



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2016; 2(6): 764-768  
www.allresearchjournal.com  
Received: 21-04-2016  
Accepted: 25-05-2016

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## Importance of Antardhuma Rasasindura: A rejuvenative compound W.S.R. to Sulphur

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### Abstract

*Rasasindura* is a famous Ayurvedic rejuvenative compound prepared by *Kupipakwa* (sand bath) method containing Mercury and Sulphur as major ingredients. In this preparation *Jarana* (digestion) is the process and *Murchana* (swooning) is the result. Now a day's *Bahirdhuma Rasasindura* is in common practice. The Sulphur fumes which come out during the preparation pollute the environment, final product is expensive and yield also less. Present study is focused to re-establish the importance of *Antardhuma Rasasindura* in classical *Rasasastra* texts and reveal the importance of Sulphur in *Jarana* process through literary work. Fifteen *Rasasastra* classical texts starting from Rasendra mangalam (8<sup>th</sup> AD) to Rasa tarangini (20<sup>th</sup> AD) were analysed for relevant references. Critical literary study revealed the superior attributes of *Antardhuma Rasasindura*. Sulphur importance with respect to Mercury was sited. Advantages of Mercurial medicines containing Sulphur and side effects of non-Sulphur Mercurial medicines are mentioned. Moreover there are verses which say without *Gandhaka Jarana* Mercury cannot attain disease curing properties. *Antardhuma* process is also eco-friendly as it is a concealed procedure. The yield of the final *Antardhuma* product may be high due to the sublimate of Sulphur and cost effective when compared to *Bahirdhuma*. The forgotten Ambrosia, *Antardhuma Rasasindura* follows all the characteristics of a new drug research.

**Keywords:** *Rasasindura, Antardhuma, Jarana, Murchana, Kupipakwa, Mercury*

### 1. Introduction

*Rasasindura* is a famous Ayurvedic rejuvenating formulation used in achieving quick results in small doses. It is prepared by *Kupipakwa* in *Valuka yantra* (sand bath) which is one of the best methods adopted for medicinal metallic preparations, especially for *Gandhaka* (Sulphur) *Jarana* (digestion) as it imparts good colour to *Parada* (Mercury) <sup>[1]</sup>. *Rasasindura* is “*Sa Gandha* (with Sulphur), *Sa Agni* (heat applied), *Murchana* (swooning)” of Mercury <sup>[2]</sup>. In this process *Jarana* of Sulphur takes place <sup>[3]</sup> which make Mercury highly potentiated. Though *Antardhuma* (concealed fumes) *Rasasindura* is very common in classical literature, now a day's *Bahirdhuma* (fumes going out) *Rasasindura* is practiced. The Sulphur fumes which come out during the *Bahirdhuma* process pollute the environment. Moreover preparation is expensive as Mercury is high in the end product and the yield is also less. So, an attempt has been made to illustrate the importance of *Antardhuma Rasasindura* in classical *Rasasastra* texts and reveal the importance of Sulphur in *Jarana* process through literary work.

### Materials and Methods

*Rasasastra* classical texts starting from Rasendra mangalam (8<sup>th</sup> Cent AD) to Rasa tarangini (20<sup>th</sup> Cent AD) were analysed for relevant references. *Jarana* of Mercury is quite different from *Murchana* of Mercury in case of *Abhraka* (Mica) and other metals (like gold, silver, etc), but they are interlinked when dealing with Sulphur <sup>[4-6]</sup>. There are two definitions of *Parada Jarana*. Mercury retains its original state without being subjected to *galana* (washing) and *patana* (sublimation) after the *Jarana* process with *Abhraka* and other noble metals like gold <sup>[7-8]</sup>. Liquefied Grasa (material used for *Jarana*) getting transformed and digested in Mercury is also called as *Jarana* <sup>[9-12]</sup>.

