IMPORTANCE OF ORGANOLEPTIC CHARACTERS IN AUTHENTICATION OF HINGULA SHODHANA W.S.R. TO COLOR AND ITS TOXICOLOGY STUDY: AN ANALYTICAL RESEARCH

Dr. Deepika Bhandari[1*]

Abstract:
Background: The use of mineral elements in Ayurvedic formulations is common. These are completely non-toxic when used after purification. Purification techniques used should be authentic and classical to avoid any toxicological after effects of prescription. Till date Importance of organoleptic characters i.e. color variation is not reported for authentication of purity of Hingula (Red sulphide of mercury) along with toxicology.
Aim: Present study was carried out to evaluate the parameters of sample purity macroscopically in relation to color and toxicity changes.
Materials & Methods: Hingula was collected from local market of Patiala, Punjab. It was purified by levigating with juice of wet ginger (Zingiber officinale).
Results: It was observed that there is a change in color of Hingula after levigation which is key parameter in authentication of pure Hingula along with its reduction in lead compound.
Conclusion: This organoleptic character i.e. color can be the key parameter for authentication of pure Hingula and lead value within permissible limits is the key point in detoxification parameter of Hingula.

Key words: Color, Hingula, Purification, Toxicity, Zingiber officinale,

[1]*Associate Professor, Smt. Urmila Devi Ayurvedic College of Medical Scienes & Hospital V.P.O Kharkan, Una Road, Hoshiarpur, Department of Agad Tantra Evum Vayavhara Ayurveda Evum Vidhivaidyaka (Department of Medical Jurisprudence & Toxicology)

***Corresponding Author:** Dr. Deepika Bhandari
*Associate Professor, Smt. Urmila Devi Ayurvedic College of Medical Scienes & Hospital V.P.O Kharkan, Una Road, Hoshiarpur, Department of Agad Tantra Evum Vayavhara Ayurveda Evum Vidhivaidyaka (Department of Medical Jurisprudence & Toxicology)

DOI: - 10.48047/ecb/2023.12.si5a.006

Introduction

One of the most significant compound mineral in Rasa Shastra is Hingula. Rasodbhava (Hingula) is the cheapest and most convenient source of Parada(mercury). It falls under Sadharana Rasa Varga. The best color is like Japa Kusum (Hibiscus rosa – sinensis). The native form was purchased from Darda Desha & Malechha Desha during the classical era. It is the compound of mercury and sulphur. Its chemical name is Cinnabar. Its chemical formula is HgS. It contains 86% of mercury and 14% sulphur. It is regarded as the most common mineral in the world for obtaining mercury. It is heavy in weight, glows brilliant red with silver streaks in between.

Without significant procedures, such as Shodhana (purification), Ayurveda does not use heavy metals or minerals for medicinal purposes mostly except in a fewcases, to make them safe, & sophisticated. With the help of Shodhana , metallic contents become superfine to be used by body safely biologically by eliminating their toxicity in one way or another.[1]

Occurrence

It is available in Northern part of India known as "Dard Desha" . These days it is available in Spain, Italy, France, Germany, China & Japan. It can be prepared artificially in laboratory.[2]

Types of Hingula

1. Khanija.
2. Kritrima.[3]

Some describe other name of types:-

1) Charmara.
2) Shukatunda.
3) Hanspada.[4]

Grahya Agrahya Lakshnas of Hingula

Grahya Hingula

- Colour like Parvala, Japakusma or Bimbiphala.
- Whitelines like long needles like appearance.
- Heavy in weight.

Agrahya Hingula

All the features of Grahya Hingula when absent then that Hingula is to be discarded for medicinal purposes.[5]

Artificial Manufacturing of Hingula

Take

- Parada - 1 Part
- Gandhaka - 4 Parts

Mix these in Lohpatra (iron vessel). After that it is heated on Deepagni (spirit lamp)for a few seconds. To this mixture ¼ Parts of Parada (mercury) and Manashila (arsenic dioxide -$As_2 S_2$) is added. Stir it vigorously and make it cool after mixing. Put the vessel down from the fire. Put small pieces of this material in Kanchkoopi (bear bottle of glass material). Close its mouth with Kapadmritika (cotton cloth soaked in fuller's earth). Heat it in Valuka Yantra (sand vessel) at different temperatures of Mridu(mild), Madhyam(medium) & Teevra (higher) Agni (temperature of fire) for 6 hours i.e. 3 hours each respectively. After 6 hours , when it cools down itself , break the glass bottle and procure the Hingula powder.[6]

Cinnabar

This is a common ore of mercury with chemical formula HgS [red mercury (II) sulfide]. It is also known as native vermilion. The name comes from the Greek- " kinnabari"- used by Theophrastus. In Latin it was known as minium, means "red lead".

