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A LITERARY REVIEW ON THE STUDY OF HINGULA

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ABSTRACT

Hingula, also known as Cinnabar is the commonest and cheapest source of Mercury. It occurs in both crystalline and massive forms. In the world, almost total mercury is obtained from it. Due to its usefulness in various procedures of *Parada Jarana* and *Dhatu-Marana*, *Acharya Vagbhata*, the author of *Rasaratna samucchaya* has classified it as a *Sadharana Rasa*. Purified *Hingula* is therapeutically used in various diseased conditions whereas *Parada (Parada* extracted from *Hingula)* is considered as equally potential as *Gandhak –jarit Parada* and there is no need for purification *(Shodhana)* of that *Parada*. In the classical age, the native form was procured from *Darada Desha* (North West of Kashmir) and *Mleccha Desha* (China). However, nowadays important places of occurrence are Spain, Italy, the Western states of the U.S.A. and Mexico. Therapeutically it is widely used in many Ayurvedic formulations like *Hinguleshwar rasa, Anandbhairav rasa, Tribhuvankirti rasa, Kasturibhairava rasa,* etc.

KEYWORDS: Hingula, Cinnabar, Shodhana, Rasa-Sashtra.

INTRODUCTION

Hingula is one of the most important compound minerals of *Rasa-Sashtra* and also the most popular mineral for obtaining mercury across the world. It is accepted as ***Sadharana rasa,*** but also found in *Maharasa* and *Uprasa* groups by other texts of *Rasashastra*. Its colour is mentioned like Japa-pushpa or Gudhal pushpa (shoe flower). In the classical age, the native

form was procured from Darada Desha (North West of Kashmir) and Mleccha Desha (China).[1] In present era, it's not found in India, most of the available *Hingula* in the market is artificial. However, important places of occurrence are Spain, Italy, Western states of U.S.A. and Mexico. Chemically it is Red sulphide of mercury well known as **Cinnabar** (HgS_combination of Mercury and Sulphur). Cinnabar contains about 86.2% of Mercury and 13.8% of Sulphur. It is heavy, soft in grinding and bright red in appearance. Purified Hingula is therapeutically used in various disease conditions like *Jwar* (fever), *Prameha* (diabetes), *Kushta* (skin disorders), *Amvaat* (Rheumatoid arthritis), etc. It is also an important ingredient in many Ayurvedic formulations like *Hinguleshwar rasa*, *Anandbhairav rasa, Tribhuvankirti rasa, Kasturibhairava rasa*, etc.[1]

Parada (*Parada* extracted from *Hingula*) is considered as equally potential as *Gandhak –jarit Parada* and there is no need for purification (*Shodhana*) of that *Parada*.[3] It is used in the extraction procedures of gold, silver and other metals.[1]

Historical Review of Hingula

Vedic period: There is no reference about this mineral in Vedic texts.[1] However in Garuda Purana description of Hingula is found to treat ear disease.[4]

Samhita period: We do not find any direct reference about Hingula in any of the ancient samhitas like Charaka & Sushruta, but the reference of Parada which is a component of Hingula is available in Sushruta Samhita (Su.chi.5) & Charaka Samhita(Cha.chi.6.)

In *Koutilya Arthashastra* (300 B.C), *Hingula* is mentioned to test the purity of the gold.[1] The first therapeutic use of Hingula is started from Rasendramangala (6 to 8 Cent. A.D) as a Rasatext and from *Chakradatta*(11th A.D) and after onward all *chikitsa granthas.*

The details are as follows: Occurrence

Presently Hingula is available in two forms (a) Native (b) Artificial.[5]

(a) Native: According to classics it is found in Darada desha that is northern part of India i.e. North West of Kashmir. Nowadays it is available in Spain, Italy, France, Germany, China and Japan.

(b) Artificial: Artificially it can also be prepared in laboratory. At present when the natural ore is not available, it is being prepared artificially in large quantities in Culcutta, Surat etc.

