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PHARMACEUTICAL AND ANALYTICAL STUDY OF KHAGESHWARA RASA

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ABSTRACT:

Kupipakwa Kalpas are formulations prepared by administering progressive heat is administered for a definite period of time. The final product is a generally a condensed compact formulation which is adhered to the neck (Galastha) or Base (Talastha) of the Kupi or on both (Ubhayastha). ‘Khageshwara Rasa’ is a Kupipakwa Rasayana described in Rasaratna samuchaya, Rasa yoga sagara, which is expressed as an effective remedy for managing Switra Roga, Kasa and Shwasa. The present work is a documentation on the preparation of Khageshwara Rasa. The work is presumed to be a general guideline for the preparation of this formulation. A mixture of drugs containing 60 gm each of Shodhita Parada, Shodhita Gandhaka and Shodhita Kasisa was done Paaka in Valuka Yantra. The end product obtained was 50 gm by weight. Proper assistance, observation and special precautions were required for the successful completion of this product. The chief features in this process was melting of Kajjali, elimination of Sulphur, boiling of Kajjali, liberation of Mercury as vapours, condensation of product and formation of final product which might be predominantly Ferro–Mercuric–Sulphide complex. Modern analytical parameters are required for the structural and compositional identity of the formulation.

Keywords: Kupipakwa kalpa; Khageshwara rasa; Gandhaka; Parada; Kaseesa

INTRODUCTION

The *Rasousadhis* are the back bone of the *Ayurvedic* therapeutics. It is chiefly based on metals and minerals, small dose, tastelessness, quick action and effectiveness. *Rasayana* property make *Rasoushadis* more popular and superior over the other medicines and this attract the attention of patients as well as the manufacturers. *Rasashastra* incorporates many of the organic-inorganic and herbo-mineral pharmaceutical preparations namely *Khalveeya*, *Parpati*, *Pottali*, *Kupipakwa Rasayanas*. Among these, *Kupipakwa Rasayana* is highly evolved pharmaceutical technique of manufacturing *Paradayukta Rasayogas* next to *Pottali Rasayana* which is having excellent clinical result, long lasting potency and safety even on prolonged use.

Kupipakwa Rasayana is a preparation where *Parada* is processed with other *dravyas* in *Kupi* with *Kramagni*. In this, *Pruthvi* and *Aap pradhana dravya* will get *agni samskara* for specific long period of time and it is transformed and attained into *laghu*, *sukshama guna* along with *tejo pradhana guna* by which the drug can easily enter into *Sukshma srotases* and helps in very fast and effective action of the drug in the body. In other words, it causes *sroto shodhana* and *Rasayana* effect resulting into *Dhatuposhana*.

Khageshwara Rasa^[1] is one of the *Kupipakwa Rasayana* which is *Saagni*, *Sagandha moorcchana* of *Parada*, *Gandhaka* and *Kasisa* in the ratio of 1:1:1 which are potentiated with *Agni samskara* by 16 hours through *kramagni*. This yoga is indicated in *Kasa*, *Shwasa* and *Shweta Kushta*.

Agni is important factor which changes the Physico-chemical properties of the substance. The properties of the drug depend on its chemical combination and disassociation which can be brought about by the duration and type of contact of heat.

Analytical research is one of the advanced fields in research by which the drugs prepared, can be understood well and vividly interpreted in the light of technology. WHO ensure the need of the quality control of Ayurvedic products by using modern techniques and by applying suitable standards. The analytical methodologies changes from time to time. But it is essential to involve these methodologies to label the drug as quality controlled for the present time. These methodologies also help in standardizing the homogeneity and reproducibility whenever the drug is produced either in large/small scales.

AIM AND OBJECTIVES

1. Preparation and physico-chemical analysis of *Khageshwara Rasa*.

2. Preparation of *Khageshwara Rasa* by *Kupipakva* method as explained in *Rasa yoga Sagara*.

3. Physico-chemical analysis of *Khageshwara Rasa*.

MATERIALS AND METHODS

Materials:

The raw materials *Hingula*, *Gandhaka*, *Kaseesa* and other associated drugs were purchased from Amrutkesari, Ayurvedic Raw drug supplier Bengaluru after eliciting the *Graahya lakshanas*. Physico-chemical analysis was carried out at CRF, Shri B.M.K Ayurvedic Medical college Belagavi and instrumental analysis was carried out at Cytixon laboratory, Hubballi.

