wjpmr, 2018,4(7), 196-199

SJIF Impact Factor: 4.639

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

Research Article

ISSN 2455-3301

WJPMR

# IMPACT OF SHODHANA W.S.R TO HEAVY METAL ON HINGULA WITH LAKOOCHA PHALA SWARASA (ARTOCARPUS LAKOOCHA)

**Dr. R. Surjith*[1], Dr. Madhavi Patel[2] and Dr. M. R. Pandya[3]**

[1]Final year PG scholar, Dept. of Rasa Shastra & Bhaishajya Kalpana, Parul Institute of Ayurved, Parul University, Vadodara, India.

[2]Associate Professor & H. O D., Dept. of Pharmacognosy, Parul Institute of Pharmacy, Parul University, Vadodara, India.

[3]Professor & H. O. D., Dept. of Rasa Shastra & Bhaishajya Kalpana, Parul Institute of Ayurved, Parul University, Vadodara, India.

***Corresponding Author: Dr. R. Surjith**

Final year PG scholar, Dept. of Rasa Shastra & Bhaishajya Kalpana, Parul Institute of Ayurved, Parul University, Vadodara, India.

**Article Received on 19/05/2018** **Article Revised on 09/06/2018** **Article Accepted on 30/06/2018**

## ABSTRACT

Ayurveda has used herbal and herbo-mineral substances in therapeutics since time immemorial. But nowadays, due to recent questions raised regarding the toxicity of Ayurvedic formulations. The science is expertise in the usage of metal-minerals and *vishadravyas* (poisonous drugs) in therapeutics by subjecting them in to a *samskara* known as *shodhana* (purificatory procedures). The role played by *shodhana* procedure in reducing the toxicity of the *dravyas* has to be understood in a scientific way. Therefore, understanding the role of *shodhana* of metal-minerals and *vishadravyas* is the need for the present era. In the present study, the *Hingula*, one of the *sadharana rasa* was subjected to *sodhana* process with *Lakoochaphalaswarasa* by the method of *Bhavana* (Levigation). And analytical study was carried out to notice the changes before and after *shodhana*w.s.r to heavy metals. The study revealed that there is significant role played by the media used for *shodhana*. Specially to detect the heavy metal analysis before and after sodhana by the method of Inductively Coupled Plasma-Atomic Absorption Spectroscopy in raw hingula and hingula purified in lakoochaphalaswarasa (Artocarpuslakoocha).

**KEYWORDS:** *Hingula, lakoochaphalaswarasa, shodhana.*

## INTRODUCTION

Cinnabar as a compound (contains mercury sulphide) has been used in various diseases. Such traditional medicines are used still today. *Rasachikitsa* is considered as the best among all other treatment modalities due to the qualities like quicker actions, effectiveness in small doses longer stability period and augmenting effect.[1] The drug formulations are found to be more potent and effective in terms of disease curing. But it should be administered after proper purification process. Because adverse drug reactions are more common if not properlyadministered based on classical guidelines. After proper processing of *shodhana*, *samskara*, *murchhana*, *jarana* and various *shodhana*process with herbo-mineral drugs it acts like nectar in the body. However, *Hingula* is the main source of *parada* but it is included under *sadharana rasa varga* in majority of books. It is reddish brown in colour and heavy mineral of the *parada* and *gandhaka*. It is insoluble in water. It is classified in *Maharasa*in *Rasarnava*, *Rasa HridayaTantra* and *Rasa kamadenu* and as a part of *Sadharana Rasa* in *Rasa Ratna Samucchaya*.[2]

### Sodhana[3]

Historically *Sodhana* concept was in existence since the time of Caraka Samhita (600-1000 B.C.) as while enumerating the fundamentals of Ayurvedic pharmaceutics *Saucha* (*Sudhikarana*) is found enumerated as one of the fundamentals necessary for '*Gunantaraadhana*'. This concept has further developed after the development of *Rasasastra* in the field of Ayurvedic medicine. As in *Rasasatra* generally the metals/minerals/mercury and some times a few drugs of poisonous nature are found used which are likely to contain some toxic effect also. Hence with a view to remove or minimise their toxicity or the toxic effects and to make these suitable for further process and for internal use, a number of *Sodhana* procedures and techniques have been found evolved which proved greatly helpful in reducing or minimising the toxic effects of these drugs.