Crystal Habit - Rhombohedral to tabular.
Crystal system - Hexagonal.
Cleavage - Prismatic.
Fracture - Uneven to subconchoidal.
Hardness on Moh's scale- 2-2.5
Luster - Adamantine to dull.
Streak - Scarlet.
Specific Gravity - 8.176
Optical Properties- Uniaxial (+)
Refractive index - $n\omega$=2.905 $n\varepsilon$
Solubility- 1.04 x 10^{-25} gper 100 ml water (Ksp at 25 ˚ C = 2 x 10^{-32})[7]

Therapeutics

When used carefully & in the right dosage Purified Hingula (Cinnabar) treats all types of eye diseases.

- It acts as an excellent appetizer, rejuvenator and aphrodisiac.
- It is an effective ingredient for liver and pancreatic diseases.
- In case of rheumatoid arthiritis, it gives very good effects.
- It is safely used in diabetes mellitis, fever, skin diseases and leprosy.
- In case of spermatorrhoea, it gives good results.
- Acts as digestive.
- In case of Gar visha (homicide) it is vastly used.
- It gives nutrition to body.
- With Hingula formulation intake, skin of face become glowing.
- It enhances body strength.
- It increases digestive fire.

- In case of Jarana (assimilation) it is equal to Gandhaka Jaarita Parada.
- It is also used to incinerate other metals. The ash made with the help of Hingula are more efficacious as compared to usage of other materials than Hingula.[8]

Use in Industry

Cinnabar is used for extraction of gold & silver.[9]

Hingula Shodhana

1. Fresh tuber of Ardrak was washed and dried wuth the help of cotton cloth.
2. Fresh juice of 500 ml was extracted and filtered through a cloth piece.
3. Priorly weighed 500 gm of grahya Hingula. Taken in Khalvayantra, pounded and then crushed into fine powder form.
4. Poured ardrak swarasa. Immersed the Hingula in it and wait.
5. Then mixture was triturated for one day i.e. 12 hrs.
6. Avoid wastage of the material.
7. On the next day same procedure was followed. the trituration time was for 3 hrs.
8. Allowed it to dry.
9. Purified Hingula dried powder was collected and stored in air tight container.

Precautions

1. Do not spill out the material during procedure to avoid wastage.
2. Storage should be in air tight container for the sample.

Observations

1. On immediate trituration with Ardrak Swarasa, the colour noticed was Aruna Varna (dark red color).
2. On continuous trituration the consistency became thick and color also became dark red.
3. After the procedure Hingula loses its shine and the particles become morefiner.
4. Pleasant smell of Ardrak was present.
5. A weight gain in Hingula was noticed.

Discussion

In case of Shodhita Hingula, Hg (mercury) and Sulphur contents were 72.44% & 24.75% respectively which were 75.44% & 22.87% respectively before Shodhana. AAS Lead showed 0.01 ppm after Shodhana as compared to 3.4 ppm before Shodhana. Its permissible limit is 10 ppm. Hingula was shiny red in color before Shodhana and became dark red coloured after Shodhana without any shine.

Conclusion

It is seen that Ayurvedic formulations are not harmful when properly made after proper purification and manufacturing. In this analytical research there is color change before & after shodhana of Hingula & poisonous lead concentration was became within normal limits after purification of Hingula with Ardrak Swarasa. Change in color is a crucial parameter in authentication of Shudha (pure) Hingula macroscopically. Lead within permissible limits will not give any hazardous health problems. This analytical study can become a pillar for authentication of Rasa Dravyas on the basis of organoleptic characteristics in future.

Conflict of Interest

None.

Source of Funding in Study

Self (PG Thesis).

References

1. Preparation and physicochemical characterization of ingredients of Indian traditional medicine, Mahamrutyunjaya Rasa, Pallavi Rai ,Sadhana J. Rajput, J Ayurveda Integr Med. 2017 Jul-Sep; 8(3): 159–168.
2. Mishra Sidhinandana, Rasendra Sambhava, Chaukhambha Orientalia, Varanasi, Edn. 2003, Pp-8.
3. Mishra Gulraj Sharma, Ayurveda Parkasha, Chaukhambha publication, Varanasi 1st Edn. 1999 Pp-272.
4. Tripathi Inderdeva, Rasaratna Samuchya, Chaukhambha Sanskrita Bhavana,Varanasi, 2nd Edn. 2003, Pp- 83.
5. Tripathi Inderdeva, Rasaratna Samuchya, Chaukhambha Sanskrita Bhavana,Varanasi, 2nd Edn. 2003, Pp- 42.
6. Mishra Gulraj Sharma, Ayurveda Parkasha, Chaukhambha publication, Varanasi 1st Edn. 1999 Pp-276.
7. http://wwwCinnabar- Wikipedia, the free encyclopedia.mht
8. Conceptual Review On Hingula (Cinnabar-HgS), Patel Asma, M.Gopi Krishna, J. Shashidhar. IJAPR, June2019, Vol 7, Issue 6.
9. Hingula (Red Sulphide of Mercury): A Conceptual Review, Jolly Saxena, Vinita and Ankur Saxena. wjpmr, 2020, 6(5), 168-173.

