

PHARMACEUTICAL STANDARDIZATION OF GANDHAKAAJEERNA BADDHO RASA

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ABSTRACT

Gandhakaajeerna baddho rasa (GABR) is a unique preparation mentioned in *Rasayogasa-gara* which has therapeutic ability to cure all diseases when given with suitable *Anupana* (vehicle). The main ingredients are *Shuddha Parada*, *Shuddha Gandhaka*, *Kakamachi*, *Tambula*, *Dathura* and *Meghanada*. The pharmaceutical procedures involved are *Shodhana*, *Jarana*, *Murchana* & *Bandhana*. *Parada* & *Gandhaka* were taken in 1:2 ratio in a specially designed yantra which was kept in *Valuka bhanda* (sand apparatus) & heated on *Mandagni* till cessation of Sulphur fumes. Later *paka* was continued on *Mandagni* by adding *Swarasas* of *Kakamachi*(*Solanum nigrum*), *Nagavalli/Tambula*(*Piper betel*), *Dhatura*(*Datura metel*) & *Meghanada*(*Amaranthus spinosum*). Till date no research work was done in any institute relating to present formulation or adopting this technique. Hence an effort was made to standardize the method of preparation of GABR.

Keywords: *Gandhakaajeerna baddho rasa*, *Jarana*, *Murchana* & *Bandhana*

INTRODUCTION

Rasa Shastra deals with medicinal aspects of metals, minerals, precious stones and poisonous plant drugs. It has been serving humanity from centuries with its unique metallic and herbo-mineral formulations. Rudra (Lord Shiva) was considered as the first physician, from whom the branch of *Rasa Shastra* has evolved. The *Rasaushadhies* have wide range of therapeutic efficacy and innate qualities like quick action, less dose, palatability, ability to cure incurable diseases and known for their prolonged shelf life. *Shodhita Parada* (Purified Mercury) is equal to Ambrosia (nectar)¹. It cures the diseases when subjected to *Murchana*, bestows *Mukti* – liberation when subjected to *Bandhana*, and gives immortality when it was subjected to *Marana*- Incinration². *Parada* doesn't attain disease curing

property until subjected to *Jarana* with *Gandhaka*³. *GABR* is a unique formulation in which *Parada* was subjected to all most all the above procedures like *Shodhana*, *Jarana*, *Murchana* & *Bandhana*.

AIM & OBJECTIVES:

- ◆ Compilation of various references pertaining to *Gandhakaajeerna baddho rasa*.
- ◆ Pharmaceutical study of *Gandhakaajeerna baddho rasa*

DRUG REVIEW:

Gandhakaajeerna baddho rasa (GABR) was identified in "*Rasayogasagara*"⁴. The author *Hariprapanna Sharma* compiled this formulation from *Rasa granthas* such as *Rasaratnakara*⁵, *Rasa Raja Shiromani*, and *Yoga Mahar-*

nava. Reference of this drug was also traced in Manthanabhairava's "Anandakanda"⁶, "Vastu Swachandamrutam"⁷ a Unani book written by Tuniraja in 1891.

"Gandha baddha" is its another name mentioned in Rasayogasagara⁴, Anandakanda⁵. In Rasaratnakara, Anandakanda and Vastu Swachandamrutam, Swarasas of only three herbal drugs were mentioned- namely Kakamachi, Nagavalli and Dhatura. In Rasayogasagara, Meghanada was mentioned in addition to the above three drugs. In the present study Pharmaceutical process was done taking Rasayogasagara sloka as the chief reference.

GABR PREPARATION

CHIEF REFERENCE: Rasayogasagara IST Vol-1, ककारादेवगे रसाः,yoga no-444

Materials: Shodhita Parada, Shodhita Gandhaka, Kakamachi swarasa, Nagavalli/Tambula swarasa, Dhatura swarasa, Meganadha/Tanduliyaka swarasa

Method/ Principle: Shodhana of Parada, Gandhaka, Swarasa nirmana, Jarana, Murchana, Bandhana

Apparatus: Khalwa yantra, Muslin cloth, Darvi, stainless steel vessels (for Shodhana), Specially prepared GABR nirmana yantra (for Jarana), funnel, pipette (for pouring Parada, Gandhaka), Mixer (for Swarasa preparation), vessels, Shalaka.

