

**PHARMASUTICAL STUDY OF HARATALA W.S.R. TO ITS VARIOUS SHODHANA PROCEDURES – A RESEARCH ARTICLE****Bandeppa Sangolgi., Ganapathi rao and Sangameshwar Benne**

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ARTICLE INFO**Article History:**Received 10th January, 2017Received in revised form 19th February, 2017Accepted 22nd March, 2017Published online 28th April, 2017**Key words:**Standard Operating Procedure (S.O.P),
Shodhana, Haratala, Kushmanda Swarasa, Tila
Kshara Jala, Churnodaka.**ABSTRACT**

Arsenic compounds are being popularly used in *Ayurveda* therapeutics since centuries, *Haratala* being important among them. It is commonly used in treating the diseases like *Sleshmaroga*, *Rakta*, *Vatarakta*, *Kustha* etc. *Haratala* is called orpiment of yellow arsenic with two molecules of Arsenic and three molecules of Sulphur (AS_2S_3). *Patra Haratala* is *Sreshtha* and used for the present study. *Haratala* consumed without proper *Shodhana* shortens the life span, causes diseases of *Kapha* and *Vata*, *Prameha*, *Santapa*, *Spotha*, *Snayu Sankocha*. Hence *Shodhana* of *Haratala* is essential. *Shodhana* is the process of removal of physical, chemical impurities and potentiating of the drugs. Generally *Shuddha Haratala* is not given alone. It is administered along with herbal drugs or in the form of *Rasamanikya* or also as a main ingredient in most of the popular formulations like *Samirapannaga Rasa*, *Vatagajankusha Rasa* etc. There are different *Medias* explained in literature for *Shodhana* of *Haratala*. According to the media of purification the quality and pharmacological properties of *Haratala* will vary. Depending on the change in properties the therapeutic effect may also vary. The present study includes *Shodhana* of *Patra Haratala* as per Classical reference of *Rasa Ratna Samucchaya* where *Shodana* of *Patra Haratala* is done by *Kushmanda Swarasa*, *Tila Kshara Jala* and *Churnodaka*. Standard Operative Procedure of the process is done in the pharmaceutical study. The analytical study reveals the standards which can be given for *Ashuddha Haratala* and *Shuddha Haratala* of various Samples. The differences in the parameters reveal that there are some changes which give us the idea regarding role of a particular media in purification of a substance, where it adds some properties of the media used.

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INTRODUCTION

Haratala is called orpiment of yellow arsenic with two molecules of Arsenic and three molecules of Sulphur (AS_2S_3). *Haratala* consumed without proper *Shodhana* shortens the life span, causes diseases of *Kapha* and *Vata*, *Prameha*, *Santapa*, *Spotha*, *Snayu Sankocha*³. Hence *Shodhana* of *Haratala* is essential. *Shodhana* is the process of removal of physical, chemical impurities and potentiating of the drugs^{4,5}. Generally *Shuddha Haratala* is not given alone. It is administered along with herbal drugs or in the form of *Rasamanikya* or also as a main ingredient in most of the popular formulations like *Samirapannaga Rasa*, *Vatagajankusha Rasa*, *Kasturibhairava Rasa*, *Talakeshwara Rasa* etc. There are various *Shodhana* procedures explained for *Haratala* in *Rasa Granthas* like *Rasa Ratna Samuchaya*⁶, *Ayurveda Prakasha*⁷ and *Rasa Tarangini*⁸. Various works on *Haratala* has been carried out like *Haratala Bhasma*, its

preparation, toxicity, antimicrobial study and experimental evaluation by using single *Shodhana* procedure. Till today no work has been carried out on various *Shodhana* procedures of *Haratala*, intention behind them and complete structural validation of the same is yet to be established. Hence for the present study the various *Shodhana* procedures mentioned in *Rasa Ratna Samuchaya*⁶ and AFI⁹. All the constituents used for *Shodhana* will be collected from local market area and our college Herbal garden. Good manufacturing practice will be followed for preparing the various *medias* and *Shodhana* of *Haratala* as per Classical reference⁶ mentioned below.