Government Drug Testing Laboratory (A.S.U) Patiala
(Food & Drug Administration, Punjab.)

Name & Address: Dr. Deepika, (M.D student), PG School of Ayurveda, Desh Bhagat University, Mandi Gobindgarh.
Sample Name : Hingula (Raw Material-Before Shodhan)
DTL Receipt No : 2139
Batch No : Not mentioned
Mfg Date : Not mentioned
Expiry Date : Not mentioned
Sample Quantity : 10 gm X 1
Date of Receipt : 08/09/2014

Results of Analysis

S.No.	Tests/Analysis Parameters	Results	Limits / Remarks
1.	Identification	Insoluble in water and acid, But soluble in Aqua Regia, & gives blue flame on heating.	By Qualitative Assay
2.	AAS (Lead)	3.4 ppm	NMT-10 ppm
3.	Colour	Brownish Red	-------
	-------	-------	-------

Date:

Analyst/Sci. Officer
Scientific Officer (Chemistry)
Govt. Drug Testing Laboratory (A.S.U.)
Patiala.

BANGALORE TEST HOUSE

D-36, 4th Main, KSSIDC Industrial Estate, Rajajinagar,
Bangalore - 560 044, INDIA
Ph.: 23356415, 23385979, 23502684, 23388895, Fax: 080-23502689
e-mail: bthr@bthindia.com bthindia@hotmail.com
website: www.bthindia.com

JAS-ANZ
Cert. No. RC81/JA/1111
Cert. No.: RC81/JA/IC/1111

TEST REPORT

Page : 1 of 1

Report No. : AU/2015/02/0138	Report Date : 12/02/2015
Issued to : Dr. Deepika M.D. IInd Year(Rasashastra0 DBU PG School of Ayurveda & Reasearch, Mandi Gobindgarh Punjab	Customer Reference: Letter Date of Receipt : 11/02/2015 Date of Start of Test : 12/02/2015
Sample Nature/ Name : Shodhita Hingula	Date of Completion of Test : 12/02/2015 Job Order No. : AU/2015/02/0138 Sample Particulars : NA
Sample Condition : Satisfactory	

SL. No.	PARAMETERS	RESULTS	PROTOCOL
	Description.	Red coloured coarse powder packed in polythene cover.	
1	Lead as Pb	Less than 0.01 ppm	API Part II

ANALYST

AUTHORIZED SIGNATORY

NOTE : 1. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified. 3. This report is not to be reproduced wholly or in part & cannot be used as an evidence in the Court of law & should not be used in any advertising media without our special permission in writing. 4. Sample(s) not drawn by us unless otherwise stated. 5. Total liability of our laboratory is limited to the invoice amount. Any dispute arising out of this report is subject to Bangalore Jurisdiction only.

Format No. BTH/QF/148 Revision Status : R3 Dt. : 11-07-2014

Approval No. : TL-9/2011 dated : 22.07.2011

BANGALORE TEST HOUSE

D-36, 4th Main, KSSIDC Industrial Estate, Rajajinagar,
Bangalore - 560 044. INDIA
Ph.: 23356415, 23385979, 23502684, 23388895, Fax: 080-23502689
e-mail: bthr@bthindia.com bthindia@hotmail.com
website: www.bthindia.com

OHSAS 18001 : 2007 & ISO 9001 : 2008
JAS-ANZ
Cert. No. RQ91/JA/1111
Cert. No.: RO91/JA/IC/1111

TEST REPORT

The Drugs & Cosmetics Act 1940 and the Rules thereunder
Form 59 [See Rule 160 D (0)]

Page : 1 of 1

Report No.: AU/2014/09/0388	Date of Report : 13/10/2014
Issued to :Dr. Deepika M.D. IInd Year(Rasashastra0 DBU PG School of Ayurveda & Reasearch, Mandi Gobindgarh Punjab	Date of Receipt : 30/09/2014 Job Order No. : AU/2014/09/0388 Your Ref. : Letter Dt: 24.09.14 Date of Start of Test 06/10/2014
Sample Name : Hingula(Cinnebar)	Mfg. Lic. No. : NA Batch No. : NA
Mfg. By : NA Supplied By : NA Batch Size : NA	Mfg.Date : NA Exp.Date : NA Sample Qty. : 5 gm

NA - Not Available

SL.	PARAMETERS	RESULTS	PROTOCOL
	Description	Red coloured hard pieces packed in polythene cover.	
1	Assay for Mercury	75.44 %	Pharmacopoeial standards for Ayurvedic formulations
2	Assay for Sulphur	22.87 %	Pharmacopoeial standards for Ayurvedic formulations

