulfide of mercury (*Kajjali*) was prepared by triturating amalgam of gold and mercury with purified sulfur^[11]. Material was triturated up to homogenous black, smooth and lusterless mass formation. Process was continued for 24 hours by break (Table 3).

Bhavana Procedure

This homogenous mass was levigated with flowers of *Japa* (*Hibiscus rossa sinensis* Linn.) Juice followed by *Kumari* (*Aloe berbandensis* Miller.) Juice for three hours each^[11]. The material was dried and stored in glass Jar (Table 4).

Kupi Nirmana

Glass bottle (beer bottle) was wrapped with mud smeared cotton cloth. Total seven layers were wrapped after complete drying of each layer.

Shadguna Balijarita Makaradhwaja preparation

Levigated *Kajjali* was filled inside mud smeared cotton cloth wrapped glass bottle (beer bottle as *Kach Kupi*). The *Valuka Yantra* was placed on traditional furnace (*Chullha*) and sand (*Valuka*) was filled upto 2 inch^[15]. Then *Kach Kupi* was placed at the center of the *Valuka Yantra* and remaining space inside it was filled by sand up to the neck of the bottle. Initially 4 kg hard coal and 2 kg wooden coal were added in hearth. Furnace was ignited. Heat was gradually increased over a period of 16 hours as per the time schedule i.e. 4:30 hours *Mandagni* (mild heat), 1:30 hours *Madhyama Agni* (Moderate heat), and 10 hours *Tivra Agni* (Strong heat). After 1:30 hours, 1 kg wooden coal was added up to 4:30 hours by interval of 1 hour to maintain mild heat. Then after 04:30 hours 2 kg hard & 1 kg wooden coal was added to give moderate heat. Later than 06:00 hours 3 kg hard & 1 kg wooden coal was added to furnace to provide strong heat. At 6:35 hours bluish colored flame was appeared in the neck of glass bottle. During the course of heating red hot iron rod (*Agni Tapta Shalaka*) was repeatedly inserted inside the neck of glass bottle to burn out the accumulated sulfur inside the neck. For the duration of 7:15 hours flame was found in the neck of glass bottle at 7:15 hours, 80 gm of *Shuddha Gandhaka* was added by using glass flask. Then flame increased gradually. The procedure of *Shuddha Gandhaka* addition was repeated thrice as shown in table. Hard coal and wooden coal was added as per the need to maintain the heat. Temperature of *Valuka Yantra* was recorded after interval of 30 minutes. Total used fuel was as well recorded. Heating process was bring to an end up to complete burning of extra sulphur in the compound and after achieving desired specific characteristic features of completion i.e. flame disappearance, bright red bottom of the *Kupi*, *Sheeta Shalaka* and copper coin test positive. The *Kupi* mouth was corked and sealed with clay and cloth at 11:40 h. On the next day, after self-cooling of furnace and *Kupi*, *Kupi* was taken out and cleaned the outer layers by scrapping with the knife. A thread was soaked in kerosene oil, tied all around the bottle bellow one-inch level from sublimed compound, and ignited. After burning of the thread, a little amount of water was sprinkled on the hot surface of bottle to break the bottle. The sublimed product (*Makaradhwaja*) was collected from neck of the bottle and

residue part of *Makaradhwa* (*Swarna* powder) was collected from inside the bottom of bottle. Same procedure was adopted for rest of two samples. Total three batches were prepared to determine the standard manufacturing procedure for *Shadguna Balijarita Makaradhwa* and named as SBMV (Graph 1) (Table 5 and 6). *Makaradhwa* was triturated in china clay mortar and pestle up to fine red colored powder.

Observation and Results

Gold foils were easily assimilated in mercury during amalgamation. No need of trituration was needed. Weight of amalgamated mercury with gold foils was observed 270 gm. *Rekhapurnatva* and *Nischandratva* features appeared in the *Kajjali* after 12 hours of trituration. Average 4.3% (Table 2) loss of *Kajjali* was found during process and total 718 gm of *Kajjali* was prepared.

Average 1/4th liquid media was required for a total weight of *Kajjali* during *Bhavana* procedure. Average 3 hours time required for the single *Bhavana* by triutration. Total 2.84% (Table 3) weight gain was observed after completion of *Bhavana* process. 759 gm of *Kajjali* was collected after drying. It was divided in to four batches in equal amount i.e. 253 gm in each batch (Table 4). During first hour of mild heat, no noticeable changes were observed in *Kajjali* except that start it to melt only. This was confirmed by cold iron rod (*Shita Shalaka*) test. After one hour of heating slight smell of sulfur was found at the mouth of the glass bottle, at this stage temperature was recorded around 351°C in *Valuka Yantra*. When temperature was gradually increased, the *Kajjali* was found melted completely at 543°C to 640°C.