Sample	Raw Drug	Media	Process/Apparatus	Duration
1	Patra Haratala	Kushmanda Swarasa	Swedana/Dola Yantra	3 hours
2	Patra Haratala	Tila Kshara Jala	Swedana/Dola Yantra	3 hours
3	Patra Haratala	Churnodaka	Swedana/Dola Yantra	3 hours

Here scientific evaluation of various *Shodhana* procedures and Standard Operating Procedure (S.O.P) will be done by considering suitable physico- chemical parameters and possible instrumental methods which may add considerable input to the existing knowledge.

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Aims and Objectives

1. Authentification of *Patra Haratala*
2. Physico - chemical analysis of *Haratala*, before and after *Shodhana* procedures.
3. An attempt will be made to establish Standard Operating Procedure (S.O.P) for *Shodhana* procedures of *Haratala* by *Kushmanda Swarasa*, *Tila Kshara Jala* and *Churnodaka*.

Pharmaceutical Syudy

Introduction

Standards are living documents, which reflect science, technology and systems. To maintain their value, they should be first decided, achieved, set and then periodically validated to maintain their reproducibility.

Medicaments of any system play a great role in establishment as well as in propagation of the particular system. So enough amount of attention has been provided in allopathic system of medicine is regards of quality production of medicaments. Result is well known that this very modern system of medicine has originated in Europe but at present it is accepted across the globe. But unfortunately in spite of the fact that our system of medicine is much more older in origin as well as in practice in comparison to present other systems of medicine, still we are not fully accepted even in this subcontinent. Many reasons are behind it. One of them is our incapability to produce quality drugs. After considering the vital importance of this fact concern *Ayurveda* is now orienting its resources for the advancement of this ignored pharmaceutical science. *Ayurveda* is the science of life, which protects and perpetuates the human life in a healthier way. For fulfillment of this purpose “Tetrod” i.e. *Vaidya*, *Aushadha*, *Rogi* and *Paricharaka* have been described by our great sages, *Aushadha* (drug) being the primary tool of *Vaidya* for combating various ailments. These *Aushadha* are prepared by different processing techniques applying to the raw drugs to get the desired effect. This processing results in transformation of good pharmacological action to that of substance. These pharmaceutical processes are called “*Samskaras*”.

Behind all the pharmaceutical procedures, *Shodhana* has its prime importance, because it is the *Shodhana* by which we can use all the substances as medicine from herbal to mineral in origin, even though they are having many toxic effects on human body. *Shodhana* is the process of removal of physical, chemical impurities and potentiating of the drugs^{3,4}. By the process of *Shodhana*, the virtues of properties of *Shodhana Dravyas* are inherited into a substance.

Standardization of *Ayurvedic* formulations and their manufacturing processes are the need of present hour. So one can check adulteration, identify the spurious material, improve the quality of drugs and maintain the uniformity of the products in different batches. In this way only *Ayurvedic* drugs can be made acceptable worldwide. There are various pharmaceutical processes which have been described for *Shodhana* such as *Swedana*, *Nirvapa*, *Avapa*, *Bharjana*, *Galana*, *Shoshana*, *Patana*, *Bhavana* etc. These are not merely the chemical purification but in a nutshell it can be said that to make substances bio-assimilable, they are subjected to *Shodhana*, the specific process of the addition and separation according to the need of our body. So it has become our prime duty to establish the proper *Shodhana* method in the scientific way in regards to get specific therapeutic effect and get maximum yield as well fulfilling all necessary parameters to make that substance best therapeutic.

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Rasa Ratna Samucchaya 3/70

In the context of present study *Haratala (Patra)* *Shodhana* have been performed by *Kushmanda Swarasa*, *Tila Kshara Jala*, and *Churnodaka* as mentioned in *Rasa Ratna Samucchaya*⁶. Practical study was carried out under the supervision of our Guide in Dept. of Rasashastra & Bhaishajya Kalpana, N.K.J.A.M.C. & P.G. Centre, Gumpa, Bidar.

Figure 1



Ashudda Haratala(Patra)

Figure 2



Kushmunda Phala

Figure 3



Churna

Figure 4



Tila Kshara

Figure 5



Kushmunda Swarasa

Figure 6



Shuddha Haratala
(Kushmunda Swarasa)

Figure 7



Churnodaka

Figure 8



Shuddha Haratala

Practical study is comprised of

Preparation of *Kushmanda Swarasa*, Practical 1.