Methods:

Pharmaceutical Study of *Khageshwara rasa* mainly contains *Parada*, *Gandhaka* and *Kaseesa* with *Arjuna twak kwatha* as the *Bhavana dravya*. The pharmaceutical study was carried out under the following steps.

1.Hingula shodhana^[2]:

Hingula was subjected to *shodhana* by giving *Bhavana* with *Nimbu Swaras* for 7 times.

Procedure :

- 500 gms of *Hingula* was taken and finely powdered in *Khalva yantra*.
- 270ml of *Nimbu swarasa* was extracted from 10 big size lemons with the help of juice

extractor and then it is filtered through the sieve.

- For the first *Bhavana*, 50 ml of *Nimbu swarasa*, the quantity was sufficient to immerse *Hingula* for the *bhavana*.
- *Mardana* has to be continued till *Hingula* absorbs the *swarasa* and then it become thick paste form and dried.
- When the material was completely dried up by *Mardana* then only it was considered as the completion of one *Bhavana* and fresh *swarasa* was added for next *Bhavana*.
- *Hingula Shodhana* was done by giving 7 *Bhavanas* with *Nimbu Swarasa*.
- The *Bhavana* has to be repeated for another 6 times.

Observations:

- The *Hingula* was solid in form and red in colour which possessed glistening particles of Mercury.
- *Hingula* possessed glistening particles at the initial stage of *Mardana*.
- *Slakshanata* disappeared at the end and *Hingula* was fine powdered.
- The cake of *Hingula* was comparatively dull in colour but red colour could be appreciated only after it was fine powdered.
- During *bhavana* the *Hingula* becomes stickier and it is difficult to move the *peshani* around the *Khalva*.

- It took us total 270 ml of *Nimbu Swarasa* for to complete the 7 *bhavanas*.
- For the first *Bhavana* the quantity of *Nimbu swarasa* required was more than other 6 *Bhavanas*.
- For the first *Bhavana* the quantity of time required for *mardana* was more than other 6 *Bhavanas*.
- At the end of each *Bhavana*, *Mardana* was done slowly as the material becomes stickier.
- After the completion of 7 *Bhavanas*, *Hingula* was washed with hot water until it loses its *snigdha* and *amlatva* and attain *ujjwala* varna.
- After completion of 7 *bhavanas*, *Hingula* was taken out from the *Khalva yantra* and it is washed with hot water thoroughly and allowed to settle after that the supernant water was decanted and the lower sublimated part is sun dried.
- Washing of *Hingula* was done with warm water for another 2 times.
- Totally it took 14 days for *Hingula Shodhana*.

2. Hingulottha parada^[3]:

The prepared *Hingula chakrikas* are taken in lower mud pot of the *Urdhwa patana Yantra* and *sandhibandhana* is done and then the *Parada* is extracted using *urdhwapatana* method.

Preparation of Urdhwapatana Yantra.

Materials : Two earthen pots of equal size, Cloth - 4×60 cm, *Mulatani mitti*, Vessels, Sieve.

Method:

- Mouth surface of two pots was rubbed on a smooth stone with sand to make the facing surfaces of mouth even.
- Dried *chakrikas* of *shodita Hingula* was weighed as 480gms and were kept in a lower pot.
- The upper mud pot is placed invertly against the lower mud pot.
- *Sandhi bandhana* was done with cotton cloth strip smeared with *Mulatani mitti* and it was allowed to dry for a day and repeat the procedure for another 6 times.

Parada Nishkasana:

- When *sandhi bandhana* dried i.e on next day *Urdhwapatana yantra* was kept on gas stove and heat was given continuously for 8 hours.
- While heating cold cloth was kept and maintained on the upper pot for condensation of sublimation of *Parada*.
- Temperature was maintained and recorded with Pyrometer.
- After the *Swangasheeta*, the *Sandhi bandhana* of the *Urdhwapatana Yantra* removed carefully.
- Next the *Parada* which is sublimated at the upper pot is collected and *Prakshalana* is done with hot water.