Procedure: Total Pharmaceutical procedure was carried out in five stages

Stage I - YANTRA NIRMANA-Preparation of Yantra (apparatus) and Lid

In chief Reference the preparation was said to be conducted in a Yantra made up of mud with a length of 16 angulas, diameter of 2 angulas closed at one end & opened on other side. The same was made

1 angula = 3/4 inch i.e → 1.9cms

16 angulas = 16x3/4=12 inches → 30cms

2 angulas = 2x3/4 = 1.5 inches → 3.75-3.8cms

When no specifications are mentioned regarding the ingredients to be used for making Yantras or Musha (vessels) then as a general rule materials advised for Samanya Musha should be taken. Samanya musha dravyas include burnt husk, coal powder, horse dung and wool. But after making trials on this, it was understood that now-a-days it is practically not possible for the potters to make them. So normal potter's preparative method was adopted. Initially Red soil devoid of stones and sand was taken. It was made into paste form by adding adequate quantity of water. Generally to prepare mud vessels, potter's mix sand to this mud in 1:3 ratio. This gives strength, stability to the mud & it can be moulded into desired shape.

Preparation of 'Yantra' with mud:

When the prepared mud was placed on spinning wheel & tried to mould into desired shape with hands, it was found very difficult to mould the mud into a 12 inch long tube as the mud started to bend and crack with increase of length. So the technique was modified.

A wide platform of mud was made with uniform thickness. A Plastic pipe with dimensions as advised for Yantra was taken. The pipe was coated with oil on its outer surface. This Pipe was placed on the mud platform & the mud was wrapped around it carefully. One end of the tube was closed with equisized coin shaped mud. All the conjoining spaces were properly sealed. Now by twisting and pulling the pipe was removed out slowly & carefully. The oil applied over the pipe helped here for easy removal of pipe from the mud. After removal of the pipe, obtained mud shape was allowed for drying under shade. After five days of complete drying, it was baked on fire & collected after self cooling. The Yantra was named as Gandhakaajeerna

badho rasa Nirmana Yantra, in short form as **GABRN Yantra**.

By following the above technique total four GABRN Yantras were prepared

Preparation of the Lid:

In the reference sloka it was said to keep the mouth of the *Yantra* closed during the *Paka*. So a lid that completely closes the *Yantra*'s mouth was prepared. A brick piece was taken and it was carved into a lid by rubbing it against rough surface. Care was taken to obtain

- uniformity in shape
- Eveness on all sides
- Whether the Lid Fixes into the mouth of the *Yantra* properly (by checking it from time to time whether it closes the mouth on all sides).

This *GABR Yantra* was kept amidst *Valuka puritha bhanda* upto 12 angulas (23cms) i.e two thirds of its length (figno-1). The whole setup was kept on stove and heated on *Mandagni* till it becomes warm (figno-2).

Stage II -Shodhana of Parada⁸, Shodhana of Gandhaka⁹

Shodhana of *Parada* was carried out by doing *Mardana* with equal quantity of *Sudhachurna* for three days. After *Mardana* it was filtered through double layered cloth. *Lasuna kalka* was added in equal quantity and *Saindhava lavana* was added in half the quantity of *Parada*. After completion of *mardana* washing of contents was done with hot water to obtain *Shuddha Parada*(figno-3). *Shodhana* of *Gandhaka* was carried out by placing it in an iron ladle along with sufficient quantity of *ghrita*. It was heated up to melting and poured in a vessel of milk. The mouth of vessel was tied with cloth which was smeared with *ghrita*. Then it was washed with hot water and powdered. This procedure was repeated for six more times to obtain *Shuddha Gandhaka*(figno-4).

Stage III -Placing Parada, Gandhaka into Yantra & heating upto Gandhakanirdhoomavasta

50g *Shuddha Gandhaka* was poured in to *Yantra* using funnel(figno-5), 50g *Shuddha Parada* was placed over this carefully with a pipette(figno-6) and over this another 50g of *Shuddha Gandhaka* was poured(figno-7). The *Yantra* mouth was closed with the lid & heated on *Mandagni* till *Gandhakanirdhoomavastha*, i.e complete cessation of Sulphur fumes. Time to time the lid was opened to observe the changes. Slowly *Parada, Gandhaka* started to melt emitting thin yellow sulphur fumes which got intensified with time & were subsided completely after period of ten hours(figno-8,9,10)).

Stage IV – Swarasa nirmana¹⁰ & Paka with Swarasas

Swarasa of *Kakamachi* (figno-14), *Nagavalli* (figno-16), *Dhatura* (figno-18) and *Meghanada* (figno-20) were prepared as per the requirement. The homogenous mixture that was formed after *Gandhakanirdhoomavastha* stage was continued to boil on *mandagni* by adding the luke warm made *Swarasa* of *Kakamachi* (figno-21) & heated till it evaporates completely (figno-23). Later *Swarasa* of *Nagavalli*, *Dhatura* and *Meghanada* were added one after the other in the same manner & and this cycle of *Swarasas* was continued till the completion of *Gandhaka jarana*.