After 6:30 hours of heating, when temperature ranged between 650°C to 670°C, the fumes changed to flames and were found to be of 4 to 5 inches in height. At this stage, regular cleaning of the *Kupikantha* (neck of the glass bottle) was required by red-hot heated iron rod to avoid the chocking by the sulfur adherence. After 7:00 hours of heating, the flame gradually decreased and was found to be limited till the neck of the glass bottle. At 7:15 hours as per pre decision 80 gm of *Shuddha Gandhaka* was added in *Kupi* through mouth of *Kupi*. After addition of *Shuddha Gandhaka* immediately flame was increased. Same results were observed during the each addition of *Shuddha Gandhaka* to *Kupi*. After 11:40 hours of heating, flame disappeared and the temperature was ranged around 830°C to 840°C. At this temperature range the bottom of the glass bottle appeared red hot suggestive to indicate the compound formation. Besides this copper coin test was also found positive; corking was done soon after the positive cold iron rod test. (Table 5). Average 32.33 g of *Makaradhwa* was obtained as a sublimed product at neck of broken *Kupi* and 18.33 g of residue as powder of gold was observed at bottom part of *Kupi* (Table 7).

DISCUSSION

Gandhaka Jarana procedure is claimed to increase in therapeutic potency of mercurial preparations. As number of *Gandhaka Jarana* increases by the increase in proportion of sulfur to mercury; the heat pattern and

temperature range differs with the number of *Jarana* in *Kupipakwa* procedures^[16].

As scientific facts claim that gold has more affinity toward mercury than any other material. The gold foils were easily assimilated in mercury. Here, in this procedure as soon as gold foils were put inside the mortar and pestle containing mercury, it was got dissolved in it. It might be due particle size of gold in gold foils is very small. Hence, no need of trituration is requisite, and there was no loss has been experiential too^[17].

Losses of weight of *Kajjali* detect more it may be due to spilling out the *Kajjali* during grinding process (Table 3). The detected loss was more in SBMV *Kajjali* it possibly will be due to increase in quantity of sulfur. Due to fineness of sulfur particle, it was spilling out through mortar during trituration. During this, it might be possible that few amounts of gold and mercury was spilled out^[18].

Physically bonding of ions in black sulfide of mercury can be scrutinized by the fineness of material. In the classical texts fineness of *Kajjali* measured by *Rekhapurnatva*^[19]. *Rekhapurnatva* in which if any fine material is rubbed inside the thumb and finger ridges, it should be filled in ridges. *Rekhapurnatava* test of *Kajjali* is imperative because it signifies the particle size and homogeneousness of *Kajjali*. It was surveillance during *Kupipakwa* preparation that if desired particle size of *Kajjali* is not achieved, it gives problems during heating procedure of *Kupipaka*. When prepared *Kajjali* was examined in sunlight; shining of few gold particles was observed. Gold particles which previously amalgamated with mercury may get separated and replaced by sulfur ions. As amalgamation is weak bond of mercury and gold. It can be assumed that some percentage of gold particles may free and some of them attached to the molecules of black sulfide of mercury with weak bond. *Bhavana* may add some organic and inorganic trace element into the final compound.^[20] Totally 4.49% weight gain was observed after completion of *Bhavana* process (Table 4). The increase of weight is due to solid content of liquid media added in compound.

The purpose of the *Kapadamitti* is mainly to enhance the heat resistance capacity and strength of glass bottle. To prevent the breaking of glass bottle, the *Kajjali* was filled up to 1/3rd part of glass bottle. It provides enough space for melting and boiling of *Kajjali* properly inside the glass bottle.

