



Research Article

**ANALYTICAL STUDY OF HINGUL SHODHAN W.S.R. TO BHAVNA OF AADRAC SWARAS**

**Amol E. Bamane<sup>1\*</sup>, Devyani D. Bhadlikar<sup>2</sup>**

<sup>1</sup>M.D Scholar, <sup>2</sup>Associate professor, Dept. of Rasashastra and Bhaishajyakalpana, Dr. D.Y. Patil School of Ayurveda Nerul, Navi Mumbai, Maharashtra, India.

**ABSTRACT**

*Rasaacharya* were well known about the toxic effect produce due to use of mineral in their impure form. For removing this toxic effect they mentioned various *Shodhan* (purification) processes in their books. *Shodhan* process plays a very significant role in purification of *Rasa dravya* like *Hingul* for internal administration. In this study *Shodhan* of *Hingul* by *Kshalan* process is performed which is mentioned in book of *Rasatarangini*. Because of the need of purification & standardization in Ayurveda we do ICP-AES for Elemental qualitative analysis *Hingul* is one of the toxic mineral which is used therapeutically in practice of Ayurveda after proper treatment called as *Shodhan*. To evaluate the effect of *Shodhan* of *Hingul* was asses by the help of ICP-AES test. Sample of raw *Hingul*, sample of seven time's triturated *Hingul*, sample of *Kshalan* water after seven time triturated *Hingul* and sample of after *Kshalan* of *Hingul* was given for the qualitative elemental analysis in the ICP-AES test. In this study we want to see the changes after the *Shodhan* process. And want to see why our text says use of *Aadrak swaras* for *Shodhan* of *Hingul*. After doing the ICP-AES test of a given sample we found elements like Nickel (NI) and Phosphorus (P) in the sample *Kshalan* water. Hence we conclude that some changes happened during the *Shodhan* process.

**KEYWORDS:** *Shodhan, Kshalan, Hingul, Aadrak Swaras, ICP-AES test.*

**INTRODUCTION**

*Rasashastra* is one of the important Branch of Ayurveda, more inclined towards pharmaceutical and pharmacological angles of different methods of collection, purification, preparations, preservation, standardization and therapeutically utilization of Mercury, Mercurial compounds, Metals, Minerals, Herbo-mineral and Metallo-mineral compounds. From Vedic period to *Samhita* period there was less use of Herbo-mineral drugs but, from the period of Nagarjuna, compounds of Herbo-mineral drugs are used profusely.<sup>[1]</sup> Ayurvedic compound formulations are divided into two groups i.e., *Rasaushadhi* (Mercurial, Metallo-mineral, Herbo-mineral) and *Kasthaushadhi* (Herbal). *Rasaushadhis* are appreciated for their smaller dosages, effectiveness and long durability. Since then this branch of Ayurveda has been playing an important and major role in curing the ailing human being. Many types of drug preparatory methods on the basis of *Murchit parad, Kharaliya kalp, Bhasma, Pisti, Parapati, Pottali, Kupipakva rasayana* etc. are explained in *Rasashastra*.<sup>[2]</sup>

*Shodhan* (Purification) is one of the important procedure which is done before the preparation of any *Rasa kalpa*.<sup>[3]</sup>

In Ayurveda use of Mercury, Mercurial compounds, Metals, Minerals, Herbo-mineral and Metallo-mineral drugs are use profusely. *Shodhan* (Purification) is one of the important procedure which is done before the preparation of any *Rasa kalpa*.

In Ayurveda various *shodhan* methods were explain in texts. Cinnabar (*Hingul*) is one of the mineral used in practice of Ayurveda after proper *Shodhana* process. In this study we want to see what exactly

happened after the *Shodhan* of *Hingul* by using *Aadrak swaras*.<sup>[4]</sup> For this purpose we do elemental qualitative analysis in ICP-AES test.

**MATERIALS AND METHODS**

*Hingul shodhan* process was carried out in Department of Rasashastra & Bhaishajya kalpana in D.Y. Patil University School of Ayurveda, Nerul Navi Mumbai.

There are two steps in *Hingul Shodhan* was done

- 1) Trituration of *Ashudha hingul* with *Aadrak* juice and
- 2) *Kshalan* (washing) of triturated *Hingul*.

The *Hingul* was procured from genuine dealer and *Aadrak* for *Aadrak* juice was obtained from market.

**Equipment**

Glass jar, mortar and pestle, stirrer, DI water, measuring cylinder.

**Process of *Hingul shodhan***

At first unpurified *Hingul* (cinnabar) was powdered in mortar with pestle. Then this *Hingul* powder was triturated with *Aadrak* juice for seven times (seven *Bhavna*). After completion of seven times triturated, *hingul* turns crystallized to powder form and its pH was acidic. Then do *Kshalan* (washing) with DI water of this triturated *Hingul*. The process was completed in 8 days and the final product called *Shudha hingul* obtained.

