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Pharmaceutical Study of Kanta Lauha and Teekshna Lauha Bhasma

Research article

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Abstract

The *Ayurvedic medicines* are formulated by using plant, animal, metal and minerals. Conversion of metals and minerals into acceptable form i.e. *bhasma* is a unique technology of *Ayurveda*. Certain technical procedures like *Sodhana, Marana* (Incineration process) etc. will play a greater role in converting the material into acceptable form. GMP provides certain directions for processing these medicines in present day. Standard operative procedure, particularly for *bhasma* preparation has become mandatory for the standardization and quality control of *bhasmas.* By considering these views in present research work the different samples of *lauha bhasma* were prepared by using different raw materials viz. Magnetite iron ore, iron turnings. As per the description of *Ayurveda, Kanta lauha* (Magnetite iron ore) is considered as best raw material for *lauha bhasma* preparation. After this next best raw material for *lauha bhasma* preparation is *Teekshna lauha* (iron turnings). The availability of *Kanta lauha* (magnetite iron ore) is rare, hence in many *Ayurvedic pharmaceutical industries, lauha bhasma* is prepared by *Teekshna lauha*. In the present work a step is made to find out the best quality of *lauha bhasma* by preparing various samples of *lauha bhasma*.

Key words: Teekshna lauha, Kanta lauha, bhasma, Sodhana, Marana

Introduction

Ayurveda is the science of life dealing with healthcare of living being since ancient period. The Ayurvedic drugs are obtained from natural sources only i.e. from plants, animals and minerals. Conversion of metals and minerals into acceptable form i.e. *bhasma* is a unique technology of *Ayurveda*. Various procedures like *Sodhana, Marana* (Incineration process) etc. applied for the preparation of bhasma, will play a greater role in converting the material into acceptable form. By considering these views in present research work the different samples of *lauha bhasma* were prepared by using different raw materials viz. Magnetite iron ore, iron turnings. In Ayurvedic literature, *Kanta lauha* (Magnetite iron ore) is considered as best raw material for *lauha bhasma* preparation. After this next best raw material for *lauha bhasma* preparation is *Teekshna lauha* (iron turnings). The availability of *Kanta lauha* (magnetite iron ore) is rare, hence in many *Ayurvedic pharmaceutical industries, lauha bhasma* is prepared by *Teekshna lauha*. In the present work a step is made to find out the best quality of *lauha bhasma* by preparing various samples of *lauha bhasma*. Two

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samples of *Kanta lauha* and one sample of *Teekshna lauha* was used for the preparation of *lauha bhasma.*

Materials and Methods

In present thesis work, the pharmaceutical study was conducted in three batches which are mentioned below.

Batch "A" : *Teekshna lauha* (Iron turning)

Batch "B" : *Kanta lauha* (Magnetite iron ore)

Batch "C" : *Kanta lauha* (Magnetite iron ore)

Procurement of Raw Material

- *Teekshna lauha* (Iron Turnings) were collected from Dept. Of Metallurgy, IT, BHU, VARANASI.
- *Kanta lauha* (Magnetite iron ore) were collected from NML Jamshedpur (JHARKHAND).
- *Tila taila* was collected from *Ayurvedic Pharmacy*, BHU, VARANASI.
- *Gomutra* was collected from Dairy farm, Institute of Agriculture sciences, BHU, VARANASI.
- *Triphala* and *Kulattha* collected from Gola Dinanath, VARANASI.

Pharmaceutical Processing

(I) Sodhana

(A) Samanya Sodhana

(a) Preparation of *Takra*, (b) Preparation of *Kanji*, (c) Preparation of *Kulattha Kwatha*, (d) Process of *Samanya Sodhana*

(B) Visesha Sodhana

(a)Preparation of *Triphala Kwatha*, (b)Process of *Visesha Sodhana*

(II) Marana

(A) *Bhanupaka*

(a) Preparation of *Triphala Kwatha*, (b) Process of *Bhanupaka*

(B) *Sthalipaka*

(a) Preparation of *Triphala Kwatha*, (b) Process of *Sthalipaka*

(C)*Putapaka*

(a) Preparation of *Triphala Kwatha*, (b) Process of *puta paka*

(a) Preparation of *takra* [1]

- Principle- Churning
- Ingredients- Curd, Water
- Equipments- Container, mixer

Method: Curd along with water (half the amount of curd) was taken and it was mixed homogeneously with the help of mixer grinder. After proper mixing whole butter portion of *takra* were removed. Then it was used for *samanya sodhana* of *lauha.*

Chief desired character

Viscosity of curd was changed. Curd was homogenously mixed with water. Test of *takra* was *amla rasa*.

(b) Preparation of *kanji*[2]

- Principle- Fermentation
- Ingredients- Rice, Water, *Masha*, *Redish.*
- Equipments- Heating device, Stainless steel container, Plastic container, Spatula.