### Hingula

Best quality of Hingula should be just like pravala (coral), japakusuma (Hibiscusrosa-sinensis) in colour, it should possess white lines or salaka like structure. Some bad effects of hingula aremoha (psychosis), prameharoga (diabetes mellitus), citta-vibhrama (delirium), andhatwa

(darkness before eyes). Klama (tiredness) and sariraksinatwa (emaciation). Therefore, the cinnabar should be properly purified before therapeutic use.[4]

**Cinnabar**

Cinnabar is a most popular mineral for obtaining mercury. In the world almost, total mercury is obtained from it. It occurs in both crystalline and massive forms. The ore is a red crystalline mass and easily distinguished from all other red minerals by its peculiar shades of colour and its great weight. It contains 13.8% sulphur and 86.2% mercury. Massive cinnabar is usually impure through the admixture of clay, iron oxide or bituminous substances, occasionally or organic materials.[5]

**Importance of Sodhanam**

*Shodhanam* 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 and impregnation of organic qualities of *Bhavanadravya* into the formulation. The impurities of the substance cause several diseases and shows toxic effect. So, it is advisable to administer the drug in a formulation in pure form. The impure *Hingulam* contains several impurities that could cause *andhyatwa* (blindness) *klaibya* (impotency) *kustha* (skin diseases) *bhrama* (giddiness) *gaurava* (heaviness) and *prameha* (diabetes). Thus, *Shodhana* of *Hingula* is recommended, to get it qualities under control, before using it in any formulation.[6]

**Heavy Metal Toxicity**

The heavy metals most commonly associated with poisoning of humans are lead, mercury, arsenic and cadmium. Heavy metal poisoning may occur as a result of industrial exposure, air or water pollution, foods, medicines, improperly coated food containers, or the ingestion of lead-based paints. A heavy metal, a dense metal that is usually toxic at low concentrations. Although the phrase heavy metal is common, there is no standard definition assigning metals as heavy metals. Some characteristics of heavy metals are lighter metals and metalloids are toxic and, thus, are termed heavy metals, such as gold, typically are not toxic.[7] Most heavy metals have a high atomic number, atomic weight and a specific gravity greater than 5.0.[8] Heavy metals include some metalloids, transition metals, basic metals, lanthanides and actinides. Although some metals meet certain criteria and not others, most would agree the elements mercury, lead are toxic metals with sufficiently high density. The exposure of heavy metals leads to life threatening issues. So, in this study Analytical method is to be carried out to detect the heavy metals.[9]

ICPAES (Inductively coupled plasma atomic emission spectroscopy) also referred to as Inductively coupled plasma optical emission spectroscopy (ICPOES), is an analytical technique used for the detection of trace metals. It is a type of emission spectroscopy that uses the inductively coupled plasma to produce excited atoms and ions that emit electromagnetic radiation at wavelengths characteristic of a particular element. The intensity of this emission is indicative of the concentration of the element within the sample.

AAS (Atomic absorption spectrometer) is a technique a light source emitting a narrow spectral line of characteristic energy is used to analysis of trace metal impurities from inorganic, organic, polymer, geological and biological samples up to ppb and in some cases in ppt level.[10]

**Table 1: Acute and chronic exposure of heavy metals.**

| Elements | Acute exposure | Chronic exposure |
|---|---|---|
| Arsenic | Nausea, vomiting, diarrhoea, coma, convulsions | Vomiting, diarrhoea, hyperaesthesia, peripheral neuritis, muscular atrophy. |
| Mercury | Thrombocytopenia, vomiting, convulsion, coma. | Chronic nausea, colicky pain abdomen, skin eruptions, paralysis of speech muscles. |
| Lead | Vomiting, thirst with abdominal pain, paralysis of muscles | Vomiting, encephalopathy, arthralgia |
| Cadmium | Vomiting, diarrhoea, renal failure. | Osteomalacia, osteoporosis, intestinal fibrosis. |

## MATERIALS AND METHODS

**Collection of raw materials**

*Hingula* (*Hamsapadahingula*) and *Lakoochaphalaswarasa* (*Artocarpuslakoocha*), procured from pharmacy, Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat.