Vernacular names

Sanskrit	----	Hingula, Darada	Hindi	----	Singaraph
Kannada	----	Inguleeyaka	Marathi	----	Hingula
Gujarati	----	Hingulo	Bengali	----	Hingula
Telugu	----	Ingaleeyakam	Assami	----	Janjaphar
Latin	----	Sulphutum hydragirium	English	----	Cinnabar

Paryayi Nam:

Rakta	---	Having the colour like blood (Red)
Suranga	---	Having the colour which looks very good
Ranjana	---	Gives colour.
Darada	---	Found in darada desha (North West of Kashmir).
Mlecha	---	Found in mlecha desha (China).
Chitranga	---	Having different shades.
Churna parade	---	Parada is present in it and is in powder form.
Maraka	---	Used in Marana of Parada.
Maniraga	---	Colour of this looks like Mani.
Rasodbhava	---	Parada can be obtained from this.
Ranjaka	---	Gives colour.
Rasagarbha	---	Contain Parada in its garbha

Hingula is accepted as **Sadharana rasa**[1]; but there are different opinions also available.

Table No.1: the different opinions regarding the grouping of Hingula.

S.No.	Book Name	Maharasa	Uparasa	Sadharanarasa
1.	Rasahridayatantra[6]	+	-	-
2.	Rasarnava[7]	+	-	-
3.	Rasendrachudamani[8]	-	+	-
4.	Rasaratnasamuchaya[9]	-	-	+
5.	Anandakanda[10]	-	+	-
6.	Rasendrachintamani[11]	+	-	-
7.	Rasendrasarasangraha[12]	-	+	-
8.	Rasopanishat[13]	-	-	+
9.	YogTarangini [14]	-	+ -	-
10.	Bhavaprakasha[15]	-	+	-
11.	Ayurved Prakash[3]	-	+	-

Different Types Of Hingula According To Rasa texts

On the basis of occurrence[5] – (1) Khanija

(2) Kritrima.

On the basis of appearance (Three types)[3]

(1) Charmara- Krishna varna (Black colour)

(2) Shukhatunda-Peeta varna (Yellow colour)

(3) Hamsapada- Japakusuma varna, Shwetarekha, Pravalaba (Red color)

According to Rasaratnasamucchaya only two[16]

(1)Shukatund (2) Hamsapada

Shresta Hingula swaroopa[16]

जपाकुसुमवर्णाभः पेषणो सुमनोहरः ।
महोज्वलो भारपूर्णो हिङ्गुलः श्रेष्ठ उच्यते ॥

- Japakusuma varnabha- Resembles colour of Hibiscus flower.
- Peshano sumanohara- Become smooth after grinding.
- Mahojwala-Very shiny(because of mercury).
- Bharapurna- Heavy.

Ashuddha Hingula dosha[17]

Intake of Ashuddha Hingula causes Andhata (Blindness), Ksheenata (Emacintion), Chittavibhrama(Delusion), Bhrama(Giddiness), Moha(Delusion), Prameha (Urinary tract disorder), Kshynya, Klama(Fatigue). Hence one should always use shodhita Hingula for medicine.

Shuddha Hingula lakshana[17]

Initially it is red in colour but after shodhana the redness increases and looks like ripened Bimbiphala.

Pharmaco-therapeutic properties of Shuddha Hingula[2,3]

Shuddha Hingula is Sarvadoshahara, Jatharagni pradeepaka, Rasayana, and sarvarogahara and helps in Jarana karma of Parada

Rasa	_	Tikta, Kashaya, Katu.
Guna	_	Snigdha, Ushna.
Veerya	–	Ushna.
Vipaka	–	Katu.
Doshaghnata	_	Pacifies tridoshas. (Kaph-Pittahar by Ayurved Prakash)
Karma	_	Deepana, Pachana, Rasayana, Vajikarana
Rogaghnata	_	Kushta, Kasa, Hrullas, Jwara, Kamala, Pleeha, Amavata, Pleeha, Netraroga, Krutrim vish
Dose	_	½ -1 Ratti (62.5 mg – 125 mg)

Hingula Shodhana

For Shodhana of Hingula, Commonly it is subjected for *Bhavana* with any *amla dravyas* or *Adraka swaras* in *khalva* for 7 times.[1,2] Other opinions of *Shodhana* in *Rasa texts* are given below in short.

Table No.2: Showing the different shodhana procedures of Hingula.