Haratala Shodhana by *Kushmanda Swarasa* Practical 2.

Preparation of *Churnodaka*, Practical 3.

Haratala Shodhana by *Churnodaka*, Practical 4.

Preparation of *Tila Kshara Jala*, Practical 5.

Haratala Shodhana by *Tila Kshara Jala*, Practical 6.

Name of the practical: Preparation of *Kushmanda Swarasa*

Practical 1

Ref.: General method of *Swarasa* preparation

Date of Starting : 1st Day

Date of Completion: 1st Day

Material Required: Stainless steel vessels, Knife, Mixer Grinder, Weighing Balance, Clean cotton cloth, Measuring jar, Spoons.

Ingredients

Kushmanda Phala x- 8 kg

Procedure

- *Kushmanda Phala* was washed in water and cleaned externally.
- With a clean knife the outer covering was removed.
- The pulp was cut in to small pieces, and then put in mixer grinder *Kalka* was prepared.
- *Kalka* was squeezed with a clean cloth and juice was extracted.
- It was filtered with clean cotton cloth and filtered liquid was collected as *Kushmanda Swarasa*.

Observations

- After removing the greenish outer covering, white pulp was observed
- Pulp was cut in to small pieces of 1 inch size.
- During the grinding little frothing was observed.
- It took approximately 45 min to extract the juice
- The color of extracted juice was light creamish white.

Precautions

- Outer covering was carefully separated.
- Pulp was made in to small pieces.
- Utensils, vessels and filtering cloth should be clean.
- Squeezing should be done properly to extract maximum juice.

Result

- Final quantity of *Kushmanda Swarasa* obtained is: 2 ltr.
- Colour: Light creamish white.

Figure-9



Tila Kshara Jala

Figure -10



Shuddha Haratala
(Tila Kshara Jala)

- Taste: *Alpa Madhura Rasa* (Figure-5)

Name of Practical: *Haratala Shodhana* by *Kushmanda Swarasa*

Practical 2

Ref: *Rasa Ratna Samucchaya* 3/70

Date of Starting: 1st Day

Date of Completion: 1st Day

Material Required: Stainless Steel Vessel, Gas Stove, Spatula, Weighing Balance, Measuring Jar, Clean Strong Cotton Cloth, and Mercury Thermometer etc.

Ingredients

1. <i>Ashuddha Patra Haratala</i> :	200gm
2. <i>Kushmanda Swarasa</i> :	2 ltr.

Sanskara Adopted: *Swedana Sanskara*

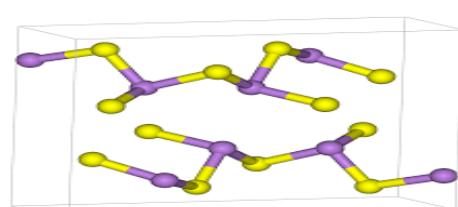
Procedure

- Physical impurities like stone, sand etc. were manually cleaned.
- *Ashuddha Patra Haratala* was taken in a clean *Khalwa Yantra* and made in to small pieces.
- The pieces were spread on a clean strong cotton cloth and *Pottali* was prepared.
- This *Pottali* was tied to a clean iron rod and the *Pottali* was suspended in a clean stainless steel vessel.
- Then the *Swarasa* was added in such a quantity that the *Pottali* got completely immersed. It was kept on gas stove and fire was ignited (Gas knob was set on sim). This arrangement resembles the *Dola Yantra*.
- The apparatus was heated for 3 hours. After that the *Pottali* was washed with warm water and the *Haratala* pieces were collected carefully.
- *Haratala* pieces were washed with warm water and dried for 6 hours.
- After complete drying the *Shuddha Haratala* was collected.

Observations

- The color of *Ashuddha Haratala* was yellowish, brownish black tinge with little shining and having peculiar odor.
- During boiling the color of the *Swarasa* changed to dark color
- During heating little aromatic smell of *Kushmanda* was found.
- As the process continued little quantity of *Swarasa* was added as the *Swarasa* evaporated.

Figure-11



Atomic Structure of Arsenic Trisulphide

- Bright yellowish shining small pieces of *Shuddha Haratala* were collected after proper drying.