Method: First the rice and *masha* (in appropriate quantity) were cooked properly by adding sufficient quantity of water. After cooking the material, small pieces of radish were added into it. Then whole material was transferred into a plastic container. Then the mouth of container was tightly closed and kept for fermentation for 15-20 days. After the completion, test (Sound, Match stick and *Amla rasa*.) was performed and prepared *kanji* was collected for *sodhana* process.

Completion test

Hissing sound was not produced. Match stick was burning continuously when it was kept over the mouth of container.

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Taste of *kanji* was *amla rasa*. Whitish colour of *kanji* was appeared.

(c) Preparation of *kullatha kwatha*

- Ingredients- *Kullatha*- 6 kg., Water- 48 lit.
- Equipments- Heating device, Stainless steel container, Spatula, Cotton cloth etc.

Method: Above mentioned quantity of *kullatha* and water was taken in an iron container and it was subjected to boiling on mild temperature till 1/4th part of the water reduces. Then it was used for *samanya sodhana* of *lauha*.

Batch "A" – *Teekshna lauha* (Iron turnings)

(A) *Process of Samanya Sodhana*

- Apparatus- *Koshti*, Iron container, Spatula, Iron mesh etc.
- Ingredients- *Lauha* (Iron turnings)-500 gm.
- *Tila taila*- QS.
- *Takra* - QS.
- *Gomutra*- QS.
- *Kanji*- QS.
- *Kullatha Kwatha*- QS.

Samanya Sodhana* by *tila taila

Method: Iron turnings were collected in an iron container which was kept over the *koshti* (furnace) and heated the material till it becomes red hot. Thereafter this material was quenched in *tila taila*, which was collected in another container. Same procedure was repeated six more times (Total seven times). Each time fresh *tila taila* was taken (Approx. 500ml). After completion, material was filtered by iron mesh and dried it.

- Average temp. of heating device : 1100^{0}C
- Average temp. of surface of container : 1000^{0}C
- Average temp. of red hot iron turning : 900^{0}C

Observations: First time iron turning took 28 minute to become red hot. The duration was lowered at later stages. When red hot iron turning was quenched in *tila taila*, it was kept the fire promptly. Colour of iron turning was turned from shiny to black. It was sticky in nature due to adhesion of *tila taila* on the surface of iron turnings. On next heating iron turning was also catch the fire

Samanya Sodhana* by *Takra

Method: After *sodhana* by *tila taila* iron turnings were collected in an iron container which is kept over the *Koshti* (furnace) and heated the material till red hot. Thereafter this material was quenched in *takra*, which was collected in another container. Same procedure was repeated six more time (Total seven times). Each time fresh *takra* was taken. Then material was filtered by iron mesh and dried it.

Observation: Iron turning took 15-20 minute to get red hot state for first time then time duration was further lowered. After quenching *takra* was started boiling. Iron turning get started to convert into smaller pieces. Some fine particles of iron were come out from vessel during quenching. Colour of iron turned to grayish black. Colour and consistency of *takra* was also changed after quenching.

***Samanya Sodhana* by *Gomutra*-**

Method : After *sodhana* by *takra*, iron turnings were collected in an iron container which is kept over the *koshti* (furnace) and heated the material till red hot. Thereafter this material was quenched in *Gomutra*, which was collected in another container. Same procedure was repeated six more time (Total seven times) each time fresh *Gomutra* was taken. Then material was filtered by iron mesh and dried it.

Observations: After quenching peculiar smell was observed. Colour of cow urine changed from yellow to blackish red.

Colour of iron turning also changed from black to reddish brown. Iron turning was decreasing in size further.

Samanya Sodhana* by *Kanji

Method: Iron turnings were collected in an iron container which is kept over the *koshti* (furnace) and heated the material till red hot. Thereafter this material was quenched in *Kanji*, which was collected in another container. Same procedure was repeated six more time (Total seven times). Each time fresh *Kanji* was taken. Then material was filtered by iron mesh and dried it.

Observations: Iron turnings took 10-12 min. to obtain red hot state. Further it was lowered. *Kanji* was started boiling after quenching the red hot iron turnings. Iron turnings were converted to smaller pieces. Colour of iron turning was also changed from reddish brown to black.

Samanya Sodhana* by *Kullatha Kwath

Iron turnings were collected in an iron container which was kept over the *koshti* (furnace) and heated the material till red hot. Thereafter this material was quenched in *Kullatha kwatha*, which was collected in another container. Same procedure was repeated six more time (Total seven times) each time fresh *Kullatha kwatha* was taken. Then material was filtered by iron mesh and dried it.

Observations: Iron turnings took 08-10 min. to obtain red hot state. Further it was lowered. *Kullatha kwatha* started boiling after quenching. Colour of *kullatha kwatha* was changed after quenching from red to blackish red. Particle of iron turning become smaller.