Remarks : Party asked for above tests only.
~~In the opinion of the undersigned, the sample referred to above is of standard quality / is not of standard quality as defined in the Act & the rules made there under for the reason given below:-~~

ANALYST

For and on behalf
AUTHORIZED SIGNATORY

NOTE : 1. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after three years from the date of issue of test certificate unless otherwise specified. 3. This report is not to be reproduced wholly or in part & cannot be used as an evidence in the Court of law & should not be used in any advertising media without our special permission in writing. 4. Sample(s) not drawn by us unless otherwise stated. 5. Total liability of our laboratory is limited to the invoice amount. Any dispute arising out of this report is subject to Bangalore Jurisdiction only.

Format No. BTH/QF/147 Revision Status : R2 Dt. : 11.07.2014

BANGALORE TEST HOUSE

D-36, 4th Main, KSSIDC Industrial Estate, Rajajinagar,
Bangalore - 560 044. INDIA
Ph.: 23356415, 23385979, 23502684, 23388895, Fax: 080-23502689
e-mail: bthr@bthindia.com bthindia@hotmail.com
website: www.bthindia.com

OHSAS 18001 : 2007 & ISO 9001 : 2008
JAS-ANZ
Cert. No. RQ91/JA/1111
Cert. No.: RO91/JA/IC/1111

TEST REPORT

Page : 1 of 1

Report No. : AU/2015/01/0215	Report Date : 21/01/2015
Issued to : Dr. Deepika M.D. IInd Year(Rasashastra0 DBU PG School of Ayurveda & Reasearch, Mandi Gobindgarh Punjab	Customer Reference: Letter Dt: 03.01.15 Date of Receipt : 12/01/2015 Date of Start of Test : 20/01/2015
Sample Nature/ Name : Shodhita Hingula	Date of Completion of Test : 21/01/2015 Job Order No. : AU/2015/01/0215 Sample Particulars : Botanical Name-Cinnebar
Sample Condition : Satisfactory	

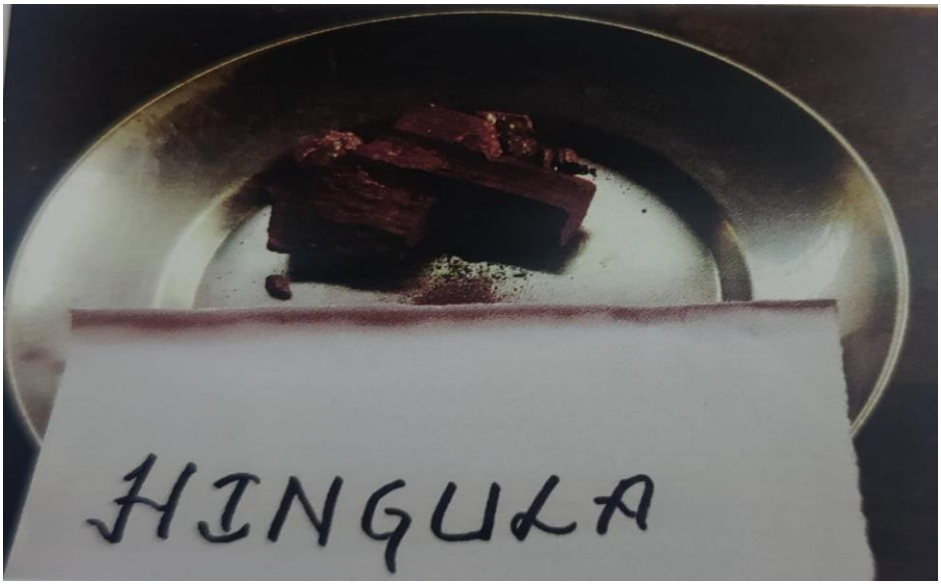
SL. No.	PARAMETERS	RESULTS	PROTOCOL
	Description	Red coloured hard mass packed in polythene cover.	
1	Assay for Mercury as Hg	72.44 %	PSAF
2	Assay for Sulphur as S	24.75 %	API Part II

ANALYST AUTHORIZED SIGNATORY

NOTE : 1. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified. 3. This report is not to be reproduced wholly or in part & cannot be used as an evidence in the Court of law & should not be used in any advertising media without our special permission in writing. 4. Sample(s) not drawn by us unless otherwise stated. 5. Total liability of our laboratory is limited to the invoice amount. Any dispute arising out of this report is subject to Bangalore Jurisdiction only.

Organoleptic Features of Hingula

Sr. No.	Features	Before Shodhana	After Shodhana
1	Color	Shiny Reddish Brown	Dark –red, Shine vanished


HINGULA