Temperature and Duration

Day	Heating Device	Duration	Temp. °C
1 st	Gas Stove	3 hours	62°– 95°C
1 st	Sun Shade	6 hours	36° – 38°C

Results

• <i>Ashuddha Patra Haratala</i>	:	• 200gm
• <i>Kushmanda Swarasa</i>	:	• 2 ltr.
• <i>Shuddha Haratala</i> obtained	:	• 190gm
Total duration for <i>Shodhana</i> process	:	1 day (Approx.)

Precautions

- Utensils and vessels should be clean and disinfected.
- *Ashuddha Patra Haratala* should be made in to small pieces before subjecting to the process.
- *Pottali* should be prepared from a strong cotton cloth.
- *Pottali* should completely get dipped in *Swarasa* and it should not touch the bottom of the vessel.
- Heating should be controlled and temperature should be maintained about 62-95°C inside the vessel.
- Temperature should be checked time to time with the help of mercuric thermometer.
- Continuous adding of *Swarasa* should be done as it gets evaporated.
- After proper *Shodhana* the pieces were carefully washed with warm water and collected carefully and dried. (Figure-6)

Name of the practical: Preparation of Churnodaka⁴⁸

Practical 3

Ref.: Rasa Tarangini 11/216-218

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Date of Starting: 1st Day

Date of Completion: 2nd Day

Material Required: Stainless steel vessels, Weighing Balance, Clean cotton cloth, measuring jar, Spoons.

Ingredients: *Churnodaka* was prepared in the ratio of Churna: Water i.e. 1:240

1. *Churna* - 8gm
2. Water (Portable) - 1920ml

Procedure

- *Churna* of about 8gm was taken in a clean stainless vessel and water of about 1920 ml was added and stirred well.
- It was kept stand still for 9 hours.
- The supernatant fluid was collected and filtered with a clean cloth and kept preserved in green glass bottle.

Observations

- When *Churna* got dissolved in water it turned milky
- After 9 hours of stand still, the *Churna* settled down and the supernatant fluid was transparent light milky in color.

Precautions

- It was kept stand still for 9 hrs
- Utensils, vessels and filtering cloth should be clean.
- Filtering should be done properly

Result

- Final quantity of *Churnodaka* obtained is: 1750ml.
- Colour : Transparent light milky.
- Taste : Sour Astringent (Figure-7)

Name of Practical: Haratala Shodhana by Churnodaka Practical 4

Ref. : Rasa Ratna Samucchaya 3/70

Date of Starting: 1st Day

Date of Completion: 1st Day

Material Required: Stainless Steel Vessel, Gas Stove, Spatula, Weighing Balance, Measuring Jar, Clean Strong Cotton Cloth, Mercury Thermometer etc.

Ingredients

1. *Ashuddha Patra Haratala*: 200gm
2. *Churnodaka*: 1750 ml

Sanskara Adopted: *Swedana Sanskara*

Procedure

- Physical impurities like stone, sand etc. were manually cleaned.
- *Ashuddha Patra Haratala* was taken in a clean *Khalwa Yantra* and made in to small pieces.
- The pieces were spread on a clean strong cotton cloth and *Pottali* was prepared.
- This *Pottali* was tied to a clean iron rod and the *Pottali* was suspended in a clean stainless steel vessel.
- Then *Churnodaka* was added in such a quantity that the *Pottali* got completely immersed. It was kept on gas stove and fire was ignited (Gas knob was set on sim). This arrangement resembles the *Dola Yantra*.
- The apparatus was heated for 3 hours. After that the *Pottali* was washed with warm water and the *Haratala* pieces were collected carefully.
- *Haratala* pieces were washed with warm water and dried for 6 hours.
- After complete drying the *Shuddha Haratala* was collected.

Observations

- The color of *Ashuddha Haratala* was yellowish, brownish black tinge with little shining and having peculiar odor.
- During boiling the color of the *Churnodaka* changed to dark color
- During heating a peculiar odor was observed.

- As the process continued little quantity of *Churnodaka* was added as the *Churnodaka* evaporated.
- Yellowish dull small pieces of *Shuddha Haratala* were collected after proper drying.

