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PHARMACEUTICAL AND ANALYTICAL STUDY OF SHANKHA BHASMA

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ABSTRACT

Introduction: *Ayurveda* is an ancient science. *Rasa Shastra* is one of the mainstream which deals with preparation of *Ayurvedic* formulations with help of various procedures like *Shodhana, Jarana, Marana*. *Shankha Bhasma* is also one of the calcium-containing minerals which is prepared by using these methods. *Shankha* has been known as Indian medicine for centuries. It is a drug of *Sudha Varga. Shankha Bhasma is* used in various formulations for treatment of various gastrointestinal disorders. It is a mineral drug with light pink to yellowish white color. It is not recommended for direct intake, so various *Shodhana, Marana* procedures have to be done before its internal use. **Methods**: Raw drugs are collected from the local market and its authentication can be done as per *Grahya Lakshana* mentioned in Classical texts. Then its purification and incineration is done as per reference of *Rasatarangini*. This was followed by physio-chemical analysis of finished products which include loss on drying, loss on ignition, acid soluble ash, test for calcium. **Result and Conclusion**: Efficacy of *Shankha Bhasma* was specified with its physico-chemical analysis. During incineration *Bhavana* of *Kumari Swarasa* was given to make it more efficient. At the end of all the procedures, the final product yields 302 gm of *Shankha Bhasma*.

KEYWORDS: *Rasa Shastra, Shankha, Grahya Lakshana, Shodhana, Marana.*

INTRODUCTION

Rasa Shastra is a branch which deals with herbomineral preparation. Here *rasa* words mainly correlate with *Parada* and the word *Shastra* denote science. Soo *Rasa Shastra* here means the Science of mercury.

Shankha has been known as Indian medicine for the last many years. It is a drug of mineral origin. It belongs to molluscan group and is a shell of marine creature called as *Turbunella Rapa.* It has lustrous yellowish brown horny layer externally and beneath it has a thick layer of Calcium carbonate. It is a large sea snail with heavy and spiral shell. The shell may very in colour from light pink to yellowish white.

Scientific name: Strombus gigas- Queen Conch.

Chemical name: Calcium carbonate

Chemical formula: $CaCO_3$

Synonyms[1]: *Shankha, Shankhaka, Kambu, Trirekha, Samundraj, Sunad, Deerganada, Kamboj, Shudra, Shankhanaka.*

Vernacular name[2]

Sanskrit: *Shankha*.

Hindi: Shankha

English: Conch shell

Tamil: Sanka

Telugu: Sehkham Kannada Shankha

Bengali: Sankh

Table 1: *Vargas* according to different *Granthas*.

Grantha	***Varga***
Charak Samhita	*Varshiya Varga*
Sushutra Samhita	*Anupam Varga*
Rasarnav	*Shukla Varga*
Rasaratnakar	*Sweta Varga*
Ayurveda Prakash	*Uprasa Varga*
Rasatarangini	*Sankhadi Varga*
Rasendra Sara Sangraha	*Uprasa Varga*
Rasaratna Samuchchaya	*Sodhaniya Gana*
Bhavaprakasha	*Upratna Varga*

Rasa Kamdhenu	*Uparasa Varga*
Rasamritam	*Sudha varga*

***Grahya Swaroopa*[3]**

Spherical, smooth touch, subtle mouth, clean, beautiful like moon, huge in size *(Guru)* conch is accepted for medicinal purposes.

Types

According to forms[4]

1. *Dakshinavarta*- This variety is *Durlabha* (rare) and *Paramasubha* (very auspicious). It is widely used for workship God and Goddess.

2. *Vamavarta*- It is a common type of conch shell which is available easily. It is widely used for medicinal purposes.

According to size[5]

1. *Sankha*
2. *Ksudra Sankha*

Methods of *Shodhana*

The *Shankhas* are made into small pieces and tied in *Pottali* and then kept to boil in liquid media for several hours. After that *Pottali* should be removed from liquid media and opened up and then should be washed with hot water and then kept for drying.