(B) *Visesha Sodhana* of *lauha*

(a) Preparation of *Triphala kwatha* for Visesha *sodhana*[3]

- Principle- Heating.
- Equipments- Heating devices, Stainless steel container, Spatula, Iron mesh etc.
- Ingredients- *Lauha* (Iron turnings)- 520gm
  Triphala kwatha - QS. (Approx. 600ml)

(b) Process of *Visesha sodhana*

Method: *Samanya sodhita Teekshna Lauha* (iron turnings) was collected in an iron container which was kept over the *koshti* (furnace) and heated the material till into red hot state. Thereafter this material was quenched in *Triphala kwatha*, which was collected in another container. Same procedure was repeated six more time (total seven times). Each time fresh *Triphala kwatha* was taken. Then material was filtered by iron mesh and dried it.

Table No. 1. Showing observations before and after *Visesha sodhana* of *Teekshna lauha* (Iron turning).

Iron turning	Before *Visesha Sodhana*	After *Visesha Sodhana*
Colour	Black	Dark black
Consistency	brittle	More brittle
Appearance	Small peaces	More small peaces
Weight	520 gm	610 gm

Reason of wt. gain: Due to adding of contents of *Triphala kwatha*. Out of this 10gm was taken as sample for analysis.

(II) *Marana* of *lauha*

For the marana of *lauha Rasendra Sara Samgraha* was followed, in this text process of marana is completed in three steps, they are as follow-

(I) *Bhanupaka,* (II) *Sthalipaka,* (III) *Putpaka*

(I) *Bhanupaka*

Equipments required- iron tray**,** spatula'

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Ingredients- Lauha *churna*- 600 gm. *Triphala kwatha*- QS.

Preparation of *Triphala Kwatha* for *Bhanupaka*[4]

Method : Triphala along with double the amount of water was boiled till it reduced to 1/4th the volume of water.

Method of *Bhanupaka:* *Lauha churna* collected from *Visesha sodhana* was kept in an iron tray and *Triphala Kwatha* added till completely dipped the *lauha churna* (Approx. 300ml.). Thereafter material was mixed together uniformly and tray was kept in sunlight till the moisture contents evaporate completely. Same process was repeated for six more times (total seven times).

Observations: It was taking 2-3 days for completely drying. Colour of *lauha churna* was turned to dark black. Big particles of *lauha churna* were converted into fine particles. Brittleness of *lauha churna* was increased.

(II)*Sthalipaka*[5]

Equipments required- Heating device, iron container**,** spatula.

Ingredients- *Lauha churna*- 1300 gm. *Triphala kwatha*- QS.

Preparation of *Triphala kwatha* for *sthalipaka*

Procedure – *Triphala kwatha* is prepared by taking *triphala* three times of lauha, 16th times of water was added to it. The whole material is boiled in stainless steel container to reduce to 1/8th of original volume of water.

Method of *sthalipaka:* First of all the amount of *lauha churna* was taken in an iron container (frying pan or cauldron) and *triphala kwatha* was added in sufficient quantity. Then it was subjected to kept over the heating device and get intense heat till completely evaporated the water contents of *triphala kwatha*. This process was repeated for six more times (Total seven times). (R.T.20/25-30, R.S.S.1/308)

Observations: During heating it was adhering to the surface of the container. Fumes were appearing due to burning of *triphala.* Smell of burning *triphala* was observed. Colour of *lauha churna* was turned to grayish black.

(II) *Putpaka*[6]

Equipments required- Earthen pot, Electric muffle furnace, Mortar and pestle etc.

Ingredients- *Lauha churna*- 2280 gm. *Triphala Kwatha*- QS.

According to *Rasendra sara sangraha lauha bhasma* should be prepared by triturating with *swarasa* of *triphala* and subjected to *puta*. But in case of unavailability of the *swarasa*, *bhasma* should be prepared by *triphala kwatha*.

Method: Above mentioned quantity of *lauha churna* was triturated in Mechanized *kharal* with *Triphala Kwatha* and then it was subjected to made *chakrika* (pallets) then dried till the completely get loss the moister contains. There after these pallets were collected into small earthen pot *(sarava)* and placed uniformly, after this earthen pot was covered by same size another earthen pot and prepared a structure like *samputa*. After this, the *samputa* was kept in electric muffle furnace and temperature gradually increased up to 600^0c, Frequency 30 and maintained for one hour. Then the furnace was switched off and left for self cooing. The next day after the *swangasitala* the *samputa* was collected and opened and internal pellets were collected. Same process of *puta* was repeated till proper *Bhasma* was not prepared (total 20 times).

The observation of pallets and materials at different no. of *putas* is mentioned below.

***1st puta*:**It was taking 8 hour to get converted in pest like structure to made pellets. Due to coarse powder of materials, it was very difficult to made pellets. Temperature was set at 600^0C and frequency at 30. It was attain in 1 hour and 10 min. During *puta* fumes with specific

odour were observed, when temperature was reached at 150^0C. After *puta* colour of pellets was black. Surface of pellets was rough. After *puta* whole material was remain half of the original volumes, because of *triphala* contents which were added during *bhanupaka* and *sthalipaka*, burnt during *putapaka*.