- After *Prakshalana*, the *Parada* was filtered through a clean cloth and collected in a clean and dry jar.

Observations:

Table no. 1 showing the temperature recorded during the procedure

Time	Temperature
0 hours	30 ⁰ c
1 hours	150 ⁰ c
3 hours	280 ⁰ c
5 hours	360 ⁰ c
7 hours	380 ⁰ c
8 hours	400 ⁰ c

- Temperature was recorded with the help of Pyrometer at regular intervals.
- After one hour of giving *agni* the smell of *Gandhaka* is appreciated.
- After completion of the procedure, globules of mercury were seen adhered to the upper part of the pot.
- *Chakrikas* of *Hingula* in the lower part was completely burnt.
- *Parada* obtained was very shiny in nature.

3. Parada Shodhana ^[4,5]: the extracted *Parada* was given *Bhavana* with 1/16th part of *Haridra Churna* for a period of 3 days filtered through cloth until it become clear then it is stored in a container.

Method:

- 200 gms of *Hingulottha Parada* was taken in a *Khalva Yantra* and 20 gms of *Haridra Churna* was added and *mardana* is done for 3 days.
- Later, powder was collected and filtered through the double folded clean cloth for 4 times and *Parada* was collected.

Observations:

- After 30 minutes of *Mardana*, little quantity of *Parada* split into small particles.
- After 1 hour of *Mardana* yellow colour of *Haridra* turned into pale brown colour which become more deepened with *Mardana*.
- After filtration, collected *Parada* was bright and silvery.

4. Gandhaka Shodhana ^[6]: It was done by *Bhudhara yantra* method the *shodhita Gandhaka* which is collected in the pot containing milk is washed and stored.

Method:

- *Gandhaka* was coarsely powdered in a *Khalva Yantra*.
- Powdered *Gandhaka* was then spread over this cloth, *Sharava* was placed invertly over the pot, *Sandhi bandhana* was done and pot was kept in a pit.
- 1 litre of fresh cow's milk was poured in a *Ghritalipta* earthen vessel through the hole, mouth of which was covered with a single layer of a clean and thin cloth and tied properly with a thread.

- The brim of the vessel was kept at level of the ground.
- 6 cow dung cakes were spread over this *sharava* and fire was set with the help of camphor. After self-cooling the pot was removed out from the pit, cloth tied over the mouth was removed; granules of *Shodhita Gandhaka* which had dropped down and collected in the milk were secured.
- It was washed with hot water thoroughly and dried under shade.

Observations:

- All mud particles and dust which were present in *Gandhaka* were separated out over cloth during the procedure.
- *Shodhita Gandhaka* was pale yellow in colour, shiny, granular form and few were streak like, fully immersed in the milk. Few granules were seen floating on the milk.
- After the procedure *Gandhaka* was washed with hot water till the remnants of milk was removed.

5.Kasisa Shodhana ^[7,8,9]: *Kaseesa Shodhana* was done by giving *bhavana* with *Nimbu Swaras* for 1 day then it is dried and collected.

Procedure:

- *Kasisa* was taken in *Khalva yantra* and finely powdered.
- 200ml of *Nimbu swarasa* was taken in a measuring flask and was poured slowly into *Khalva yantra* containing *Kasisa churna*.

- *Kasisa churna* must be completely immersed in the *Nimbu swarasa*.
- *Mardana* was done continuously and cautiously till *Kasisa* completely absorbs the *swarasa* and become dry.

Observations:

- *Ashodhita Kasisa* was bluish green in colour, lustrous and crystalline in nature.
- After powdering *Kasisa* became lusterless.
- It took 15 minutes to powder the *Kasisa* finely.
- *Mardana* was until the *Kasisa* become dry.
- After *shodhana Kasisa* become brownish in colour.

6. Preparation of Kajjali: 1 part of *Shuddha Parada* and 1 part of *Shuddha Gandhaka* were taken in a *Khalva yantra* and *Kajjali* was prepared. To this *Kajjali*, 1 part of *Shuddha Kaseesa* was added and *mardana* was done to obtain the homogenous mixture of *Kajjali*.