Table 2: Showing *Shodhana* procedure of *Shankha* by different *Acharyas.*

Media used	Procedure followed	Time taken	Reference
Jambiri Swarasa	*Swedana*	4 *yama*	*Rasatarangini*[6]
Jayanti Swarasa	*Swedana*	1 *yama*	*Rasatarangini*[7]
Tanduliyajala	*Swedana*	1 *yama*	*Rasatarangini*[8]
Kanji	*Pachana*	1 *yama*	*Rasatarangini*[9]
Nimbukamla	*Swedana*	½ *yama*	*Rasatarangini*[10]
Amla Dravya	*Swedana*	1 *yama*	*Ayurveda Prakash*[11]
Gomutra, Lavana and Nimbu	*Swedana*	1 *yama*	*Rasendrasaar Sangreha*[12]

Marana* of *Shankha

Dried *Shankha* should be placed in *Sarava Samputa* and then *Sandhi Bandhana* should be done. This *Sandhi Bandhana* should be dry in shade, then subjected to *Gajputa Agni*. After *Swangsheeta* the *Sharava Samputa* was taken out. Then *Shankha* pieces are taken out and

broken into powder. It is then given the *Bhavana* of *Kumari Swarasa* and again subjected to *Gajaputa*. After such 2-3 *Puta*, white coloured *Shankha Bhasma* is obtained.[13]

The pieces of *Shodhita Shankha* are put in fire and subjected to *Samyavadi Laghu Puta* till they become bloomed.[14]

One *Pala* of *Shankha*, killed by being heated in blind crucible, is to be rubbed by means of a rod with half of a *Masha* of *Tankana* and then used as a medicine.[15]

Pharmacological properties[16,17]

Rasa*: Katu, Kashaya, Kshariya*

Guna*: Laghu, Hima*

Veerya*: Sheeta*

Karma*: Grahi, Balya, Vilekhana, Vishagna, Varnya, Hridya, Agnideepana.*

Rogaghanta*: Amlapittta, Agnimandya, Parinamshoola, Grahani, Tarunya Pidika Nashaka, Netrapushpahara.*

Dose[18]: 2 *Ratti*

Anupana[5]: *Jala or Nimbu Swarasa*

MATERIAL AND METHODS

Shodhana of *Shankha*

Material used: *Dola Yantra*, gas stove, cotton cloth, iron rod, knife, brush etc.

Method of *Shodhana*[10]

Shankha was taken and made into small pieces. The pieces of *Shankha* were tied in cloth and Pottali was prepared. The Pottali was immersed in *Dolayantra* with the help of an iron rod containing *Nimbukamla*. The *Dolayantra* was subjected for heating on mild flame which was maintained throughout. Required amount of *Nimbukamla* was added frequently in *Dolayantra* to avoid burning of drugs. The procedure continued for one and half hours. Then *Pottali* was taken out from *Dolayantra* and the physical impurities are removed by scraping with a knife and brush and then washed with hot water. Then these pieces of *Shankha* were dried completely.

Preparation of *Shankha Bhasma*

Equipment: *Khalva Yantra, Ulukala Yantra*, earthen pot, *Multani Mitti*, cloth, *Upala* (cow dung cakes), Match box, pyrometer etc.

Ingredients: *Shuddha Shankha* - 420 gm

Specification of heat: *Sadharana Puta* followed by *Gajputa.*

Specification of *Upala*:

Total weight of *Upala*: 157.26kg

Sadharana Puta: 45.7kg

1st *Gajputa*: 59.89kg

2nd *Gajputa*: 51.67 kg

Method of *Marana*

The dried *Shodhita Shankha* pieces were taken and put into the earthen pot and was closed by *Sharava*. *Sandhi Bandhana* was done with the cloth smeared with *Multani Mitti* and dried well. After completely drying the *Samputa*, *Sadharan Puta* were given. After attaining *Swangasheeta* stage, the earthen pot was taken outside and *Samputa* was removed carefully and the pieces of *Shankha* were collected. Pounded it in *Khalva Yantra*. After that it was given to the *Bhavana* of freshly prepared *Kumari Swarasa*. After becoming semi solid paste like, *Chakrika* were prepared in round and flat shape and dried well. After complete drying the *Chakrikas* should be placed in *Sharava* properly and covered with another *Sharava* and *Samputikarana* was done properly and dried well. After drying of *Samputikarana*, *Gajaputa* is given with the help of cow dung cakes by placing *Sharava Samputa* in the center of *Upalas* (i.e before placing ⅔rd quantity of *Upalas* are placed). After attaining *Swangasheeta* stage, *Sharava Samputa* was taken out and mud smeared cloth removed carefully. At last collect the *Chakrikas* and powdered and weighed.

OBSERVATION AND RESULTS

Observations of *Shankha Shodhana*

1. After a few minutes of heating the *Nimbukamla* started to overflow.
2. The color of *Nimbukamla* become deep yellow and dirty. The *Shankha* pieces become brighter in color.
3. During the process the typical smell of *Nimbukamla* was observed.

Precautions during *Shankha Shodhana*

1. The *Pottali* was immersed in *Dolayantra* in such a manner that it should not touch the *Patra* on any side and the whole drug should be in contact with liquid.
2. Mild fire was maintained throughout.