Here in present study attempt was made to standardize the temperature pattern for the *Shadguna Gandhaka Jarana* in the classical *Valuka Yantra*. It was observed that white colored fumes were appeared at the neck of glass bottle at 167°C temperature. Whereas flame was appeared when temperature ranges in between 650 to 675°C in sand. The sulfur burns at the temperature 444°C. In the *Gandhaka Jarana* procedure it was found at the temperature 650°C (Table 6). it might be possible that temperature of sand was more than the temperature inside the glass bottle. Because when compared with *Shadguna Gandhaka Jarana* in prepared in the Electrical muffle furnace flame was found appeared at the temperature 450°C.^[8]

Four confirmative tests for *Kupipakwa Rasayana* were told in classics that is, copper coin test, cold iron rod test, red hot bottom of glass bottle test and honeycomb structure test inside the glass bottle. For a copper coin test, copper coin is put over mouth of glass bottle for few seconds, for the confirmation of sublimation. If it gets grayish white colored, it shows the deposition of free mercury denotes sublimation started and if gets black colored means free sulfur remains. Positive test symbolize time for sealing the mouth of glass bottle to prevent loss of product that is, corking. For cold iron rod test, cold iron rod is inserted inside the neck of glass bottle for few seconds and then observed for positive as a said above. Red hot bottom of glass bottle is one of naked eye examination. From the starting of the heating bottom of glass never appear red hot through the mouth of bottle due to the presence of free sulfur and its fumes. It will see when whole free sulfur burn out. Honeycomb structure is again naked eye examination. When free sulfur is burns out the boiling mercury sulfide looks like honeycomb structure inside the glass bottle. If there is the presence of free sulfur due to its fumes and flames the boiling mercury sulfide is unseen. Hence, it is confirmative test for strong heat was found mentioned in the texts of Rasashastra literature i.e. *Dagdha tusha*. In this test dried grass is placed over sand in sand bath if it burns it is positive sign of strong heat. It was found positive during the temperature ranges in between 650-675° and above.

Addition of parts of processed sulfur to the glass bottle after cessation of flame was found difficult. It requires a more care because chances of accidental burning may be possible. After addition of one part of processed sulfur to the glass bottle for initial few minutes white colored fumes were found at the neck of glass bottle which were gradually increased and finally turned in to bluish colored flames. Sudden decrease in temperature may be the reason behind it.

Above explained procedure is found tedious and difficult to prepare when compared with product prepared by *Kajjali* of direct addition of six parts of processed sulfur to one part of processed mercury. As this procedure requires more care and excess time and fuel.

Average 12.77% [Table 7] 32.33 g yield of *Makaradhwaja* was obtained from all SBMV batches. Comparing with previous studies the observed yield is found less^[8]. The adopted method of preparation may be the reason behind it. As here in present study addition of processed sulfur was added during the cessation of flame, may be some amount of free mercury evaporated. Total 24 hours heat was given respectively to each batch until self cooling of device. In the texts it was mentioned that prepare *Kajjali* of 1 part of *Shuddha Parada* and 1 part of *Shuddha Gandhaka* but here in this study it was modified and *Kajjali* was prepared by adding 2 part of processed sulfur to 1 part of processed mercury. The modification was done to minimize the duration of *Kupipaka* (heating time) procedure.

Though the procedure was successfully completed but the few drawbacks were observed during the procedure. Safety is major concern during the operation;

due to direct addition of sulfur in continuous heating procedure. Another issue is of breakage of glass bottle. Any mishandling throughout addition of *Gandhaka* in the procedure may break the glass bottle. Time of addition should be cautiously calculated. If it gets late mercury may get evaporated through the glass bottle due to absence of sulfur which may leads to product loss. Further research work is needed for the development of pharmaceutical standardization.

CONCLUSION

Shadguna Gandhaka Jarana for *Makaradhwaja* prepared in the classical heating device *Valuka Yantra* by adopting addition of parts of *Shuddha Gandhaka* during ongoing process method requires intermittent heat heating pattern i.e. 4.30 hours mild heat (30- 500°C), 1:30 hours moderate heat (500-650°C), and 10 hours strong heat (650-840°C). Total 16 hours heating is needed for the preparation. Following this pattern 32.33 g (12.77%) yield can be obtained from the 253 g of *Kajjali*.

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Tables

Table 1. Ingredients for *Shadguna Balijarita Makaradhwaja*

| Sr. No. | Ingredient | Quantity |
|---------|---|----------|
| 1. | <i>Shuddha Swarna</i> | 30 g |
| 2. | <i>Shuddha Gandhaka</i> | 1440 g |
| 3. | <i>Hingulottha Parada</i> | 240 g |
| 4. | Juice of <i>Aloe berbandensis</i> Miller. | 200 ml |
| 5. | Juice of <i>Hibiscus rossa sinensis</i> Linn. | 200 ml |

Table 2: Observations of *Swarna Pishti* preparation

| Batch | Wt of <i>Swarna Varkha</i> (g) | Wt of <i>Parada</i> (g) | Duration (h) | Wt of <i>Swarna Pishti</i> (g) |
|-------|--------------------------------|-------------------------|--------------|--------------------------------|
| SBMV | 30 | 240 | 1 | 270 |