The whole procedure is done by i.e *Shodhana* of *Hingula*done by the procedure of *Bhavana*. Seven times *Bhavana* in each batch with *lakoochaphalaswarasa* (*Artocarpuslakoocha*). In the present study *Hingulashodana* is carried out as per the reference of *Rasa Tarangini* by applying the principle of *Bhavana* (Levigation).

**Ingredients**

**Table 2: Pharmaceutical composition of Hingula Shodhan.**

| Batch | 1 | 2 | 3 |
|---|---|---|---|
| *Ashuddhahingulachurna* (In gm) | 60 | 60 | 60 |
| *Lakhuchaphalaswarasa (*In ml*)* | 840 | 840 | 840 |

**Procedure**[11]

180 gm of *Hingula*(Cinnabar) was divided in to separate 3 batches i.e. 60 gm each batch. All the equipments are cleaned properly with hot water, then dried properly on gas burner for sterilization. *Ashuddhahingula* (impurified

cinnabar) was made in to fine powder form and passed through sieve 60. *Ashuddha Hingula* is made in to fine powder and put it in to *khalva yantra* add 120 ml of *lakoochaphalaswarasa* bhavana is done for 7 times (21 hours). In the first *bhavana* 120 ml *lakoochaphalaswarasa*. Same as it is followed by remaining 6 *bhavanas*. *Bhavana* is done for 1 *yama* (3 hours). while doing *bhavana* the fine particles gets softens. Colour gets changed, odour becomes acidic. At the end it will become stickier. Then *bhavana* should be done slowly. After the completion of *bhavana* it should be dried and powdered and stored in air tight container.

Extraction of *Lakoochaphalaswaras*. Take *pakwalakoochaphala* and remove the external covering, then remove the seeds the juice was extracted manually then it is filtered.120 ml of *lakoochaphalaswaras* is used for each and every *bhavana.* Site of procurement: Market and Pharmacy of Parul Institute of AyurvedSite of Commencement: *Rasa Shastra* & *Bhaishajya Kalpana* Laboratory, Parul Institute of Ayurved.

Times Required: 7 *Bhavana*(21 hours).

**Apparatus Required**

*Khalva yantra*, *Lakoochaphalaswarasa*, measuring jar, Ounce glass, Weighing machine, Two stainless steel vessels, Spoon.

## OBSERVATIONS

For the first *bhavana* the quantity of *Lakoochaphalaswarasa* required was quite more than the subsequent *bhavanas.* Because the *Hingul* is dry. The colour of *Ashuddha Hingula* was shining dull red which was changed after every *bhavana*. Time required for *bhavana* changes according to the room temperature. Time required for *bhavanas* is given in the morning. While repeating *bhavana* it become stickier. Shining is gets reduced. The colour of *Hingula* became brighter and brighter after each *bhavana*. The shining is reduced. So, from the all 3 purified batches of *hingul* (25 gm) is collected and packed in airtight container and analytical study is carried out to detect the heavy metals.

## RESULTS

An average of 4% loss was observed on *shodana* of *hingula.* Instrumental analysis: ICP-AAS. Site of Commencement: Vasu Research Centre, GIDC Makarpura, Vadodara.

**Table 3: Pharmaceutical result of hingulashodhana with lakoochaphalaswarasa.**

| **Batch** | **1** | **2** | **3** |
|---|---|---|---|
| *Ashuddhahingulachurna* (In gm) | 60 | 60 | 60 |
| *Lakhuchaphalaswarasa (*In ml*)* | 840 | 840 | 840 |
| *Shuddhahingulachurna* (In gm) | 58 | 56 | 59 |
| *Bhavana* (In hours) | 21 | 21 | 21 |
| Weight loss | 2 | 4 | 1 |

**Table 4: Analytical result of hingulashodhana with lakoochaphalaswarasaw.s.r toreduction of heavy metals.**

| **Elements** | **Limit as per API** | ***AshuddhaHingul*** | ***ShuddhaHingul*** |
|---|---|---|---|
| | Quantity (in ppm) | Quantity (in ppm) | Quantity (in ppm) |
| Lead | NMT 10 ppm | 28.99 ppm | 0.63 ppm |
| Cadmium | NMT 0.3 ppm | ND | ND |
| Arsenic | NMT 3 ppm | 4.62 ppm | 0.18 ppm |
| Mercury | NMT 1ppm | 5 ppm | 0.5 ppm |

Abbreviations:
API- Ayurvedic Pharmacopeia of India.
Ppm- parts per million.