3. To avoid overflow and to maintain level of *Nimbukamla* small quantity of *Nimbukamla* was added frequently.

Table 3: Results of *Shankha Shodhana.*

Initial weight	Final weight	Weight loss in grams	Weight loss in percentage
475 gm	445gm	30 gm	6%

Reason of weight loss: Due to dissolution of physical impurities of the sample in *Nimbukamla.*

Observations of *Shankha Marana*

1. After *Sadharana Puta, Shankha* pieces become white, soft and brittle.
2. Lusture disappeared completely from *Shankha*.
3. During *Bhavana,* Trituration was difficult in the beginning because of the stickiness of the mixture which subsided gradually.
4. Mixtures become pinkish white and paste like with typical smell.
5. After *Puta*, *Chakrikaas* become pale white in color.

Precautions during *Shankha Marana*

During *Puta* procedure

1. *Sandhi Bandhana* should be done properly.
2. *Puta* area should be completely dry.
3. While giving *Puta* the earthen pot, *Samputa* should be placed in the center of *Upalas*.
4. Only after 24 hours, after attaining *Swangasheeta* stage the *Sharava* should be removed from *Puta* otherwise it will affect the product.
5. After attaining *Swangasheeta* stage, *Samputa* was re-opened carefully.

During *Bhavana* procedure

1. *Bhavana* should be given for prescribed 3 hours.
2. While preparing *Chakrikaas,* the person should wear gloves. This is because of calcium, it can damage the skin of the hand during exposure to that.

Table 4: Results of *Shankha Marana.*

Puta no.	Initial weight	Final weight	Weight loss in grams	Weight loss in percentage
Sadharan Puta	420 gm	369gm	51 gm	12%
1st *Puta*	369 gm	332 gm	37 gm	10%
2nd *Puta*	332 gm	302 gm	30 gm	9%

Analytical study

Analytical study of *Shankha Bhasma* was done at the Government Drug Testing Laboratory, Patiala.

Table 5: Analytical reports of *Shankha Bhasma.*

Name of Test	Reports
Loss on drying	0.37%
Loss on ignition	0.14%
Acid Insoluble ash	NIL
Test for Calcium	Give Characteristic Test

DISCUSSION

Shankha has an external lustrous yellowish brown horny layer and beneath it has thick layer, chiefly formed of Calcium Carbonate. It has *Katu Rasa*, *Laghu* and *Hima Guna*, *Sheeta Veerya.*[16,17] *Shankha* has *Sheeta Virya* and has Calcium Carbonate in it, which is the best known antacid. Due to its *Laghu Guna* and *Katu Rasa,* it helps in mitigating vitiated *Vata* and *Kapha*.

Shankha Shodhana was done by *Swedana* in *Dolayantra* with *Nimbukamla Swarasa*, which may helps in quick absorption. The *Pottali* was immersed in Dolayantra in such a manner that it should not touch the *Patra* otherwise their may be chance of burning of cloth and *Shankha* pieces coming out. After that it was washed with hot water. This help in eliminating the impurities of *Ashudha Shankha* by dissolving impurities in acidic medium and also increase the calcium component more over enhances the medicinal properties of *Bhasma*. *Amla Rasa* in the *Shodhana Dravya* also has *Kshalana* and *Bhedhana* properties which break the active Constituent of drug. Initially 475 gm of *Shankha* was taken for purification, which was left with 445 gm with 6% weight loss.

***Marana* of *Shodhita Shankha*[13]**

a) Role of media - *Kumari* (aloe veera) *Swarasa* is the best binding and reducing agent as it contains "Aloe-Emodin-anthrone" (mixture of aloin & barbaloin) and chrysophanol glycoside, both helps in disintegration of particles and facilitate in achieving finer particle size. *Kumari Swarasa* contains maximum amount of water which helps in reducing the alkalinity of drugs and also prevents further disintegration of CaO. *Mardana* process also helps in loosening the molecular cohesiveness and helps drugs to break into fine partical during the subsequent processing. The constituents of Aloe vera are Hydroxyanthraquinone-

barbaloin (a mixture of aloin A & B, the diastereoisomeric 10 C glucoside of aloe- emodin anthrone), γ - hydroxyaloin isomers. Other constituents include aloe emodin, chrysophanol, chromone derivatives- aloeresin B with its pcoumaryl derivatives oleoresin A and C and the aglycone aloesone, Water 99-99.5%, Solid materials-Vitamins, Minerals, Enzymes, Sugars, phenolic compounds, Lignin, Saponins, sterols, amino acids, salicylic acids. These elements also present in trace amount in *Bhasma*. So it can be said that *Bhavana Dravya* enhance the medicinal property of the *Bhasma*.