***2nd puta*:** Material was triturated Approx. 6 hour. Pellets were made easily due to it was finer than previously. Surface of pellets were rough. Temperature was same as previous. After *puta* colour of pellets was blueish black. But surface of some pellets were brown in colour. After trituration it was again black in colour.

***3rd puta*:** Material was triturated Approx. 6 hour. Particle size of *lauha bhasma* was also decrease. Colour of pellets was reddish brown on the superior surface but inferior surface are black in colour. After trituration it was turned to grayish black. Temperature setting was same as previous. After *puta* pellets were soft and easily breakable by hand.

***4th puta*:** Same as previous.

***5th puta*:** Pellets were soft in consistency and easily breakable. Colour of pellets was reddish brown. Surface of pellets was smooth.

***6th puta*:** Pellets were soft in consistency and easily breakable. Colour of pellets was reddish brown.Surface of pellets was smooth.

***7th puta*:** Same as previous *puta.*

8th *Puta*: Pellets were soft they were getting broken by mild pressure of finger. Colour of pellets was same as previous.

9th *Puta*: Same as previous *puta.*

10th *Puta*: Hardness of pellets was increased. Colour of pellets was turned to reddish black. Black spots were found over some pellets.

11th *Puta*

Observation: Same as previous.

12th *Puta*: Pellets were hard on breaking by hand. Bhasma was become *Rekhapurna* about 40%. Material was become sticky after triturating in *khalva*.

13th *Puta*: Same as previous.

14th *Puta*: Same as previous.

15th *Puta*: Pellets were little hard. Blackish spots were found on the surface of pellets. *Bhasma* was became 50% rekhapurna. 40%bhasma was found positive in *varitara* test. Loss of material-20gm.

16th *Puta*: Colour of *bhasma* was turned to blackish red i.e. *pakvajambuphala varna*. *Bhasma* was 60% *rekhapurna*. It was 50% found positive in *varitara* test. On the trituration material became sticky in nature.

17th *Puta*: On trituration in *kharal* gritty appearance of *bhasma* was observed. Colour of *bhasma* was same as previous puta. *Bhasma* was 65% *rekhapurna*. 50%*bhasma* was found positive in *varitara* test.

18th *Puta*: Pellets were now soft and could be broken easily by hand. Colour of *bhasma* was blackish red. *Bhasma* was 70% *rekhapurna*. 60% *bhasma* was found positive in *varitara* test.

19th *Puta*: Pellets were soft and could be broken easily by hand. Colour of *bhasma* was blackish red. *Bhasma* was 75% *rekhapurna*. 65% bhasma was found positive in *varitara* test.

20th *Puta*: Pellets were soft and could be broken easily by hand. Colour of *bhasma* was blackish red i.e. *pakvajambuphala Varna*. *Bhasma* was 95% *rekhapurna*. 75% bhasma was found positive in *varitara* test.

BATCH "B": Batch "B" was prepared at the same method and same temperature which was adapted for batch "A". Details of findings and observations are given below.

Batch "B"– *Kanta lauha* (Magnetite iron ore)

Samanya Sodhana* by *tila taila

Method-Same as batch A

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Observations: First time *Kanta lauha* took 20 minute to obtain red hot state. The duration was lowered at later stages. When red hot *Kanta lauha* was quenched in *tila taila*, it was also kept the fire same as *Teekshna lauha*. Colour of *Kanta lauha* was turned from brownish black to dark black. It was sticky in nature due to adhesion to *tila taila* on the surface of *Kanta lauha*. After first time *Kanta lauha* was also catch the fire on next heating.

Samanya Sodhana* by *Takra

Method-Same as Batch A

Observations: First time *Kanta lauha* took 20 minute to obtain red hot state. The duration was lowered at later stages. When red hot *Kanta lauha* was quenched in *takra*, it was stared boiling. Colour of *Kanta lauha* was dark black. Colour of *takra* was also changed. After quenching big particle of *Kanta lauha was* break into smaller size.

Samanya Sodhana* by *Gomutra

Method-Same as Batch A

Observation: *Lauha* took 15 min. to get red hot state for first time then time duration was further lowered. After quenching peculiar smell was observed. Colour of cow urine was changed from yellow to reddish black. Colour of *Kanta lauha* was also changed from black to reddish black. *Kanta lauha* was decreasing in size further.

***Samanya Sodhana* by *Kanji*-**

Method – Same as Batch A

Observations: *Kanta lauha* took 10-12 min. to obtain red hot state. Further it was lowered. *Kanji* was started boiling after quenching the red hot *Kanta lauha*. *Kanta lauha* were converted to smaller pieces. Colour of *Kanta lauha* was black. Colour of *Kanji* was also changed.

Samanya Sodhana* by *Kullatha Kwatha

Method- Same as Batch A

Observations: *Kanta lauha* took 08-10 min. to obtain red hot state. Further it was lowered. *Kullatha kwatha* was started boiling after quenching. Colour of *kullatha kwatha* was changed after quenching from red to blackish red. Particle of *Kanta lauha* become smaller.