Temperature and Duration

Day	Heating Device	Duration	Temp. °C
1 st	Gas Stove	3 hours	62° – 95°C
1 st	Sun Shade	6 hours	36° – 38°C

Results

• <i>Ashuddha Patra Haratala</i> :		• 200gm
• <i>Churnodaka</i> :		• 1750 ml
• <i>Shuddha Haratala</i> obtained :		• 192gm
Total duration for <i>Shodhana</i> process :		1 day (Approx.)

Precautions

- Utensils and vessels should be clean and disinfected.
- Ashuddha Patra Haratala* should be made in to small pieces before subjecting to the process.
- Pottali* should be prepared from a strong cotton cloth.
- Pottali* should completely get dipped in *Churnodaka* and it should not touch the bottom of the vessel.
- Heating should be controlled and temperature should be maintained about 62-95°C inside the vessel.
- Temperature should be checked time to time with the help of mercuric thermometer.
- Continuous adding of *Churnodaka* should be done as it gets evaporated.
- After proper *Shodhana* the pieces were carefully washed with warm water and collected carefully and dried. (Figure-8)

Name of the practical: Preparation of *Tila Kshara Jala*⁴⁸ Practical 5

Ref.: Rasa Tarangini 11/216-218

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Date of Starting: 1st Day

Date of Completion: 1st Day

Material Required: Stainless steel vessels, Weighing Balance, Clean cotton cloth, measuring jar, Spoons.

Ingredients: *Tila Kshara Jala* was prepared in the ratio of
Tila Kshara: Water i.e. 1:240

- Tila Kshara* - 8gm
- Water (Portable) - 1920ml

Procedure

- Tila Kshara* of about 8gm was taken in a clean stainless vessel and water of about 1920 ml was added and stirred well.
- It was kept stand still for 3 hours.
- The fluid was collected and filtered with a clean cloth and kept in a glass bottle.

Observations

- Tila Kshara* got dissolved in water
- After 3 hours of the was filtered
- Fluid was transparent watery in color.

Precautions

- It was kept stand still for 3 hrs
- Utensils, vessels and filtering cloth should be clean.
- Filtering should be done properly

Result

- Final quantity of *Tila Kshara* obtained is: 1920ml.
- Colour : Transparent watery
- Taste : Kshara (Figure-9)

Name of Practical: *Haratala Shodhana by Tila Kshara Jala*

Practical 6

Ref: Rasa Ratna Samucchaya 3/70

Date of Starting: 1st Day

Date of Completion: 1st Day

Material Required: Stainless Steel Vessel, Gas Stove, Spatula, Weighing Balance, Measuring Jar, Clean Strong Cotton Cloth, and Mercury Thermometer etc.

Ingredients

- Ashuddha Patra Haratala*: 200gm
- Tila Kshara Jala*: 1920 ml

Sanskara Adopted: *Swedana Sanskara*

Procedure

- Physical impurities like stone, sand etc. were manually cleaned.
- Ashuddha Patra Haratala* was taken in a clean *Khalwa Yantra* and made in to small pieces.
- The pieces were spread on a clean strong cotton cloth and *Pottali* was prepared.
- This *Pottali* was tied to a clean iron rod and the *Pottali* was suspended in a clean stainless steel vessel.
- Then *Tila Kshara Jala* was added in such a quantity that the *Pottali* got completely immersed. It was kept on gas stove and fire was ignited (Gas knob was set on sim). This arrangement resembles the *Dola Yantra*.
- The apparatus was heated for 3 hours. After that the *Pottali* was washed with warm water and the *Haratala* pieces were collected carefully.
- Haratala* pieces were washed with warm water and dried for 6 hours.
- After complete drying the *Shuddha Haratala* was collected.

Observations

- The color of *Ashuddha Haratala* was yellowish, brownish black tinge with little shining and having peculiar odor.
- During boiling the color of the *Tila Kshara Jala* changed to dark color
- During heating a peculiar odor was observed.
- As the process continued little quantity of *Tila Kshara Jala* was added as the *Tila Kshara Jala* evaporated.

- Bright yellowish shiny small pieces of *Shuddha Haratala* were collected after proper drying.