b) Process of *Marana* - Initially the pieces of 420 gm of *Shudha Shankha* were placed in an earthen pot and covered it with *Sharawa* then enclosed with mud smeared cloth and whole *Sharawa Samputa* was subjected to *Gajputa* as a *Sadharana Puta*. For the incineration by *Gajputa* 45.7 kg cow dung cakes were used initially. Then heat was given. On the successive/next day after *Swangsheeta* the samples in *Sharawa Samputa* were taken out of *Puta*. The pieces of *Shankha* get powder in mortar *(Khalva)* and weighed manually then triturated with *Kumari Swarasa*. After giving *Bhavana Chakrikas* were prepared and dried well. After *Chakrikas* got completely dried, then kept in an earthen pot and covered with another *Sharawa* and *Sandhi Bandhana* was done with mud smeared cloth. For the incineration by 1st *Gajputa* 59.89 kg cow dung cakes were used and heat was given. On the successive/next day after *Swangsheeta* the samples in *Sharawa Samputa* were taken out of *Puta*. Obtained material was triturated with *Kumari Swarasa* in mortar *(Khalva)* and *Mardana* was carried out. Pellets were made, dried and kept in *Sharawa Samputa* and 2nd *Puta* was given. For the incineration by 2nd *Gajaputa* 51.67 kg were taken and the heat was given. On the successive/next day after *Swangsheeta* the samples in *Sharawa Samputa* were taken out of *Puta*. White coloured 302 gm of *Shankha Bhasma* was obtained. In the classical text two *Gajaputa* had been advocated for the preparation of *Shankha Bhasma*. In this *Marana* process it has been observed that the second *Gajaputa* had been given with less quantity of cow dungs as compared to first one, This is due to because the palates of *Shankha Bhasma* after the first *Puta* had became very fragile more over the quantity of *Shankha Bhasma* had also been reduced. So, keeping in mind and observing the palates physically the quantum of heat should be less than the previous *Puta*. Therefore the quantity of cow dungs reduced than initially to save the pallets from burning. In this temperature the heat gradually rises and falls which makes material more *Agnisthayi* (heat stable).

The Initial weight of *Shankha* is 420 gm which reduced to 302 gm after 2nd *Puta*. The Color of *Chakrikas* also changes in 1st *Puta* to pale white color and in 2nd *Puta* it changes to white color. Total 31% weight reduced. Reason for the weight loss of the *Bhasma* may be due to oxidation of organic substances during the incineration process, trituration and other mechanical processes.

Important aims of analytical study are to know the particular characteristics of the product and the physio-chemical changes which occur during and after different pharmaceutical procedures and to follow SOPs for quality of raw drugs, manufacturing of intermediate and finished products. The following parameters were adopted for the test of quality, identity and purity of the *Shankha Bhasma*.

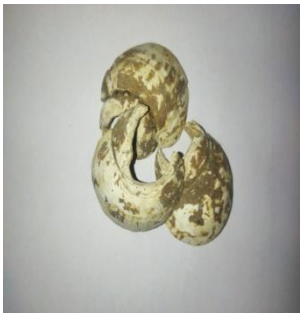
Classical *Bhasma Pariksha* of *Shankha Bhasma*: *Shankha Bhasma* was having smooth in consistency which denotes its *Slakshnatva* because of its fine particals resulting of continuous trituration and number of *Puta* given.

Loss on Drying[19]: Loss on Drying helps to know about any moisture content in the drug. Loss on Drying of *Shankha Bhasma* was 0.37%.

Loss on Ignition[20]: LOI of the product indicates the extend to which the pyroprocessing was incomplete. It is a measurement of unburned carbon remaining in the ash. This test is commonly done for mineral compounds. Loss on ignition of *Shankha Bhasma* was 0.14 %.

Acid Insoluble Ash[21]: In the present study, the acid insoluble ash of *Shankha Bhasma* was NIL which suggests that all the components are acid soluble which is absorbed by the acid media that is by gastric juice.

Test for Calcium[22]: Test of calcium salts with solution of ammonium carbonate in ammonium chloride solution give characteristic test for calcium which show presence of calcium component in it. *Shankha Bhasma* give characteristic test for calcium positive.