Stage V - Breaking & collection of end product

Heating was continued till the complete evaporation of the *swarasa* & was left for self cooling- *Swanga sheetam*. The *Yantra* was broken and the final product was collected. It was grinded well into a homogenous mixture(figno-25,26).

OBSERVATIONS:

- After *Shodhana*, brightness of the *Parada* was increased.

- After *Shodhana*, *Gandhaka* color was changed from dull yellow to thick, bright yellow color with increased luster.
 - It took around ten hours for attaining *Gandhaka nirdhoomavastha*- stopping of yellow Sulphur fumes totally. At this point the added *Parada* and *Gandhaka* were turned into thick, viscous, dense, black tar like liquid.
 - When the *Swarasa* was made lukewarm its color changed from thick green to brownish green and consistency changed from dense to opaque.
 - Adding little bit *Swarasa* it immediately came up to top with effervescence and sound. After adding further liquid the effervescence and sound were decreased. Within five minutes the semisolid homogenous mixture obtained was converted into granule form on adding the *Swarasa*. By stirring it continuously, it was again converted into liquid within fifteen minutes.
- This observation was same with each *Swarasa*. By the end of evaporation of liquid, semisolid matter was observed.
- It took around seven hours for the complete evaporation of the *Kakamachi*, ten hours each for *Nagavalli*, *Dhatu* and *Meghanada Swarasas* respectively.
 - The Signs of Completion of *Jarana* were observed when *Kakamachi Swarasa* was added again and *Paka* was done till the complete evaporation of the *Swarasa*. The heating was stopped and was left for self cooling.
 - The end product was adhered at the bottom and also over walls of the *Yantra*.
 - The sediment at the bottom was hard stony like, light in weight and dark black in color.
 - The sediment over the walls of *Yantra* was in dull and greenish black in color.
 - The obtained end product was brownish black in color.

Results: Weight of the *Yantra* -950g, Fluid Capacity of the *Yantra* -300ml.

Table No. 1 : Showing Result of *Shodhana*

S.no	Material taken for <i>Shodhana</i>	Initial Weight	Final Weight	Loss in Weight	Loss %
1	Parada	300g	290 gm	10 gm	3.33%
2	Gandhaka	500g	495g	5g	1%

Table No.2: Showing result of *Swarasas* preparation for all the drugs

S.no	Drug	Weight of drug taken	Volume of Extracted <i>Swarasa</i>
1	<i>Kakamachi</i>	700gms	300ml
2	<i>Nagavalli/ Tambula</i>	700g	320ml
3	<i>Dhatu</i>	550g	300ml
4	<i>Meghanada</i>	800g	310ml

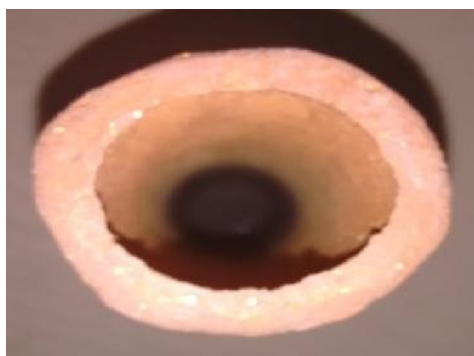
NOTE: The above pharmaceutical procedure was carried out for four times to standardize the time taken, yield.

Table No.3: Showing the weight of the final product in each practical

S.no	Weight of the ingredients	Practical no	Time taken	final product (GABR)
1.	Parada – 50g Gandhaka - 100g	I	47hours	141g
2.		II	49hours	138g
3.		III	46hours	139g
4.		IV	47hours	142g

- Maximum temperature recorded inside the yantra at time of *Gandhakanirdhoomavasta* was 139°C on average.
- The average time taken is 47.5 hours & Average yield of GABR was 140gms.