Temperature and Duration

Day	Heating Device	Duration	Temp. °C
1 st	Gas Stove	3 hours	62°– 95°C
1 st	Sun Shade	6 hours	36°– 38°C

Results

• Ashuddha Patra Haratala	:	• 200 gm
• Tila Kshara Jala	:	• 1920 ml
• Shuddha Haratala obtained	:	• 190 gm
Total duration for Shodhana process		1 day (Approx.)

Precautions

- Utensils and vessels should be clean and disinfected.
- *Ashuddha Patra Haratala* should be made in to small pieces before subjecting to the process.
- *Pottali* should be prepared from a strong cotton cloth.
- *Pottali* should completely get dipped in *Tila Kshara Jala* and it should not touch the bottom of the vessel.
- Heating should be controlled and temperature should be maintained about 62–95°C inside the vessel.
- Temperature should be checked time to time with the help of mercuric thermometer.
- Continuous adding of *Tila Kshara Jala* should be done as it gets evaporated..
- After proper *Shodhana* the pieces were carefully washed with warm water and collected carefully and dried. (**Figure-10**)

DISCUSSION

The present research work was planned with an aim to establish Standard Operating Procedure (S.O.P) for *Shodhana* procedures of *Ashuddha Patra Haratala* by *Kushmanda Swarasa*, *Tila Kshara Jala* and *Churnodaka*. To find out the effect of different *Shodhana* medias on the physico-chemical properties of *Haratala*. Went through the whole literature on *Haratala* available from *Vedic* period to the advancement of present time.

Pharmaceutical Study

Aushadha is a primary tool of *Vaidya* for combating various ailments. These *Aushadha* are prepared by different processing techniques applying to the raw drugs to get the desired effect. This processing results in transformation of good pharmacological action to that of substance. These pharmaceutical processes are called “*Samskaras*”.

Behind all the pharmaceutical procedures, *Shodhana* has its prime importance, because it is the *Shodhana* by which we can use all the substances as medicine from herbal to mineral in origin, even though they are having many toxic effects on human body. *Shodhana* is the process of removal of physical, chemical impurities and potentiating of the drugs. By the process of *Shodhana*, the virtues of properties of *Shodhana Dravyas* are inherited into a substance. By the critical review of different classical texts it seems that first time the written reference for the *Shodhana* process was found in *Anand Kandam* (*Kriya karana Vishranti Prathamollas* 322-323).

There are various pharmaceutical processes which have been described for *Shodhana* such as *Swedana*, *Nirvapa*, *Avapa*, *Bharjana*, *Galana*, *Shoshana*, *Patana*, *Bhavana* etc. These are not merely the chemical purification but in a nutshell it can be said that to make substances bio-assimilable, they are subjected to *Shodhana*, the specific process of the addition and separation according to the need of our body.

In the context of present study *Haratala (Patra) Shodhana* have been performed by *Kushmanda Swarasa*, *Tila Kshara Jala*, and *Churnodaka* as mentioned in *Rasa Ratna Samucchaya*⁶. Practical study was carried out under the supervision of our Guide in Dept. of Rasashastra & Bhaishajya Kalpana, N.K.J.A.M.C. & P.G. Centre, Gumpa, Bidar.

Practical study was done in 6 steps

- Preparation of *Kushmanda Swarasa*, Practical 1.
Haratala Shodhana by *Kushmanda Swarasa* Practical 2.
 Preparation of *Churnodaka*, Practical 3.
Haratala Shodhana by *Churnodaka*, Practical 4.
 Preparation of *Tila Kshara Jala*, Practical 5.
Haratala Shodhana by *Tila Kshara Jala*, Practical 6.

Preparation of *Kushmanda Swarasa*: (Practical 1)

It was prepared by general method of *Swarasa* preparation. The utensils used are Stainless steel vessels, Knife, Mixer Grinder, Weighing Balance, Clean cotton cloth, Measuring jar, Spoons. *Kushmanda Phala* of about 8 kg was taken and washed in water and cleaned externally. With a clean knife the outer covering was removed. After removing the greenish outer covering, white pulp was observed. The pulp was cut in to small pieces, and then put in mixer grinder. During the grinding little frothing was observed. *Kalka* was prepared. *Kalka* was squeezed with a clean cloth and juice was extracted. It was filtered with clean cotton cloth and filtered liquid was collected as *Kushmanda Swarasa*. It took approximately 45 min to extract the juice. The color of extracted juice was light creamish white which was about 2 ltr. and having taste of *Alpa Madhura Rasa* (Figure-5)