Table 3: Observations of *Kajjali* preparation

| Batch | Wt of <i>Swarna Pishti</i> (g) | Wt of S. <i>Gandhaka</i> (g) | Total | <i>Nischandratva, Rekhapurnatva</i> of <i>Kajjali</i> (H) | Total <i>Mardana</i> period (h) | Wt of <i>Kajjali</i> after Trituration (g) | Wt loss during Trituration (g) |
|-------|--------------------------------|------------------------------|-------|---|---------------------------------|--|--------------------------------|
| SBMV | 270 | 480 | 750 | 12 | 24 | 718 | 32 |

Table 4: Observations *Bhavana* processing of *Kajjali*

| Batch | Wt of <i>Kajjali</i> after Trituration (g) | Juice of <i>Japakusum</i> (ml) | Total milling period (h) | <i>Kumari Swarasa</i> (ml) | Total milling period (h) | Wt of <i>Kajjali</i> after <i>Bhavana</i> | Wt increased due to <i>Bhavana</i> (g) |
|-------|--|--------------------------------|--------------------------|----------------------------|--------------------------|---|--|
| SBMV | 738 | 200 | 3 | 200 | 3 | 759 | 21 |

Table 5: Batch wise distribution of *Shadguna Balijarita Makaradhwaja* in *Valuka Yantra*

| Batch | No. of <i>Kupi</i> | Sub batch | Wt of <i>Kajjali</i> (g) | Duration of heat (h) |
|-------|--------------------|-----------|--------------------------|----------------------|
| SBMV | 3 | SBMV 1 | 253 | 16 |
| | | SBMV 2 | 253 | 16 |
| | | SBMV 3 | 253 | 16 |

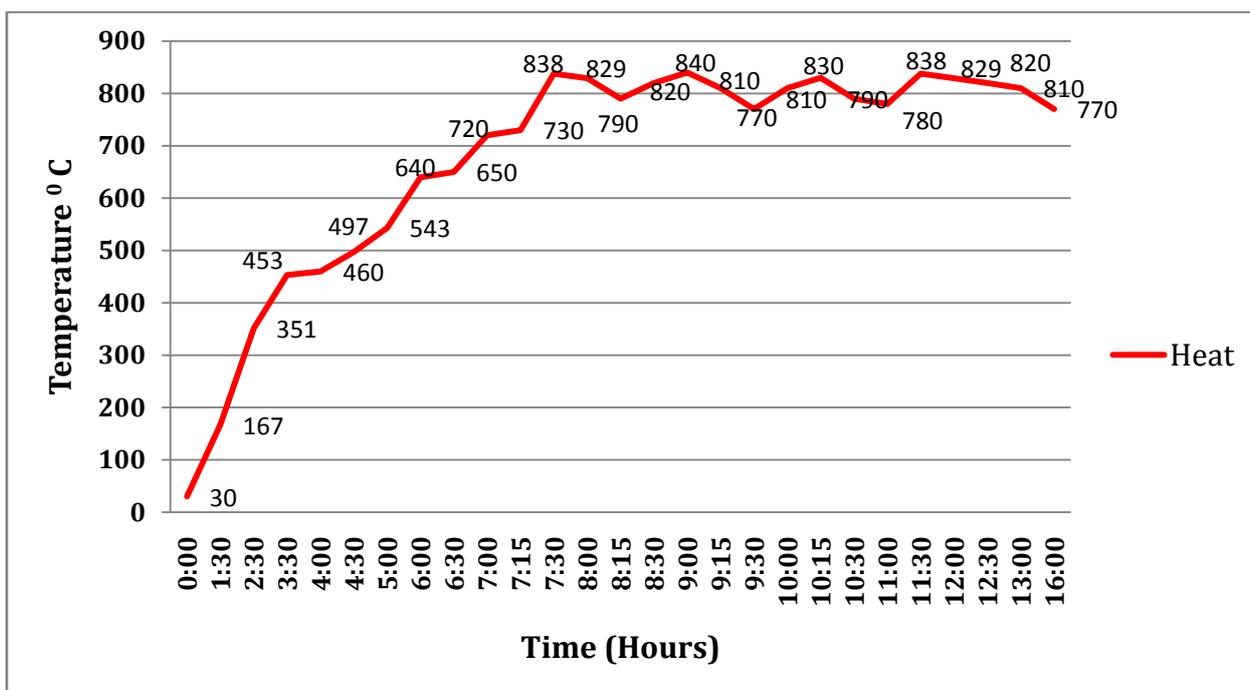
Table 6: Mean Observations *Kupipaka* of three batches of SBMV