STEP WISE PREPARATION OF GANDHAKAAJEERNA BADDHO RASA



A) (Fig no-1)Yantra Preparation



(Fig no-2)Yantra kept on heating apparatus



B) (Fig no-3)Shuddha Parada



(Fig no-4)Shuddha Gandhaka

C) Placing of Ingredients into Yantra & Subjecting to Mandagni Paka till Gandhakanirdhoomavasta



(Fig no-5)Adding Shuddha Gandhaka



(Fig no-6) Adding Shuddha Parada



(Fig no-7) Adding Shuddha Gandhaka



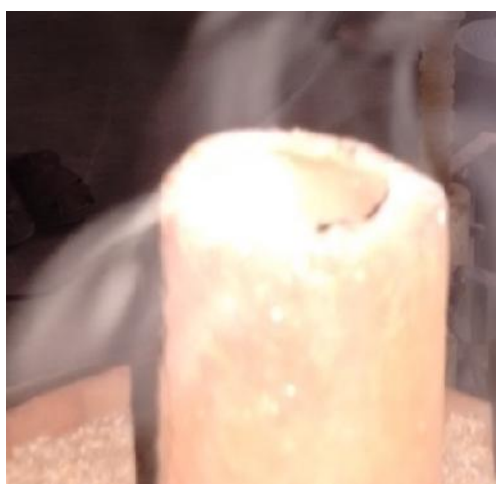
(Fig no-8) Observing the depth



(Fig no-9) Initial stage of Mandagni paka



(Fig no-10) Initial thin fumes



(Fig no-11) Thick fumes of Gandhaka



(Fig no-12) Gandhakanirdhoomavasta

D) Swarasa Preperation



(Fig -13) kakamachi fresh drug



(Figno-14) kakamachi Swarasa



(Fig no-15) Nagavalli fresh drug



(Fig no-16) Nagavalli Swarasa



(Fig no-17) Dhatura fresh drug



(Fig no-18) Dhatura Swarasa



(Fig no-19) Meghanada fresh drug



(Fig no-20) Meghanada Swarasa

E) Paka with Swarasa till completion of Jarana



(Fig no-21) Adding of Swarasa



(Fig no-22) Paka with Swarasa



(Fig no-23) At the end of Paka

F) Collection of GABR



(Fig no-24) After completion of Jarana



(Fig no-25) Breaking



(Fig no-26)GABR

DISCUSSION

The name *Gandhakaajeerna baddho rasa* was formed by three words such as- *Gandhaka* + *aajeerna* + *baddha rasa*. The word *aajeerna* gives two meanings

- 1) **AJEERNA**- that *Parada* which is solidified out of undigested/semi digested *Gandhaka*.
- 2) **AAJEERNA**- that *Parada* which is solidified after complete digestion of *Gandhaka*.

If we take the first meaning as such then it will be contrary to the important guide line given at the end of the practical which states to continue the *paka* with *Swarasas* till

the completion of *Gandhaka Jarana*. Therefore reading the formulation name as **AAJEERNA BADDHORASA** will convey the Pharmaceutical process more clearly than the earlier..

- **Murchhana** involved in this formulation is *Sagandha* and *Saagni Murchhana*.
- **Jarana**- *Jarana* involved is *Dviguna Gandhaka Jarana*.
- In *Rasa granthas*- *Rasarnava*¹⁰, *Rasaprka-shasudhakara*¹¹, *Rasendrachudamani*¹², *Rasendrasarasangrah*¹³, the effect of the herbal drugs –*Kakamachi*, *Nagavalli*, *Dhatu* and *Meghanada* on *Parada* were described as below.

Table No.4: Showing the effect of ingredients on Parada from various texts

S.NO	NAME OF THE DRUG	EFFECT ON PARADA
1.	<i>Kakamachi</i>	<i>Niyamana</i> ^{12,13} , <i>Bandhana</i> ^{10,11,12} , <i>Marana</i> ^{11,12} , <i>Murchana</i> ¹³ , <i>Dravana</i> ^{10,12} , <i>Nirjivana</i> ¹⁰
2.	<i>Nagavalli</i>	<i>Bandhana</i> ¹¹ , <i>Jarana</i> ¹⁰ , <i>Nirjivana</i> ¹⁰ , <i>Marana</i> ¹²
3.	<i>Dhatu</i>	<i>Marana</i> ^{10,12} , <i>Bandhana</i> ¹²
4.	<i>Meghanada</i>	<i>Jarana</i> , <i>Marana</i> , <i>Niyamana</i> ¹¹

- *Shodhana* is done for *Parada* and *Gandhaka*. It is done to remove visible and invisible impurities, to reduce the toxicity and to enhance the therapeutic property.

Parada shodhana:

- Substances having *Ushna*, *Teekshna*, *Kshara*, *Amla* and *Lavana* property are considered as purifiers (*Sarva malaharah Kshara*)¹⁴. Lime is an alkaline substance;

it may be helpful in removing external and internal impurities of Mercury.