The raw *Hingul*, seven times triturated *Hingul*, *Kshalan* liquid and *Shudha hingul* obtained from the above process was taken for analysis.

a) Observation table of *Bhavana*

Sr.No	Date	Quantity of drug ( <i>Hingul</i> ) In grams	Quantity of <i>Aadrak</i> juice in ml	Time required for each <i>Bhavana</i>
1	3/01/2016	20	5 ml	1 hrs 15 min
2	4/01/2016	20	4 ml	1 hrs 01 min
3	5/01/2016	20.2	4 ml	1 hrs 07 min
4	6/01/2016	20.2	4 ml	56 min
5	7/01/2016	20.3	3.5 ml	34 min
6	8/01/2016	20.3	3.5 ml	44 min
7	9/01/2016	20.4	3.5 ml	35 min

***Bhavana* procedure with *Aadrak* juice****Modern parameters for analysis of *Hingul***

ICP-AES was performed in IIT Bombay for doing the elemental qualitative analysis.

**ICP-AES**

Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) is an emission spectrophotometric technique, exploiting the fact that excited electrons emit energy at a given wavelength as they return to ground state after excitation by high temperature Argon Plasma. The fundamental characteristic of this process is that each element emits energy at specific wavelengths

peculiar to its atomic character. The energy transfer for electrons when they fall back to ground state is unique to each element as it depends upon the electronic configuration of the orbital. The energy transfer is inversely proportional to the wavelength of electromagnetic radiation.

Although each element emits energy at multiple wavelengths, in the ICP-AES technique it is most common to select a single wavelength (or a very few) for a given element. The intensity of the energy emitted at the chosen

wavelength is proportional to the amount (concentration) of that element in the sample being analyzed. Thus, by determining which wavelengths are emitted by a sample and by determining their intensities, the analyst can qualitatively and quantitatively find the elements from the given sample relative to a reference standard.

#### Method

- 1) Take 0.1 gm of sample and nitric acid 3 to 4 ml.
- 2) Then prepared a mixture of sample and nitric acid
- 3) Then this mixture is put on hot plate for 5 to 10 min heating at 60° to 70°
- 4) Then cool the mixture.
- 5) Then this mixture put in volumetric flask and adds 25 ml of distilled water in it.

#### Result: Table Detected elements in given samples

Sample	Test	Results
Ashudha Hingul	ICP-AES	Al, As, B, Ba, Ca, Cr, Fe, Hg, K, Mg, Mn, Na, S, Si, Ti, Zn
After seven time trituration	ICP-AES	Al, As, B, Ba, Ca, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, S, Si, Ti, Zn
Powder of Hingul After Kshalan	ICP-AES	Al, As, B, Ba, Ca, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, S, Si, Ti, Zn
Kshalit Water	ICP-AES	Al, As, B, Ba, Ca, Cl, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, P, S, Si, Ti, Zn

#### RESULTS

In this test we found elements like Nickel (NI) and Phosphorus (P) in the sample of *Kshalan* water.

#### DISCUSSION

*Shodhan* is a process by which Minimization or removal of toxic effect of the drug, Conversion of hard material into soft and brittle (*Bhanguratwa*) so as to proceed for further pharmaceutical techniques, Impregnation of organic qualities of *Bhavana dravya* in to the drug. It Increase the therapeutic efficacy of the drug. The impurities of the substance cause several diseases and shows toxic effect. So it is advisable to administer the drug in pure form. The impure *Hingul* contains several impurities. After purification it becomes palatable. Regarding the cinnabar (*Hingul*), different purification methods have been described by different authors. Due to intake of Unpurified cinnabar (*Hingul*) produces blindness (*Andhyatwa*), impotency (*Klaihya*), skin diseases (*Kustha*), giddiness (*Bhrama*), heaviness (*Gourav*) and *Prameha*.<sup>[5]</sup>

#### ICP-AES

In ICP-AES study there are some elements which are present in sample of *Kshalan* which are removed after washing (*Kshalan*). After doing study of those elements which were removed after *Kshalan* i.e. Nickel (Ni),

6) Then this prepared sample in ICP-AES machine for analysis.

#### Simultaneously make the blank solution also

- 1) For preparation of blank solution, take 4 ml nitric acid and add distilled water in it till marking of volumetric flask.

Note: do this procedure for every sample.

#### Samples for ICP-AES

- 1) **First sample (H):** Raw cinnabar (*Hingul*)
- 2) **Second sample:** Seven times triturated sample of (*Hingul*).
- 3) **Third sample:** *Hingul* powder after *Kshalan*
- 4) **Fourth sample:** *Aadrak* juice *Kshalit* water sample.

Phosphorus (P) are may be harmful for the body in higher concentration.

#### CONCLUSION

*Shodhan* process helps to remove toxic substance or elements, which is seen in samples of ICP-AES study, which is the primary aim of *Shodhan*.

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#### \*Address for correspondence

**Dr. Amol E. Bamane**  
Kamalkunj Niwas, Arunoday  
Colony, Karve Naka, Karad. Dist -  
Satara, Pin code no.- 415110.  
Email: [dramolbamane@yahoo.com](mailto:dramolbamane@yahoo.com)  
Ph- 09595445599