(B) *Visesha Sodhana* of *lauha*

Method- Same as Batch A

Table No. 2. Showing observations before and after *Visesha sodhana* of *Kanta lauha* (Magnetite iron ore).

Kanta lauha	**Before *Visesha Sodhana***	**After *Visesha Sodhana***
Colour	Brownish black	Dark black
Consistency	brittle	More brittle
Appearance	Small peaces	More small peaces
Weight	500gm	530gm

(II) *Marana* of *Kanta lauha:* Same as Batch A

(I) *Bhanupaka-*

Equipments required- iron tray**,** spatula'

Ingredients- *Kanta Lauha churna-* 510 gm. *Triphala kwatha-* QS.

Preparation of *Triphala Kwatha* for *Bhanupaka*: Same as Batch A

Method of *Bhanupaka:* Same as Batch A

Observations: It was taking 2-3 days for completely drying for first *avartana.* First time quantity of *triphala kwatha* was 300ml to be used and further it was slightly increased. Colour of *Kanta lauha churna* was dark black. Big particles of *Kanta lauha churna* were converted into small particles. After completion quantity of *Kanta lauha* was increased about two to three times of original weight.

(II) *Sthalipaka*

Equipments required- Heating device, iron container**,** spatula.

Ingredients- *Lauha churna*- 1240 gm. *Triphala kwatha*- QS.

Method of *sthalipaka:* Same as Batch A

Observations: During heating it was adhering to the surface of the container. Fumes and odour was appearing due to burning of *triphala.* Colour of *Kanta lauha churna* was turned to grayish black.

(III) *Putpaka*

Equipments required- Earthen pot, Electric muffle furnace, Mortar and pestle etc. **Ingredients-** *Lauha churna*- 1960 gm. *Triphala Kwath*- QS.

Method: Same as Batch A

***1st puta*:** It was taking 8 hours to get convert into pest like structure to make pellets. Due to coarse powder of materials, it was very difficult to make pellets. Temperature was set at 600^0C and frequency at 30. It was attain in 1 hour and 10 min. During *puta* fumes with specific odour were observed, when temperature was reached at 200^0C. After *puta* colour of pellets was black. Surface of pellets was rough. After *puta* whole material was remain half of the original volumes, because of *triphala* contents which were added during *bhanupaka* and *sthalipaka*, burnt during *putapaka*. After triturating again powder was converted into black colour.

***2nd puta*:** Material was triturated approx. 6 hours. Pellets were made easily due to it was finer than previously. Surface of pellets were rough. After *puta* colour of pellets was bluish black. But surface of some pellets were brown in colour. *Pellets* were soft and easily breakable by hand. After trituration it was again black in colour.

***3rd puta*:** Material was triturated approx. 6 hours. Particle size of *lauha bhasma* was also decrease. Colour of pellets was reddish brown on the superior surface but inferior surface was black in colour. After *puta,* pellets were looking like tattered. After trituration it was turned to black. After *puta* pellets were soft and easily breakable by hand.

***4th puta*:** Pellets were soft in consistency which is easily breakable by hand. Colour of pellets was reddish brown but inside it was black. After trituration it was brown in colour.

***5th puta*:** Pellets were soft in consistency and easily breakable. Colour of pellets was reddish brown. Surface of pellets was slightly rough. 25% bhasma was rekhapurna.

***6th puta*:** Same as previous *puta*.

***7th puta*:** Same as previous *puta*.

8th *Puta*: Pellets were soft they were getting broken by mild pressure of finger. Colour of pellets was same as previous.

9th *Puta*: Same as previous *puta.*

10th *Puta*: Pellets were little hard then previous. Colour of pellets was turned to reddish black. Surface of pellets was smooth. 40% *bhasma* was found positive in *rekhapurna* test.

11th *Puta*: Same as previous.

12th *Puta*: Pellets were soft on breaking by hand. *Bhasma* was become *Rekhapurna* about 50%. Material was rough during triturating in *khalva*.

13th *Puta*: Same as previous.

14th *Puta*: Same as previous.

15th *Puta*: Pellets with little hard and Blackish spots were found on the surface of pellets. *Bhasma* was became 60% *rekhapurna*. 50% *bhasma* was found positive in *varitara* test.

16th *Puta*: Colour of bhasma was turned to blackish red i.e. *pakvajambuphala varna. Bhasma* was 75% *rekhapurna*. It was 60% *varitara*. On the trituration material was rough in nature.

17th *Puta*: On trituration in *kharal bhasma* was blackish red in colour. *Bhasma* was 85% *rekhapurnna*. 70% *bhasma* was found positive in *varitara* test.

18th *Puta*: Pellets were now soft and easily breakable by hand. Colour of *bhasma* was

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blackish red i.e. *pakvajambuphala varna. Bhasma* was 95% *rekhapurna*. 75% *bhasma* was found positive in *varitara* test.

BATCH "C": Batch "C" was prepared at the same method and same temperature which was adapted for batch A. Detail of findings and observations are given below.