- *Lasuna* and *Saindhava lavana* have also *Ushna*, *Teekshna* and *Vishada* property which might be helpful in minimizing the toxic qualities of Mercury¹⁵. Hence, these might have been suggested for *Shodhana*.
- Garlic has been proved as a best antidote for heavy metal poisoning. Hence,

processed *Parada* is augmented with antidote itself. Hence, one-step ahead in safety *Lasuna* was selected as a drug for *Shodhana* of *Parada*. Mercury purified with garlic can be used in formulating such drugs, which can be indicated essentially in Coronary Artery Disease (CADs), Cardio Vascular Disorders (CVDs), hyperlipidemia, tumours, hormonal disorders, atherosclerosis, and obesity¹⁶.

Gandhaka Shodhana:

- Sulphur turns into liquid at 115.21°C. However, at that temperature, arsenic sulphides (Orpiment M.P¹⁷ → 310°C, Realgar M.P¹⁸ → 360°C) which are one of the chief impurities of sulphur stay in ghee as fine small solid particles. These crystals stay back in cloth and liquid sulphur flows freely through fine pores. Repetition of this procedure for seven times removes any traces of arsenics.
- ‘Ghee – Milk procedure’ can effectively separate sulphur granules from external impurities. Pure sulphur is neither lipid nor water-soluble, therefore, both water and lipid soluble impurities can be separated from sulphur, as sulphur has to pass through both media.
- Ghee serves as base for uniform spreading of temperature. It layers fine powder crystals of sulphur and prevents them to get in contact with external oxygen, which otherwise cause oxidation and considerable weight loss.
- *Gandhaka* is highly *Pitta vardhaka*¹⁹. Both ghee and milk are *Vata Pitta shamaka dravyas*²⁰ and among them ghee is the drug of choice among fats in reducing *Pitta*. Therefore, these can reduce ‘*teevra pitta vrudhikara*’ effect of *Gandhaka*.
- Milk and *Ghee* are *Vishahara* and *Rasayana*. These can remove *Visha doshas* of *Gandhaka* and impregnate *Rasayana* property to *Gandhaka*.

- Final cleaning with hot water removes greasy remnants of milk and ghee.

YANTRA NIRMANA:

- Usage of *Kachakupi* for *Jarana* can be seen from 10 th century A.D. Nithyanath ji the author of *Rasaratnakara* belongs to 12th century A.D. This indicates that the author was aware of the usage of *kachakupi*, but specifically indicated a *yantra* made out of mud for *Jarana* in the present formulation. Therefore, in the present study in spite of availability of advanced equipments like clay-graphite crucibles, silica crucibles, clay crucibles, digestion tubes, the pharmaceutical procedure was carried out as per the chief reference using a *Yantra* prepared with mud.

MANDAGNI PAKA-

- Unlike in classical *Gandhaka Jarana* that is done in *Kachakupi (Kramagni)* by subjecting to *Mridu, Madhyama* and *Teevragni* stages- here *Jarana* is advised to be performed on *Mridu or Mandagni agni* stage alone.

GANDHAKA NIRDHOOMAVASTHA

- It was confirmed by copper foil test. Fumes were exposed to a copper foil. Yellow sulphur fumes left black discoloration on copper foils. On further heating shiny white fumes started coming out & they left silvery discoloration on copper foil. It's known that Mercury vapour reacts with metals & gives silvery discoloration. This confirming the burning of extra sulphur from the mixture.

ADDING OF SWARASAS:

- After the adding & completion of *Paka* with *Kakamachi swarasa*, blackish semi-solid matter that was found at the bottom which indicates the formation of compound as a part of the processing.
- Same observations were noticed by *Paka* with *Nagavalli, Dhatura* and *Meghanada swarasa* also.

- After the completion of one sequence of *Paka* with four drugs again *Paka* with fresh *Kakamachi swarasa* was started.

SIDDHA LAKSHANAS-

- *Rasavada* experts were consulted to confirm the *siddha lakshanas* of *Jarana* in particular to this pharmaceutical procedure. Vaidya Lolla Ramchandra Rao, a popular *Rasavaidya* of Andhra Pradesh, who edited the Telugu version of *Rasaratnakara*, explained two points to confirm the completion of *Gandhaka Jarana* in this particular processing.
- As per his practical observation, in the context of this formulation *Gandhaka Jarana* is said to be completed based on these following points:

- 1) The semisolid matter that was converted into granule form on adding *Swarasa* should remain as such even after the complete evaporation of the *Swarasa*.
- 2) When the *Shalaka* was introduced up to bottom of *Yantra* it should be felt as if it was kept in sandy gravel and when taken out no matter should adhere to it.