S.No	Book	Processing dravya	Method	Duration	Final form
1.	Rasamanjari	Meshiksheera	Bhavana	7 times	Powder
2.	Rasamanjari	Amlavarga	Bhavana	7 times	Powder
3.	Rasendrachudamani	Ardraka swarasa	Bhavana	7 times	Powder
4.	Rasendrachudamani	Lakucha swarasa	Bhavana	7 times	Powder
5.	Rasendrachintamani	Meshi ksheera	Bhavana	7 times	Powder
6.	Rasendrachintamani	Amlavarga	Bhavana	7 times	Powder
7.	Rasaprakasha sudhakara	Lakucha swarasa (in Kushmanda khanda)	Svedana	3 hours	Khanda
8.	Rasratnasamuccaya	Ardraka	Bhavana	7 times	Powder
9.	Rasratnasamuccaya	Lakucha	Bhavana	7 times	Powder
10.	Rasratnasamuccaya	Meshiksheera	Bhavana	7 times	Powder
11.	Rasratnasamuccaya	Amlavarga	Bhavana	7 times	Powder
12.	Rasendrasarasangrah	Mahishi dugdha	Bhavana	7 times	Powder
13.	Rasendrasarasangrah	Ardraka swarasa	Bhavana	7 times	Powder
14.	Rasendrasarasangrah	Lakucha swarasa	Svedana	3 days	Powder
15.	Rasendrasarasangrah	Jambeera swarasa	Svedana	3 days	Powder
16.	Rasendrasarasangrah	Ajamootra	Bhavana	7 times	Powder
17.	Ayurved Prakash	Mahishi dugdha	Bhavana	7 times	Powder
18.	Ayurved Prakash	Amlavarga	Bhavana	7 times	Powder
19.	Ras Tarangini	Shringavera swarasa	Bhavana	7 times	Powder
20.	Ras Tarangini	Lakucha swarasa	Bhavana	7 times	Powder
21.	Ras Tarangini	Meshiksheera	Bhavana	7 times	Powder
22.	Ras Tarangini	Nimbu swarasa	Bhavana	7 times	Powder
23.	Rasamrut	Meshiksheera	Bhavana	7 times	Powder
24.	Rasamrut	Nimbu swarasa	Bhavana	7 times	Powder
25.	Rasarnava	Mahishi ksheera, Gomamsa, Dadhyamla, Tilatailas	Pachana	3 days	Powder

Hingula Marana

Generally, *Hingula Marana* is not mentioned in most of the *Rasa texts* except a few.

1st method[18]

One part of powdered shuddha Haratala is taken in a sharava. Above this 2 parts of Shodhitha Hingula is spread. Ardraka swarasa is poured over it to immerse completely. Hingula layer is encircled with lavanga churna. Then sharava having all these drugs are covered with another sharava and gap is closed by doing sandhi bandhana. This samputa is subjected to moderate heat for 3 hours.

2nd method[19]

Take a piece of shuddha Hingula, (or make a small ball of powdered Shuddha Hingula) cover it by cloth and keep it into the tuber of Neel dye plant. Now whole structure is covered by

mrutkapad and give Laghuputa (the puta of 10 Aranyaupalas). Repeat this procedure for 100 times (give 100 putas). Same procedure is repeated in the tuber of Vanvruntak for 100 times, then same in fruit of Arka for 100 times, then 100 times in Fruit of Indravaruni, and 100 times in Amlavetas fruit. (Total 500 putas) At the end, we will get 'Aruna varna' Hingula bhasma.

Satvapatana of Hingula

Mercury is extracted from Higula as Satva.[2]

Satvapatana method:[22] Hingula should be given Bhavana of any Amla dravya like Jambira/ Nimburas, kanji etc. is kept in a patanayantra (Adha patana) and heated for 1 yaam to obtain satva, here we get drops of Parada as satva of Hingula.

Hingula sevanajanya dosha nivaranartha (antidote)[23]

Shuddha Gandhaka 3-6 gms with Milk is given twice a day until the doshas caused due to intake of Ashuddha Hingula subside.

Artificial preperation of Hingula[19]

To synthesize Hingula artificially, one part of parada and 4 part of Gandaka are mixed thoroughly in lohapaatra. Mixture is heated in trivragni for few seconds. To this Manashila of 1/4th part of Parada is added and mixed well. After self cooling the vessel is taken out, the product is collected and made into small pieces they are filled in kachakupi and subjected to kramagni heating for 6 days as done in kupipakwa preparation. Then we obtain red colored Hingula.