Haratala Shodhana by *Kushmanda Swarasa*: (Practical 2)

For this present practical the reference was from *Rasa Ratna Samucchaya* 3/70. The utensils used are Stainless Steel Vessel, Gas Stove, Spatula, Weighing Balance, Measuring Jar, Clean Strong Cotton Cloth, and Mercury Thermometer etc. The ingredients used are *Ashuddha Patra Haratala*, 200gm and *Kushmanda Swarasa* of about 2 ltr. is used. The *Sanskara* adopted is *Swedana Sanskara*.

The physical impurities like stone, sand etc. were manually cleaned. *Ashuddha Patra Haratala* was taken in a clean *Khalwa Yantra* and made in to small pieces. The pieces were spread on a clean strong cotton cloth and *Pottali* was prepared. This *Pottali* was tied to a clean iron rod and the *Pottali* was suspended in a clean stainless steel vessel. Then the *Swarasa* was added in such a quantity that the *Pottali* got completely immersed. It was kept on gas stove and fire was ignited (Gas knob was set on sim). This arrangement resembles the *Dola Yantra*. *Pottali* should completely get dipped in *Swarasa* and it should not touch the bottom of the vessel.

The heat was maintained in between 65°C to 95°C. During boiling the color of the *Swarasa* changed to dark color.

During heating little aromatic smell of *Kushmada* was found. The apparatus was heated for 3 hours. After that the *Pottali* was washed with warm water and the *Haratala* pieces were collected carefully. *Haratala* pieces were washed with warm water and dried for 6 hours. Bright yellowish shining small pieces of *Shuddha Haratala* were collected after proper drying. It took totally 9 hours, 3 hours for heating and 6 hours for drying.

Ashuddha Patra Haratala of about 200 gm was taken and about 2 ltr of *Kushmada Swarasa* was used. And the final product of *Shuddha Haratala* obtained was 190gm (Figure-6)

Preparation of Churnodaka⁴⁸: (Practical 3)

For this preparation the reference of *Rasa Tarangini* 11/216-218 is followed. The utensils used are Stainless steel vessels, Weighing Balance, Clean cotton cloth, measuring jar, Spoons. *Churnodaka* was prepared in the ratio of *Churna* : Water i.e. 1:240 where *Churna* of about 8gm was taken in a clean stainless vessel and water (portable) of about 1920 ml was added and stirred well. When *Churna* got dissolved in water it turned milky. It was kept stand still for 9 hours. The supernatant fluid was transparent light milky in color was collected and filtered with a clean cloth and kept preserved in green glass bottle. It was about 1750 ml and sour astringent taste. (Figure-7)

Haratala Shodhana by Churnodaka: (Practical 4)

The reference of *Rasa Ratna Samucchaya* 3/70 was followed. The utensils used are Stainless Steel Vessel, Gas Stove, Spatula, Weighing Balance, Measuring Jar, Clean Strong Cotton Cloth, Mercury Thermometer etc.

Ashuddha Patra Haratala of 200 gm and *Churnodaka* of about 1750 ml were used. *Swedana Sanskara* was adopted. The physical impurities like stone, sand etc. were manually cleaned. *Ashuddha Patra Haratala* was taken in a clean *Khalwa Yantra* and made in to small pieces. The color of *Ashuddha Haratala* was yellowish, brownish black tinge with little shining and having peculiar odor. The pieces were spread on a clean strong cotton cloth and *Pottali* was prepared. This *Pottali* was tied to a clean iron rod and the *Pottali* was suspended in a clean stainless steel vessel. Then *Churnodaka* was added in such a quantity that the *Pottali* got completely immersed in *Churnodaka* and it should not touch the bottom of the vessel.