While processing with *Kakamachi swarasa* for second time these signs were observed. Then the heating was stopped and left for self cooling.

CONCLUSION

The Chief reference of the present study is taken from *Rasayogasagara. Shodhanma, Jarana, Bandhana* and *Murchchana* are the principle procedures involved in the preparation of *Gandhakaajeerna baddho Rasa*.

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REFERENCES

1. Acharya Sri Madhava, Ayurveda Prakasha, 1/22 sloka Sanskrit commentary by, edited with the Arthavidyotani and Arthaprakasini commentary by Shri Gulraj Sharma Mishra, Chaukhambha Bharati Academy, Varanasi 1994.
2. Acharya Sri Madhava, Ayurveda Prakasha, 1/11-12 slokas Sanskrit commentary by, edited with the Arthavidyotani and Arthaprakasini commentary by Shri Gulraj Sharma Mishra, Chaukhambha Bharati Academy, Varanasi 1994.
3. Dr. C.B. Jha, Ayurvediya Rasa shastra, *Jarana context*, Chaukhamba Orientalia, Varanasi 1998, pageno-147, 148.
4. Vd. Pandit Hariprapanaji, Rasayogasagara, vol-I, with Sanskrit and English introduction, Krishnadas academy, Varanasi. Reprint 2004, Pageno-368.
5. lolla Ramchandra Rao, Rasaratnakara-4/39, Ramji technologies, Kakinada, pageno-64,65.
6. Siddhinandana Mishra, Bhairavandas Anandakanda 23/175-180, siddhiprada hindi commentary, Chaukhambha Orientalia, Varanasi, 20007, Pageno-487.
7. Vastu Swachandamrutam, sloka-, Pageno-328
8. Sadanand Sharma, Rasa Tarangini, 5/27-29, with Sanskrit commentary Prasadini by Shri. Haridatta Shastri and Hundi Rasa Vignyan Commentary by Pt. Dharmanand Shastri edited by Pt. Kashinath Shastri, Edi. 11th, Pub Motilal Banarsidas, Delhi. 1979.
9. Vagbhata, Rasaratna sammuchaya, 3/20-22, Vidyotini Hindi comm. by D.A.ulkarni, pub. Meharcand, New Delhi, 1998.
10. Sharangadhara Samhita, madhyama kanda-1/4, with the commentary Adhamall's Dipika & Kashirama's Gudhartha Dipika, Chaukhambha Orientalia Varanasi, 2000.
11. Rasarnava 5/3-7,12,13,18,20-25,27,28, Pageno-55-60, edited with Rasacandrika, Hindi vyakhya, Bhagirathi Tippani, edited

- by Dr. Shri Krishna Dixit, Chaukhambha Sanskrit series office, Varanasi,1995.
12. Rasaprakashasudhakara 9/3,14,27,29, by Siddhiprada, Hindi comm. By Dr. Siddhinandana Mishra, Chaukhambha Orientalia, Varanasi, 1998.
13. Rasendrachudamani 7/, 8/, Pageno-117,118,121-127, by Somdev Hindi comm. By Dr. Siddhinandan Mishra, Chaukhambha Orientalia, Varanasi, 1984.
14. Rasendrasarasangraha 1/93-105, Pageno-26,27, by Sri gopala Krishna bhatta, Hindi commentary- Rasvidyotini by Dr. Indradev Tripathi, Chaukhambha Orientalia, Varanasi,2014 reprint.
15. Rasarnava 5/43, edited with Rasacandrika, Hindi vyakhya, Bhagirathi Tippani, edited by Dr. Shri Krishna Dixit, Chaukhambha Sanskrit series office, Varanasi,1995.
16. Charaka Samhita Sutrasthana 1/88,89, Vidyotini Hindi comm. by Pandit Kasinatha Sastri and Dr.Gorakha Natha Chaturvedi, Chaukhambha Bharati Academy, Varanasi,1995.
17. <http://www.umm.edu/altmed/articles/garlic-000245.htm>
18. http://en.wikipedia.org/wiki/Arsenic_trisulfide
19. http://www.chemicalbook.com/ChemicalProductProperty_EN_CB4367754.htm
20. Ayurveda Prakasha 2/116.
21. Kaideva Nighantu Dugdhavarga 3/120.

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