Method:

- 60gms of *Hingulottha Parada* was put in *Khalva yantra* and 60 gms of fine powder of *Shodhita Gandhaka* was added and *mardana* is done.
- *Mardana* was done slowly and with a uniform speed till all the *Kajjali Lakshanas* were observed i.e the whole mixture must be converted into a fine, black, smooth, lusterless powder.
- After *Kajjali siddha lakshana*, 60 gms of finely powdered *Shodhita Kasisa* is added.

- Slowly the green colour of *Kasisa* reduces and it mixes with *Kajjali* and turn into a black colour.

- While doing *Mardana* faint smell of *Nimbu* is appreciated.

mardana was done slowly and with a uniform speed till all the *Kajjali Lakshanas* were observed i.e the whole mixture must be converted into a fine, black, smooth, lusterless powder.

Observations:

- After doing *mardana* for 10 min *Parada* and *Gandhaka* mixture appeared yellowish green coloured and tailing of mercury was seen.
- After 30 mins of *mardana* greyish tinge with small shiny globules were seen.
- After 4 hours of *mardana* no more mercury globules seen but shining particles were present.
- After 8 hours of *mardana*, mixture appeared blackish coloured, shining particles were observed.
- After 14 hours of *mardana*, mixture of *Parada* and *Gandhaka* turned to soft smooth black compound.
- After 100 hours of *mardana*, mixture become very soft & fine, while *mardana* it was spilling out of the *Khalva yantra*.
- After 250 hours of *mardana*, *Kajjali* test were done, no shining particles seen.

- The *Shodhita Kasisa* is added to the *Kajjali* and slowly started mixing them with the help of *Mardana*. Slowly the green colour of *Kasisa* reduces and it mixes with *Kajjali* and turn into a black colour.

- While doing *Mardana* faint smell of *Nimbu* is appreciated.

- After homogenous mixture of *Kajjali* was obtained.

7.Bhavana to Kajjali: *Arjuna twak Kwatha* was prepared for giving *bhavana* to the *Kajjali* by adding 1 part of *Arjuna twak* and 8 part of water then it is reduced to 1/4th which is then filtered and collected.

Procedure:

150 gms of *Kajjali* was taken in *Khalva Yantra* and to this *Kajjali*, *Arjuna twak kwatha* was added and *mardana* is Started. Trituration was carried upto 12 hours and then left for drying.

Observation:

- Initially when the *Kwatha* is added and as soon as the *Mardana* is started *Kajjali* became like a thin paste.
- There was very free movement of *Peshani* during the *Bhavana*. Later the paste goes on becoming sticky and by around 12 hours of *Bhavana*, the product completely got thicken up and kept for drying.

8.Preparation of Khageshwara rasa:

Purva karma:

- Amber coloured glass beer bottle of 650 ml was taken. The bottle was cleaned and completely dried. At the base of the bottle, paste of *Multani mitti* was applied. A cloth smeared with *Multani mitti* measuring 6 cm width and breadth was covered and dried completely.
- Next day after complete drying, another cloth smeared with *Multani mitti*, having same measurement was applied over the former layer. In this way 8 layers were covered over the surface of the bottle.
- The lower 1 /3rd part of the *Kupi* was marked with the help of a scale and 150 gms of *Kajjali* was slowly filled in to *Kacha Kupi* with the help of a funnel and a glass rod.
- A *Loha bhand*a (iron vessel) of conical shape with the measurement of 45cm height and circumference of 90 cm at the top and 50cm at the bottom the vessel was taken.
- The circular rim of the vessel exactly fits on the iron ring of the *Bhatti*.
- Over the *valuka* and below the *Kacha kupi*, 2 *abhraka patra's* of 4×4cm and thickness of 0.5cm was placed, over this the *Kajjali* filled *kupi* was kept firmly and centrally.
- Remaining portion of the *Yantra* was filled with sand (20kg) upto the neck of the *Kupi*.
- The *Kajjali* filled *Kacha Kupi* kept in the *Valuka Yantra* was placed in the *Agni Bhatti*.
- Pyrometer was properly placed i.e., 5-6 cm away from the *Kupi* in *Valuka yantra* and 4 cm above the bottom of *Valuka Yantra*.
- Fuel-the fire wood of 20kg was put into the *Bhatti* one by one , *Pooja* was done with the chanting of "*Aghora Mantra*".
- Fire was set with the help of camphor; temperature reading was carried out with the help of pyrometer for every 30 minutes.
- For the first 6 hours *Mrudhvagni* was given i.e., temperature maintained between 125⁰C – 250⁰ C
- Next 4 hours *Agni* was gradually raised to *Madhyamagni* stage i.e, 250⁰C- 450 ⁰C
- Next 6 hours *Tivragni* started i,e temperature maintained between 450 ⁰C- 650 ⁰C and above. It took about 10 hours to get *siddhi laxanas*.
- Later, corking was done and again heat was given for 6 hours for complete sublimation of product. Later the apparatus was allowed for self cooling.