Batch "C"– *Kanta lauha* (Magnetite iron ore)

Samanya Sodhana* by *tila taila

Method-Same as batch A

Observation -Same as Batch B

Samanya Sodhana* by *Takra

Method-Same as Batch A

Observations: First time *Kanta lauha* took 15 minute to obtain red hot state. The duration was lowered at later stages. When red hot *Kanta lauha* was quenched in *takra*, it was stared boiling. Colour of *Kanta lauha* was dark black. Colour of *takra* was also changed from white to blackish. Big particles of *Kanta lauha was* breaking into smaller size.

Samanya Sodhana* by *Gomutra-

Method-Same as Batch A

Observations: Iron took 15 min. to get red hot state for first time then time duration was further lowered. After quenching peculiar smell was observed and *Gomutra* get started boiling. Colour of cow urine was changed from yellow to reddish black.Colour of *Kanta lauha* was also changed from black to reddish black. *Kanta lauha* was decreasing in size further.

Samanya Sodhana* by *Kanji-

Method – Same as Batch A

Observations: *Kanta lauha* took 10-12 min. to obtain red hot state. Further it was lowered. *Kanji* was started boiling after quenching the red hot *Kanta lauha*. *Kanta lauha* were converted to smaller pieces. Colour of *Kanta lauha* was black. Colour of *Kanji* was also changed from whitish to blackish.

Samanya Sodhana* by *Kullatha Kwath

Method- Same as Batch A

Observations: *Kanta lauha* took 10-12 min. to obtain red hot state. Further it was lowered. *Kullatha kwatha* was started boiling after quenching the *Kanta lauha*. Colour of *kullatha kwatha* was changed after quenching from red to blackish red. Particle of *Kanta lauha* become smaller.

B) *Vishesha Sodhana* of *lauha*

(b) Process of *Vishesha sodhana*

Ingredients- *Kanta lauha* (Magnetite iron ore) - 480 gm. *Triphala kwatha* - QS.

Method- Same as Batch A

Table No. 3. Showing observations before and after *Visesha sodhana* of *Kanta lauha* (Magnetite iron ore).

Kanta Lauha	**Before *Vishesha Sodhana***	**After *Vishesha Sodhana***
Colour	Brownish black	Dark black
Consistency	brittle	More brittle
Appearance	Small peaces	More small peaces
Weight	480gm	510gm

Reason of wt. gain-Because adding of contents of *Triphala kwatha*. Out of this 20 gm was taken as sample for analysis.

(II) *Marana* of *Kanta lauha:* Same as Batch A

(I) *Bhanupaka-*

Equipments required- iron tray**,** spatula'

Ingredients- *Kanta Lauha churna-* 490 gm. *Triphala kwatha-* QS.

Method: Same as Batch A

Method of *Bhanupaka:* Same as Batch A

Observations: It was taking 2-3 days for completely drying for one *avartana.* First time quantity of *triphala kwatha* was 300 ml to be used and further it was increased. Colour of *Kanta lauha churna* was dark black. Big particles of *Kanta lauha churna*

were converted into smaller particles. Brittleness of *Kanta lauha* was increased.

Reason of wt. gain-Because addition of some solid contents of *triphala kwatha* with the *Kanta lauha*.

(II) *Sthalipaka*

Equipments required- Heating device, iron container**,** spatula etc.

Ingredients- *Lauha churna*- 1225 gm. *Triphala kwatha*- QS.

Method of *sthalipaka:* Same as previous batch

Observation: Same as previous batch

(II) *Putpaka*

Equipments required: Earthen pot, Electric muffle furnace, Mechanized *kharala* etc.

Ingredients: *Lauha churna*- 1735 gm. *Triphala Kwath*- QS.

Method Same as Batch A

***1st puta*:** It was taking 8 hour to get converted in pest like structure to made pellets. Due to coarse powder of materials, it was very difficult to made pellets. Temperature was set at 600^0C and frequency at 30. It was attain in 1 hour and 10 min. After *puta* colour of pellets was black. Surface of pellets was rough and cracked. After *puta* whole material was remain half of the original volumes, because of *triphala* contents which were added during *bhanupaka* and *sthalipaka*, burnt during *putapaka*. After triturating again powder was converted into black colour.

***2nd puta*:** Material was triturated Approx. 6 hour. Some particles of *Kanta lauha* was remain as such which are not converted into powder form. Surface of pellets were rough. After *puta* colour of pellets was bluish black. But surface of some pellets was brown in colour. Pellets were soft and easily breakable by hand. After trituration it was again black in colour.

***3rd puta*:** Same as batch B

***4th puta*:** Pellets were soft in consistency and easily breakable by hand. Colour of pellets was reddish brown but inside it was black. After trituration *bhasma* was brown in colour.

***5th puta*:** Pellets were soft in consistency and easily breakable. Colour of pellets was reddish brown. Surface of pellets was rough. 20% bhasma was *rekhapurna*.

Reason of loss: Because burning of triphala contents. Out of this 20gm was taken as sample for analysis.