In this Analytical study, limit as per API quantity (in ppm) is to be find out before and after shodhan. In ashuddhahingul ppm is seen more than the limits of API to its natural mineral occurrence. As per the limits of API lead is 10 ppm quantity but in ashuddhahingul it was found to be 28.99 ppm and in shodithahingula it was found to be 0.63.As per the limits of API cadmium is 0.3 ppm quantity but in ashuddhahingul and shodhithahingula it was not detected in both of them. As per the limits of API arsenic is 3 in ppm quantity but in ashuddhahingul it was found to be 4.62 ppm and in shodithahingula it was found to be 0.18. As per the limits of API mercury is 1 ppm quantity but in ashuddhahingul it was found to be 5 ppm and in shodithahingula it was found to be 0.5 ppm.

## DISCUSSION

Though there are many methods according to different acharyas but according to *Rasa Tarangini* four methods among the four methods *lakoochaphalaswarasa (Artocarpuslakoocha*) method is undergone in this study. While doing bhavana it shows the similarities and differences in the physical observations among the raw and purified samples. It was observed that during the first *bhavana* differs in its lustre (decreased adamantine), hardness is reduced and change in colour. Shining is also reduced due presence of acid content in *Lakoochaphalaswarasa (Artocarpuslakoocha*) due to its acid content it reacts with metals and loose its lustre and shining. So, as it is mentioned by *acharyas* in *bhasmapareekshanischantratva* in bhasmapariksha we can understand that it is purifiedin second *bhavana* it will

be stickier in *khalva yantra* and colour is changed bright red is noticed. In the remaining five *bhavanas*the colour is become brighter devoid of blemishes and soft in touch acidic smell is noticed. Artocarpuslakoocka is containing strong antioxidants and these are flavonoids and phenolic acids. Fruit can be consumed as alternative nutritional food and plant used as raw materials of pharmaceuticals due to its pharmacological properties. Ethanolic extraction of A. lakoocha extract contains antioxidants and polyphenolic compounds, especially tannins and flavonoids.

## CONCLUSION

The method of *shodhana* proves effective in removal of heavy metals up to decent quantity. All of the heavy metals' quantities reduce and go to lower levels than that of mentioned limits as per Ayurvedic Pharmacopoeia of India. In this way, it is concluded that impact of shodhana on hingula with lakoochaphalaswarasa (juice of Atrocarpuslakoocha) is significant as per the need w.s.r. heavy metals.

## REFERENCES

1. Dr.Bharathi Umrethia and Dr. Bharat Kalsariya, A text book of Rasashastra, Printed at Himali graphics, Nadiad, Pg. no. 4.
2. Dr.Damodarjoshi, Rasa sastra, Chaukhamba Orientalia publishers, Reprint edition 2013; Pg no. 245.
3. Dr.Damodarjoshi, Rasa sastra, Chaukhamba Orientalia publishers, Reprint edition 2013; Pg no. vii.
4. Sadanandsharma, RasaTarangini 9/3 and 9/11, 11th edition, 8th Reprint, 2014; Pg no 199 and 200.
5. Sadanandsharma, RasaTarangini 9/4, 11th edition, 8th Reprint, 2014; Pg no 199.
6. Sadanandsharma, RasaTarangini 9/11, 11th edition, 8th Reprint, 2014; Pg no 200.
7. https://rarediseases.org/rarediseases.
8. P. Vijay Chadha, Handbook of forensic medicine and toxicology (medical jurisprudence), 5th edition, Jaypee Brothers Medical Publishers Pvt Ltd, New Delhi, Chapter 26, Pg No. 253-54.
9. P. Vijay Chadha, Handbook of forensic medicine and toxicology (medical jurisprudence), 5th edition, Jaypee Brothers Medical Publishers Pvt Ltd, New Delhi, Chapter 26, Pg No. 256-57.
10. Dr Ravindra Angadi, Text book of bhaishajya Kalpana vijnana, Chaukhambhasurabharatiprakashana, Reprint 2011; Pg No. 446.
11. Dr Bharat J. Rathi, Practical Handbook of RS&BK, Chaukhambha Publication, First Edition 2013; Pg No. 3.