Pradhana karma:

Table no.2 showing observations during the preparation of *Khageshwara rasa*

Timing	Temperature	Observations
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6:30 am	41 ⁰ c	-
8:55 am	230 ⁰ c	Mild Yellow fumes observed
10:00 am	265 ⁰ c	Mild Yellow fumes observed
11:00 am	307 ⁰ c	Yellow fumes observed, <i>Ushna shalaka snachalana</i> is done.
11:45 am	450 ⁰ c	-
12:45 pm	467 ⁰ c	<i>Ushna shalaka snachalana</i> is done.
1:30 pm	450 ⁰ c	-
2:45 pm	467 ⁰ c	-
3:15 pm	556 ⁰ c	Cotton burned when kept on <i>valuka</i> .
4:30 pm	527 ⁰ c	Cold <i>shalaka</i> is dipped & saw reddish colouring on <i>shalaka</i> .
6:15 pm	614 ⁰ c	Blue fumes is observed. Copper coin test-whitish discolour of coin, mouth is closed with cork.
7:30 pm	628 ⁰ c	Continuous high heat given.
10:30 pm	650 ⁰ c	Fire is put off & kept for cooling.

Paschat karma:

- After complete cooling of the *Bhatti*, *Valuka Yantra* was removed out from the *Agni Bhatti*. Sand surrounding the *Kupi* in *Valuka Yantra* was carefully removed and then *Kupi* was removed.
- The mud smeared cloth layers of the *Kupi* were scrapped out with a knife. A jute thread dipped in kerosene was tied to the *Kupi* 2-3cm below the level of sublimated product and ignited.
- When the whole thread gets burnt off, wet cloth was wrapped around that. The bottle gets broken into 2 equal halves with a breaking sound.
- From the neck region product was collected as a single block with a central hole by a simple tapping and was stored in a clean sterile container.

RESULTS

A) Table no.3 showing results of Results of Pharmaceutical study

Material	Initial wt.	Final wt	Gain/loss	Yield
<i>Hingula Shodhana</i>	500gms	510 gms	Gain :10 gms	100%
<i>Hingulotha parada</i>	480gms	200gms	Residue:280gms	40%

<i>Parada Shodhana</i>	200gms <i>Haridra Churna</i> : 20gms	190 gms	Loss: 10gm	90%
<i>Gandhaka Shodhana</i>	500gms	470gms	Loss: 30gms	94%
<i>Kasisa Shodhana</i>	500gms	480gms	20gms	96%

Table No.4 Showing result of *Khageshwara Rasa*

Test	<i>Khageshwara Rasa</i>
Quantity of <i>Kajjali</i>	150 gms
Apparatus	<i>Valuka yantra</i>
Observations	Total time taken 16 hours and for complete self cooling 18 hours. the maximum temperature recorded is 650°C.
Yield	<i>Kanthastha</i> :50 gms Residue :20gms
Colour	Reddish

B)Analytical study

Table no.5 showing results of Organoleptic characters of *Khageshwara Rasa*

Tests	Results
Form	Powder
Colour	Reddish
Odour	Characterstic

1. DETERMINATION OF pH VALUE

Materials:

- Glass electrode
- pH meter
- Buffer tablet (pH - 4) Acid - 0.05H Potassium hydrogen phthalate,(pH - 9) Alkali-0.05H Sodium tetra borate.