***6th puta*:** Same as previous puta.

***7th puta*:** Colour of pellets was light red. Consistency of pellets was soft. Surface of pellets was rough.

8th *Puta*: Pellets were soft they were getting broken by mild pressure of finger. Colour of pellets was same as previous.

9th *Puta*: Pellets which were kept over the periphery remains blackish, but inner pellets were reddish brown in colour. *Bhasma* was 40% *rekhapurna*

10th *Puta*: Pellets were little hard then previous. Colour of pellets was turned to reddish black. Surface of pellets was smooth. 45% *bhasma* was *rekhapurna*.

11th *Puta*: Same as previous.

12th *Puta*: Pellets were soft on breaking by hand. 50% *Bhasma* was *Rekhapurna*. Material was rough during triturating in *khalva*.

13th *Puta*: Same as previous.

14th *Puta*: Same as previous.

15th *Puta*: Pellets were little hard. Colour of pellets was slightly blackish red. *Bhasma* was became 60% *rekhapurna*. 50% *bhasma* was found positive in *varitara* test.

16th *Puta*: Colour of *bhasma* was turned to blackish red i.e. *pakvajambuphala varna*. *Bhasma* was 80% *rekhapurna*. It was 65% *varitara*. On the trituration material was rough in nature. Weight of material after *Bhavana*- 425 gm. Weight of material after *puta*-420 gm.

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17th *Puta*: Pellets were soft in consistency then *Teekshna lauha.* On trituration in *kharal* bhasma was blackish red in colour. *Bhasma* was 85% found in *rekhapurnna* test. 70% *bhasma* was found positive in *varitara* test.

18th *Puta*: Pellets were now soft and easily breakable by hand. Colour of *bhasma* was blackish red i.e. *pakvajambuphala varna. Bhasma* was 95% *rekhapurna*. 75% *bhasma* was found positive in *varitara* test.

Discussion:

Conversion of metals and minerals into acceptable form i.e. *bhasma* is a unique technology of *Ayurveda*. This pharmaceutical study was done on the basis of *Resendra Sara Samgraha* to find out the best method for the preparation of *lauha bhasma*, as well as find out the best *lauha bhasma.* in this study it was found that *kanta lauha* is best for *bhasma* and next is *teekshna lauha*. *Kanta lauha bhasma* was well prepared in less *putas* then *teekshna* lauha.

Conclusion:

1. Certain technical procedures like *Sodhana, Marana* (Incineration process) etc. will play a greater role in converting the material into acceptable form.
2. . Here in present work a step is made to find out the best quality of *lauha bhasma* by preparing various samples of *lauha bhasma*. Two samples of *Kanta lauha* are used for preparation of *lauha bhasma* and one sample of *Teekshna lauha* is used for the preparation of *lauha bhasma*
3. *Kanta lauha Bhasma* was prepared in 18 *putas* and this *Kanta lauha Bhasma* was meeting all the best qualities of *lauha Bhasma,* where as *Teekshna lauha Bhasma* was prepared in 20 *putas.*
4. As per the description of *Ayurveda, Kanta lauha* (Magnetite iron ore) is considered as best raw material for *lauha bhasma* preparation. After this next best raw material for *lauha bhasma* preparation is *Teekshna lauha* (iron turnings).

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Table No. 4. Showing Weight of material, before and after puta.

S.No.	No. of Puta	Weight of Batch A		Weight of Batch B		Weight of Batch C	
		Before puta	**After puta**	**Before puta**	**After puta**	**Before puta**	**After puta**
1.	**1.**	2280 gm.	1500 gm.	**1960 gm.**	**1200 gm**	1735 gm.	980 gm.
2.	**2.**	1480 gm.	1000gm	1180 **gm.**	900 gm.	960 gm.	850 gm.
3.	**3.**	1000 gm.	650 gm.	900gm.	**600 gm.**	850 gm.	610 gm.
4.	**4.**	650 gm.	600 gm.	600 gm.	550 gm.	610 gm.	550 gm.
5.	**5.**	600 gm.	590 gm.	550 gm.	530 gm.	550 gm.	535 gm.
6.	**6.**	570gm.	550 gm.	510 gm.	490 gm.	515 gm.	500 gm.
7.	**7.**	550 gm.	530 gm.	490 gm.	485gm.	500 gm.	485 gm.
8.	**8.**	530 gm.	510 gm.	485gm.	480 gm.	485 gm.	480 gm.
9.	**9.**	510 gm	500 gm.	480 gm.	480 gm.	480 gm.	480 gm.
10.	**10.**	500 gm.	495 gm.	480 gm.	480 gm.	480 gm.	480 gm.
11.	**11.**	475 gm	470 gm	460 gm.	450 gm.	460 gm.	455 gm.
12.	**12.**	470 gm.	470 gm.	450 gm.	450 gm.	455 gm.	450 gm.
13.	**13.**	470gm.	460 gm.	450 gm.	450 gm.	450 gm.	450 gm.
14.	**14.**	460 gm.	460 gm.	450 gm.	440 gm.	450 gm.	440 gm.
15.	**15.**	460 gm.	455 gm.	440 gm.	440 gm.	440 gm.	440 gm.
16.	**16.**	435 gm.	435 gm.	420 gm.	420 gm.	420 gm.	420 gm.
17.	**17.**	435 gm.	435 gm.	420 gm.	410 gm.	420 gm.	410 gm.
18.	**18.**	435 gm.	430 gm.	410 gm.	400 gm.	410 gm.	400 gm.
19.	**19.**	430 gm.	430 gm.				
20.	**20.**	430 gm.	430 gm.				