It was kept on gas stove and fire was ignited (Gas knob was set on sim). This arrangement resembles the *Dola Yantra*. The apparatus was heated for 3 hours. The temperature was maintained in between 62° – 95°C. During boiling the color of the *Churnodaka* changed to dark color. After that the *Pottali* was washed with warm water and the *Haratala* pieces were collected carefully. *Haratala* pieces were washed with warm water and dried for 6 hours. Yellowish dull small pieces of *Shuddha Haratala* of about 192 gm were collected after proper drying. (Figure-8)

Preparation of Tila Kshara Jala⁴⁸(Practical 5)

The reference followed was same as that of *Churnodaka* from *Rasa Tarangini* 11/216-218. The utensils used are Stainless steel vessels, Weighing Balance, Clean cotton cloth, measuring jar, Spoons. *Tila Kshara Jala* was prepared in the ratio of *Tila Kshara* : Water i.e. 1:240. *Tila Kshara* of about 8gm was taken in a clean stainless vessel and water of about

1920 ml was added and stirred well. It was kept stand still for 3 hours. The fluid collected was transparent watery in color and filtered with a clean cloth, and kept in a glass bottle. *Tila Kshara Jala* obtained is 1920ml which is *Kshara* taste. (Figure-9)

Haratala Shodhana by Tila Kshara Jala: (Practical 6)

For the present preparation the reference of *Rasa Ratna Samucchaya* 3/70 was followed. The utensils used are Stainless Steel Vessel, Gas Stove, Spatula, Weighing Balance, Measuring Jar, Clean Strong Cotton Cloth, and Mercury Thermometer etc. *Ashuddha Patra Haratala* of about 200gm and *Tila Kshara Jala* of about 1920 ml was taken the *Sanskara* adopted is *Swedana Sanskara*.

Ashuddha Haratala was yellowish, brownish black tinge with little shining and having peculiar odor. Physical impurities like stone, sand etc. were manually cleaned. *Ashuddha Patra Haratala* was taken in a clean *Khalwa Yantra* and made in to small pieces. The pieces were spread on a clean strong cotton cloth and *Pottali* was prepared. This *Pottali* was tied to a clean iron rod and the *Pottali* was suspended in a clean stainless steel vessel. Then *Tila Kshara Jala* was added in such a quantity that the *Pottali* got completely immersed. It was kept on gas stove and fire was ignited (Gas knob was set on sim). This arrangement resembles the *Dola Yantra*. The apparatus was heated for 3 hours. The temperature was 62° – 95°C. *Pottali* should completely get dipped in *Tila Kshara Jala* and it should not touch the bottom of the vessel.

During boiling the color of the *Tila Kshara Jala* changed to dark color. As the process continued little quantity of *Tila Kshara Jala* was added as the *Tila Kshara Jala* evaporated. After that the *Pottali* was washed with warm water and the *Haratala* pieces were collected carefully. *Haratala* pieces were washed with warm water and dried for 6 hours. Bright yellowish shiny small pieces of *Shuddha Haratala* of about 190gm were collected after proper drying (Figure-10)

CONCLUSION

- *Haratala* is used both internally and externally.
- *Shuddha Haratala* is not used alone. It is administered along with herbal drugs or in the form of *Rasamanikya*.
- *Haratala* can be artificially prepared by 49 parts of purified arsenic oxide (*Somala*) and 24 parts of purified sulphur (*Gandhaka*) are mixed in a mortar.
- *Ashuddha Patra Haratala* is having yellowish with brown tinge with shiny, peculiar odor with crystalline smooth surface.
- *Shuddha Haratala (Kushmada Swarasa Shodhita)* was bright yellowish shiny, aromatic, crystalline smooth.
- *Shuddha Haratala (Churnodaka Shodhita)* was bright yellowish shiny, peculiar odor and crystalline smooth texture.
- All relevant analytical data of samples of *Ashuddha* and *Shuddha Haratala* are showing difference in their physical and chemical values. It shows the importance of process of *Shodhana*, which is probably responsible for safe therapeutic uses of *Haratala*
- This shows the role of different media in deciding the absorption, assimilation, effect and excretion of the

- drug. So due to these there may be changes in mode of action and also disease and disease condition.
- The properties of liquid media embedded into the *Haratala* during the process of *Shodhana* may augment the effect of *Haratala*.

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How to cite this article:

Bandeppa Sangolgi *et al* (2017) 'Pharmasutical study of haratala w.s.r. To its various shodhana procedures - a research article', *International Journal of Current Advanced Research*, 06(04), pp. 3425-3432.
DOI: <http://dx.doi.org/10.24327/ijcar.2017.3432.0286>