- Beakers
- *Khageshwara Rasa*- 1gm.

Method:

- Operate the pH meter and electrode System according to the manual instructions. Standardizing the meter and electrodes with 0.05H Sodium borate when measuring an alkaline Solution.
- At the end of a set of measurements, take a reaching of the Solution used to standardizing the meter and electrodes. This reading should not differ by more than 0.02 from the original value at which the apparatus was standardized.

- Now in 5ml of water 1gm of sample was put and pH is determined for the solution.

Results: pH value of *Khageshwara Rasa* is 6.29

2) DETERMINATION OF TOTAL ASH VALUE

Materials:

- Silica crucible.
- Electronic weighing machine.
- Electric furnace.
- *Khageshwara Rasa*- 2 gms.

Procedure:

Two grams of accurately weighed sample was taken and transferred to the cleaned, dried and weighed Silica crucible and was subjected to ignition using electric furnace at 450°C for an hour. Silica crucible was taken out from the furnace and was allowed to cool, and weighed. After cooling the weight of the ash obtained, the ash value of Sample was calculated.

Result: Total ash value is 0.592%

3) DETERMINATION OF ACID INSOLUBLE ASH

Material:

- Silica crucible.
- Dil HCl - 25ml.
- Burner
- Conical flask.
- Whatsmann filter Paper
- Ash of *Khageshwara Rasa*
- Electronic weighing machine.

Method:

- 2gm of sample is digested with 25 ml dil.hydrochloric acid for 5 min, then filtered through whatsmann paper and was washed with water.
- The residue was taken in a crucible dried and ignited, allowed to cool and weighed.

Result: Acid insoluble ash of *Khageshwara Rasa* is 0.098%

4) DETERMINATION OF WATER SOLUBLE ASH

Material:

- Water
- Burner
- Ash of *Khageshwara rasa*
- Whatsmann filter Paper
- Electronic weighing machine.

Method:

Boil the ash for 5 minutes with 25ml of water, collect the insoluble matter in an ashless filter paper; wash with hot water, and ignite for 15 minutes at a temperature not exceeding 450°C. Subtract the weight of the insoluble matter from the weight of the ash; the difference in the weight represents the water soluble ash. Calculate the percentage of water soluble ash with reference to the air dried drug.

Results:Water soluble ash of *Khageshwara Rasa* is 0.334%

5) DETERMINATION OF LOSS ON DRYING AT 110°C

Materials:

- Silica crucible
- Electronic air oven
- Electronic weighing machine
- *Khageshwara rasa* - 1 gm

Method:

- One gram of sample was taken in a Silica crucible and accurately weighed, heated on electric air oven up to 110°C for 3 hrs. Again weighed the difference and weight was calculated.

Result: Loss on drying at 110°C of *Khageshwara Rasa* is 0.496%

6) PARTICLE SIZE ANALYSIS (By Laser Diffraction Method)

Material:

- Malvern Master sizer instrument.
- *Khageshwara Rasa* 1gm.

Method: Laser diffraction method

- Sample passes through the laser beam as homogeneous stream of particles and it leads to scattering of light over a wide range of angles. Based on this scattering pattern of sample, particle size distributions are

calculated comparing with appropriate optical model.

- Particle size has been calculated considering its Length density, Volume density, Area density. In present study Volume density mean is considered for determining the actual particle size of the sample as it covers length and area of the particle. The size of the particle ranges from 0.0 -0.5µm upto 100% of the particle size measured and finally mean particle size are taken for a particular sample.