Table No. 5. Showing the quantity of ingredients taken in each Puta of different batches

S. No.	No. of Puta	Batch A	Batch B	Batch C
		Ingredients in gm.	**Ingredients in gm.**	**Ingredients in gm.**
1.	**1.**	Lauha churna-2280 Triphala kwatha –QS	Lauha churna-1960 Triphala kwatha-QS	Lauha churna-1735 Triphala kwatha–QS
2.	**2.**	Lauha churna-1480 Triphala kwatha –QS	Lauha churna-1180 Triphala kwatha-QS	Lauha churna- 960 Triphala kwatha–QS
3.	**3.**	Lauha churna-1000 Triphala kwatha –QS.	Lauha churna-900 Triphala kwatha –QS.	Lauha churna- 850 Triphala kwatha-QS
4.	**4.**	Lauha churna-650 Triphala kwatha –QS.	Lauha churna-600 Triphala kwatha –QS.	Lauha churna-610 Triphala kwatha –QS
5.	**5.**	Lauha churna-600 Triphala kwatha –QS.	Lauha churna-550 Triphala kwatha –QS.	Lauha churna-550 Triphala kwatha –QS

6.	**6.**	Lauha churna-570 Triphala kwatha –QS.	Lauha churna-510 Triphala kwatha –QS.	Lauha churna-515 Triphala kwatha –QS
7.	**7.**	Lauha churna-550 Triphala kwatha –QS.	Lauha churna-490 Triphala kwatha –QS.	Lauha churna-490 Triphala kwatha –QS
8.	**8.**	Lauha churna-530 Triphala kwatha –QS.	Lauha churna-485 Triphala kwatha –QS.	Lauha churna-485 Triphala kwatha –QS
9.	**9.**	Lauha churna-510 Triphala kwatha –QS.	Lauha churna-480 Triphala kwatha –QS.	Lauha churna-480 Triphala kwatha –QS
10.	**10.**	Lauha churna-500 Triphala kwatha –QS.	Lauha churna-480 Triphala kwatha –QS.	Lauha churna-480 Triphala kwatha –QS
11.	**11.**	Lauha churna-475 Triphala kwatha –QS.	Lauha churna-460 Triphala kwatha –QS.	Lauha churna-460 Triphala kwatha –QS
12.	**12.**	Lauha churna-470 Triphala kwatha –QS.	Lauha churna-450 Triphala kwatha –QS	Lauha churna-455 Triphala kwatha –QS
13.	**13.**	Lauha churna-470 Triphala kwatha –QS.	Lauha churna-450 Triphala kwatha –QS	Lauha churna-450 Triphala kwatha –QS
14.	**14.**	Lauha churna-460 Triphala kwatha –QS.	Lauha churna-450 Triphala kwatha –QS	Lauha churna-450 Triphala kwatha –QS
15.	**15.**	Lauha churna-460 Triphala kwatha –QS.	Lauha churna-440 Triphala kwatha –QS	Lauha churna-440 Triphala kwatha –QS
16.	**16.**	Lauha churna-435 Triphala kwatha –QS.	Lauha churna-420 Triphala kwatha –QS	Lauha churna-420 Triphala kwatha-QS
17.	**17.**	Lauha churna-435 Triphala kwatha –QS.	Lauha churna-420 Triphala kwatha –QS	Lauha churna-420 Triphala kwatha –QS.
18.	**18.**	Lauha churna-435 Triphala kwatha –QS.	Lauha churna-410 Triphala kwatha –QS	Lauha churna-410 Triphala kwatha–QS.
19.	**19.**	Lauha churna-430 Triphala kwatha –QS.	-	-
20.	**20.**	Lauha churna-430 Triphala kwatha –QS.	-	-

Photo 1: Processing of Puta in Electric Muffle Furnace

Pellets of Kanta lauha after 5th Puta

Pellets of Teekshna lauha after 5th Puta

Pellets of Kanta lauha after 10th Puta

Pellets of Teekshna lauha after 10th Puta

Kanta Lauha Bhasma after 18th Puta

Teekshna Lauha Bhasma after 20th Puta

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Photo 2: Lauha Sodhana


Magnetite iron ore in Red hot state


Iron turnings in Red hot state

Photo 3: Sodhana Media


Tila taila (Sesamum oil)


Takra (Butter Milk)


Gomutra (Cow Urine)


Kanji (Sour gruel)


Kullatha Kwatha


Triphala Kwatha

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