Vishishta Yogas[1,5]

1. Jwaramurari rasa
2. Mrutyunjaya rasa
3. Hinguleshwara rasa
4. Anandabhairava rasa
5. Pleeharnava rasa
6. Kanakasundara rasa
7. Aswakanchki rasa
8. Amritasanjeevini rasa
9. Tribhuvanakeerti rasa
10. Laxminarayana rasa
11. Manikya Rasa
12. Darada vati
13. Kamagnisandeepana rasa
14. Hingulamrita malahara
15. Siddadaradamruta rasa
16. Amavatari rasa
17. Amrutarnava rasa
18. Kasturibhairava rasa
19. Icchabhedi rasa
20. Ashwakanchuki rasa
21. Agnikumara rasa
22. Rasagarbha Pottali

Modern Description of cinnabar

Cinnabar also called as cinnabarite or native vermilion. It is an ore of Mercury. The name comes from Greek word "Kinnabari" used by Theophrastus. In Latin it was sometimes known as minium, meaning also "Red lead". It is a compound of Mercury and Sulphur. It is also called as Chinese red Chemical composition: Mercury-86.2%, Sulphur-13.78%.[24]

Occurrence

Generally occurs due to the result of volcanic Eruptions, also available near hot springs. Important places of occurrence are Spain, Italy, Western states of U.S.A. and Mexico. Prepared artificially in laboratory from Mercuric acetate, Amonium thiocynate, glacial acetic acid and hydrogen sulfide.[24] Artificial preparation is mainly seen in Surat and Calcutta.

Structure

HgS adopts two structures i,e it is Dimorphic. The more stable form is Cinnabar, which has a structure akin to that for HgO: each Hg centre form has two short Hg-S bonds (2.36A) and four longer Hg---S contacts (3,10,3.10,3.30,3.30A). The black form of HgS has the Zinc blend structure.

Characterstic features of Cinnabar[25]

Table No.3: Shows the features of Cinnabar.

Category	Mineral
Chemical formula	HgS
Molecular weight	232.66
Colour	Brownish red
Crystal habit	Rhombohedral to tabular. Granularto Massive
Crystal system	Trigonal-Trapezohedral
Fracture	Uneven to subconchoidal
Cleavage	Prismatic, perfect
Mohs scale Hardness	2-2.5
Luster	Adamantine to dull
Streak	Scarlet
Specific gravity	8.176
Optical properties	Uniaxial(+)
Refractive index	Nw=2.905
Solubility	1.04 X10-25g/100ml water (Ksp at 25=210)

Identification

- It does not have any taste and smell
- Insoluble in water.
- Does not undergo oxidation (when exposed to environment)
- Not attacked by HNO3 or cold HCl
- Insoluble in aquaregia with separation of sulfur.
- Soluble in warm HCl with evolution of H2S.

On heating it gives blue flame with smell of Sulfur and Mercury is originated with a white-colored small particles.

Types[25]

(1) Ordinary

(a) Crystalized, (b)Massive & (c) Earthy

(2) Hepatic: Liver brown colour with sometimes a brownish streak occasionally scaly in structure though commonly granular or compact.

Physical Property

- Cinnabar is a Red or White lines with red colored mineral.
- Trigonal or Rhombohedral usually massive, granules.
- Sometimes Brownish Red colored Cinnabar is also seen.
- It is opaque or sub transparent and adamantine luster.

Chemical property

- Insoluble in water and acids but dissolves in aquaregia (mixture of HCl and HNO_3 forms mercuric chloride).
- On heating Mercury gets separated and sulphur evaporates as sulfur dioxide.

$HgS + O_2 \rightarrow Hg + SO_2\uparrow$

- When ignited in air it decends into metal and sulfur the latter burning to SO_2.

CONCLUSION

It may be concluded that since 200 years B.C our *Acharyas* were aware of *Hingula*. Later with its usefulness in *Rasashastra* it is accepted as *Sadharana rasa*. Our *Acharyas* were also well known to prepare *Hingula* artificially since13th Century A.D. Previously it might be used in the extraction procedures of gold, silver, and other metals. And later on

therapeutically uses like in *Agnimandya, Jwar, Amavata, Prameha, Kustha,* etc. were started. One thing that makes it more special is that the *Hingulottha Parad* is similar to the *Asthasanskarit Parada/ Gandhak-jarit Parada,* so there is no need of purification of it.

In the classical age, the native form was procured from *Darada Desha* and *Maleccha Desha*. Nowadays most of the Hingula present in the market are only artificially prepared.

Therapeutically it is widely used in many Ayurvedic formulations like *Hinguleshwar rasa, Anandbhairav rasa, Tribhuvankirti rasa, Kasturibhairava rasa,* etc. Due to the high toxicity of mercury, it must be purified and perfectly incinerated with all parameters. There is a need for further studies to prove free from toxicity for global acceptance of such *Rasa-aushadhis.*

Conflict-of-Interest: No.

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