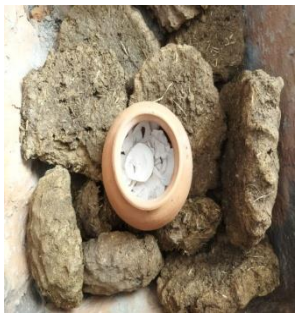
1. *Ashudha Shankha*

2. *Nimbu Swarasa*

3.Shodhana in *Dolayantra*

4. *Shudha Shankha*

5. *Shudha Shankha*



6.Prepartion for *Sadharana Puta*

7.After *Swangasheeta*

8.*Shankha* pieces after *Sadharana Puta*

9.Powdering of *Shankha*

10. *Kumari Swarasa*

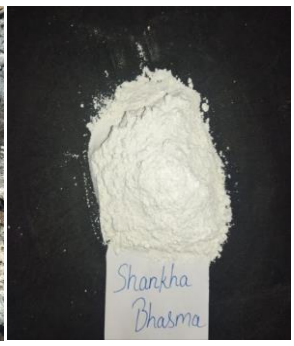
11. Addition of *Kumari Swarasa* to *Shankha* powder

12. *Bhavana* given with *Kumari Swarasa*

13. *Chakrikarana*

14. *Putapaka*

15. After *Swangasheeta*



16. *Shankha Bhasma*

REFERENCES

1. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/1, 265.
2. Dr. K. M. Nadakarni's, Indian Materia Medica Vol – II. Edited by A. K. Nadakarni, 3rd edn., Bombay: Popular Prakashana, 1982; 164.
3. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/2, 265.
4. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/3-5, 265.
5. *Ayurvediya Rasshastra*, A Textbook of *Rasashastra*, by *Chandrabhushan Jha*, Varanasi: Chaukhamba Surbharti prakashan, 2013; 442.
6. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/7, 266.
7. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/8, 266.
8. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/9, 266.
9. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/10, 266.
10. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/11, 266.
11. *Madhava Upadhyaya, Ayurveda Prakash, Suspashtavabodhini* Hindi Commentary by Vd. *Gururaj Sharma Mishra*, reprint edition 2007, Varanasi: Chaukhamba Bharti Academy, 2/263, 323.
12. *Bhatta Gopalakrishna, Rasendra Sara Samgraha*, Edited by *Pandit Paryagadatta Joshi, Girijadayalu Shukla*, 6th Edition, Varanasi: Chaukambha Amara Bharati prakashana, 2nd Chapter, Hikka Shwasa chikitsa, Verse 22, 283(1): 328.
13. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam*, Hindi commentary, published by Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/17-19, 267.
14. *Madhava Upadhyaya, Ayurveda Prakash, Suspashtavabodhini* Hindi Commentary by *Vd. Gururaj Sharma Mishra*, reprint edition 2007, Varanasi: Chaukhamba Bharti Academy, 2/264, 324.

15. *Mukharji Bhudeva, Rasa Jala Nidhi,* Varanasi: Chaukhambha orientalia, 1998; 2, 2 nd Chapter, 220.
16. *Madhava Upadhyaya, Ayurveda Prakash, Suspashtava Bodhini* Hindi Commentary by *Vd. Gururaj Sharma Mishra,* reprint edition 2007, Varanasi: Chaukhamba Bharti Academy, 2/262, 232.
17. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam,* Hindi commentary, published by Chaukhamba Surbharti publications, Varanasi 2018; 12th Taranga/20-21.
18. *Sharma Sadananda, Rasatarangini* by Dr. *Devnath Singh Gautam,* Hindi commentary, Varanasi: Chaukhamba Surbharti publications, 2018; 12th Taranga/21.
19. Dr. D.R. Lohar, Protocol for testing of ASU Medicines, Govt. of India, Deptt. Of Ayush, Ministry of Health and Family Welfare, Pharmacopeial Laboratory for Indian Medicines, Ghaziabad, 2008, Appendix 2.2.9, 50.
20. The Ayurvedic Pharmacopoeia of India, Part 1, Vol-VII, Ministry of Health and Family Welfare, Govt of India, Dept of Ayush, New Delhi, Controller of Publication Civil Lines, Reprint, 2001; Appendix-3,1.2, 73.
21. Dr. D.R. Lohar, Protocol for testing of ASU Medicines, Govt. of India, Deptt. Of Ayush, Ministry of Health and Family Welfare, Pharmacopoeial Laboratory for Indian Medicines, Ghaziabad, 2008, Appendix 2.2.4, Page 49.
22. The Ayurvedic Pharmacopoeia of India, Part 1, Vol-VI, , New Delhi, Govt. of India, Ministry of Health and Family Welfare, Dept of Ayush, Reprint 2001, Appendix 2.2.7 pg. 214.