| Time (h) | Quantity of fuel (kg) | | Temp. recorded (°C) | Observation |
|----------|-----------------------|-------------|---------------------|---|
| | Hard Coal | Wooden coal | | |
| 00:00 | 04 | 02 | 30 | Black fumes of cow dung cake (<i>Agni sthapna</i>) |
| 01:30 | 00 | 01 | 167 | Whitish Fumes started |
| 02:30 | 00 | 01 | 351 | Fumes was increasing with yellow color. |
| 03:30 | 00 | 01 | 453 | Fumes was increasing |
| 04:00 | 00 | 01 | 460 | Fumes was increasing |
| 04:30 | 00 | 01 | 497 | Fumes was increasing |
| 05:00 | 02 | 01 | 543 | Fumes was increasing dark yellow colored |
| 06:00 | 03 | 01 | 640 | Profuse fumes at the neck of <i>Kupi</i> with reddish yellow color |
| 06:30 | 00 | 00 | 650 | Bluish colored flame appeared at the neck of the <i>Kupi</i> at 6:35 |
| 07:00 | 00 | 00 | 720 | Flame was decreasing gradually |
| 07:15 | 00 | 00 | 730 | 80 g of <i>Shuddha Gandhaka</i> was inserted through mouth of <i>Kupi</i> |
| 07:30 | 04 | 01 | 838 | Flame was increasing gradually |
| 08:00 | 00 | 00 | 829 | Flame was decreasing gradually |
| 08:15 | 00 | 00 | 790 | 80 g of <i>Shuddha Gandhaka</i> was inserted through mouth of <i>Kupi</i> |
| 08:30 | 04 | 01 | 820 | Flame was increasing gradually |
| 09:00 | 00 | 00 | 840 | Flame was decreasing gradually |
| 09:15 | 00 | 00 | 810 | 80 g of <i>Shuddha Gandhaka</i> was inserted through mouth of <i>Kupi</i> |
| 09:30 | 04 | 01 | 770 | Flame was increasing gradually |
| 10:00 | 00 | 00 | 810 | Flame was decreasing gradually |
| 10:15 | 00 | 00 | 830 | 80 g of <i>Shuddha Gandhaka</i> was inserted through mouth of <i>Kupi</i> |
| 10:30 | 04 | 01 | 790 | Flame was increasing gradually |
| 11:00 | 00 | 00 | 780 | Flame was decreasing gradually |

| | | | | |
|-------|----|----|-----|---|
| 11:30 | 04 | 01 | 838 | At 11:40 hours Flame disappeared totally and corking was done |
| 12:00 | 00 | 00 | 829 | Self cooling |
| 12:30 | 00 | 00 | 820 | Self cooling |
| 13:00 | 00 | 00 | 810 | Self cooling |
| 16:00 | 00 | 00 | 770 | Self cooling |

Table 7: Results of Shadguna Balijarita Makaradhwaja in Valuka Yantra

| Batch | No. of Kupi | Sub batch | Wt of Kajjali (g) | Wt of Gandhaka added during Kupipaka (g) | Makaradhwaja (g) | Residue (g) |
|--------------|-------------|-----------|-------------------|--|------------------|--------------|
| SBMV | 3 | SBMV1 | 253 | 320 | 32 | 20 |
| | | SBMV2 | 253 | 320 | 38 | 18 |
| | | SBMV3 | 253 | 320 | 27 | 17 |
| Total | | 3 | 759 | 680 | 97 | 55 |
| Avg. | | | | | 32.33 | 18.33 |



Graph 1. Temperature pattern Graph of Shadguna Balijarita Makaradhwaja prepared in Valuka Yantra

Legends for figures



Fig 1. Shuddha Swarna Patra



Fig 2. Swarna Varkha and Hingulottha Parada Amalgamation



Fig 3. Swarna Pishti Preparation



Fig 4. Shadguna Balijarita Makaradhwaja preparation in classical Valuka Yantra (Appearance of fume)



Fig 5. Shadguna Balijarita Makaradhwaja preparation in classical Valuka Yantra (Appearance of flame)



Fig 6. Sublimed Shadguna Balijarita Makaradhwaja



Fig 7. Powdered Shadguna Balijarita Makaradhwaja