Result: 27.4 to 59.75 µm

Table no.6 showing results of Physico-chemical tests of *Khageshwara Rasa*

Tests	Results
Loss on drying at 110C	0.496%
Ash value	0.592%
Acid insoluble ash	0.098%
Water soluble ash	0.334%
pH value	6.29
Particle size	27.74 to 59.75 micrometer

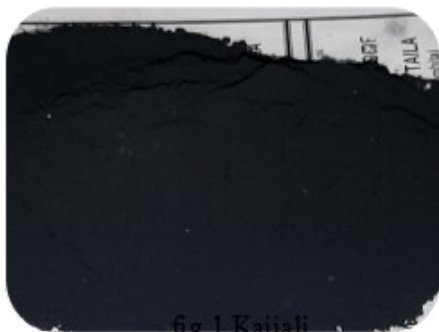


fig.1 Kajjali



fig.2 Adding Kasisa to Kajjali



fig.3 Adding kwatha to the Kajjali

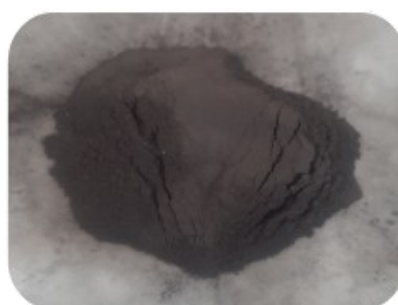


fig.4 Arjuna kwatha bhavita
Kajjali



fig.5 Kantastha product



fig.6 Khageshwara Rasa

DISCUSSION

Rasashastra as a science has lots of hidden facts. Discussion is of supreme importance where the scholar has to try, to throw the light on such type of hidden facts and break the silence of science.

Khageshwara Rasa containing *Parada*, *Gandhaka* and *Kaseesa* in 1:1:1 ratio processed with *Arjuna twak kwatha* is a *Sagandha*, *Sagni*, *Bahirdhooma*, *Kantastha* *Kupipakwa rasayana*, *kramagni paka* for *saardhadina* i.e. 12 hrs as explained in classics.

It is explained in *Rasa yoga sagara* and *Rasa Ratna Sammucchaya* with indications like *Shwitra*, *Shwasa* and *Kasa*.

Kupi Pakwa Yogas are prepared by the administering thermal energy in a progressive manner. Here a process of sublimation is carried out, where *Parada* (Mercury) is heated to a temperature above its boiling point. By this intense temperature majority of sulphur is eliminated in the form of fumes. The bonded sulphur might Removing the hot sand around the neck of the *Kupi*, which favours sublimation of *Khageshwara Rasa* around the inner side of bottle neck. *Khageshwara Rasa* around the inner side of bottle neck. (After breaking the *Kupi*) be retained. Presence of sulphur and its binding with mercury to form a mercury sulphide complex can be assumed by different previous analytical studies ^[10]. Similarly the water molecules and majority of the sulphate ions in *Kasisa*, which is chemically $\text{FeSO}_4 \cdot 7 \text{H}_2\text{O}$ ^[11], are likely to be eliminated by the intense heat. The elemental components, Mercury, bonded Sulphur and Iron should form a stable complex which will be condensed and solidified in the neck of the bottle. The product adhered in the neck of *Kupi* (*Galastha*) was considered as the final product which was reddish grey in appearance and red on grinding.

CONCLUSION

- *Khageshwara Rasa* is a *Kupipakwa rasayana* and it is a *Sagni*, *Sagandha* and *Bahirdhuma murcchana* of *Parada*.
- *Shodhana* of *Hingula*, *Kasisa* with *Nimbu swarasa bhavana* and *Parada* with *Haridra* certainly have a role in detoxifying and potencing the drugs.
- *Urdhwapatana* is simple method to obtain *Hingulottha Parada*.
- On the basis of observations made during the preparation, the heating pattern for *Khageshwara Rasa* may be concluded as:
- *Mrudu agni*: 125-250°C
- *Madhyamaagni*: 250-450°C
- *Teevraagni*: 450-650°C
- *Khageshwara Rasa* is reddish in colour, characteristic odour, insoluble in water and sparingly soluble in chloroform and alcohol.
- Loss on drying is 0.496% revealing the presence of negligible amount of moisture content.
- Total ash is 0.592%, which suggests that *Khageshwara Rasa* has got low organic content.
- Acid insoluble ash is 0.098%, so it can be concluded that more than 90% drug may be absorbed in body for therapeutic action.

- Water soluble ash is 0.334%, which indicates complete drying or free from moisture content which is important to restore shelf life.
- pH is 6.29, shows the nature of the sample.
- Particle size is 27.4 to 59.75 micrometer, which signifies the fineness of particles.

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