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In *Murchana* Mercury attains disease curing capability [13-16], specifically when *Murchana* is done with Sulphur [17]. *Jarana* and *Murchana* are synonyms according to Ayurveda prakasha [18], which can be applied in case of *Murchana* and *Jarana* of Mercury with Sulphur only. Mercury becomes red coloured after *Gandhaka Jarana* [19], *Parada Bandhana* (solid state of Mercury) is the outcome of *Jarana* [20] and also after *Gandhaka Jarana* Mercury becomes *Baddha* (solid state) [21]. *Gandhaka Jarana* of Mercury is two types: [22] *Antardhuma* and *Bahirdhuma*. *Murchana* of Mercury with Sulphur are 2 types: [23] *Antardhuma* (concealed fumes) and *Bahirdhuma* (fumes going out); also 3 types: [24] *Nirdhuma* (no fumes like *Kajjali* preparation), *Antardhuma* and *Bahirdhuma*.

### Importance of Sulphur regarding Mercury

In all *Rasa* and *Uparasa* Sulphur is superior [25]. Sulphur is best in imparting colour to Mercury, in *Parada Bandhana* (solidifying Mercury), in digestion (*Paka* and *Jarana*) of Metals in Mercury and also controls the fickleness of Mercury [26]. Even though Mercury is *Satavedhi* (hundred times penetrative in alchemy), *Sahasravedhi* (thousand times penetrative) or *Kotivedhi* (ten million times penetrative) one can only attain *Siddha* (success in treatment) by preparing paste of Mercury with Sulphur for internal use [27]. According to classics First *Jarana* for Mercury should be of Sulphur and physician who utilizes Mercury without *Gandhaka Jarana* is liable to be cursed by God [28]. Importance of *Sa-Gandha* (with Sulphur) *Murchana* and side effects of *Nir-Gandha* (without Sulphur) *Murchana* of Mercury has been cited in the texts [29]. Without *Gandhaka Jarana* Mercury cannot attain disease curing properties [30-32].

### Importance of Antardhuma Parada Jarana:

In *Antardhuma Sa-Gandha Parada Murchana* mouth of the *Kupi* (flask) is sealed and *Gandhaka Jarana* is carried out in

the process of *Sa-Gandha Parada Murchana* [33]. *Jarana* is the process and result is *Murchana*. The method of *Parada Jarana* where there is no loss in Mercury should be followed [34], which is only possible in *Antardhuma*. *Shadguna* (six parts) or *Sataguna* (hundred parts) Sulphur undergone digestion by *Antardhuma* method imparts colour (red) to Mercury and acquires *Sahasravedha* for silver, copper and lead [35-36]. It is well known that Mercury which attains *Loha vedha* (Alchemy) property is also capable of *Deha vedha* (body transmutation).

Superior attributes of *Antardhuma Gandhaka Jarita* Mercury have been cited in classical texts. *Antardhuma Samaguna Gandhaka Jarita* Mercury (equal amount of Sulphur digested mercury in concealed method) acquires disease curing properties [37], whereas *Bahirdhuma Gandhaka Jarita* Mercury (Sulphur digested Mercury in open method) attains this quality after *Shadguna* (six parts of Sulphur) *Jarana* only. This variation is due to inadequate *Jarana* of Sulphur in *Bahirdhuma* method [38-39].

### Yantra (instruments) mentioned for Parada Jarana:

The first *yantra* (similar to *Musha yantra*) for *Parada Jarana* was described in Rasendra mangalam in which *Antardhuma Gandha Jarana* was carried out [40]. *Rasasastra* texts mentioned various *yantras Gandhaka Jarana* of Mercury like *Garbha yantra* [41], *Kurma/ Kacchapa yantra* [42], *Istika yantra* [43], *Tula yantra* [44], *Kostika yantra* [45], *Somanala yantra* [46], *Valuka yantra* [47], *Bhudhara yantra* [48-49], and *Musha yantra* [50], *kupiantra*, *Valukayantra*, *Nalikiantra*, *Mushayantra*, *Bhudharayantra*, *Somanala yantra*, *Nabhi yantra*, *Chakraka yantra*, *Jala yantra*, *Vidhayadara yantra*, *Damarukayantra*, *Sthaliantra*, *Dhupayantra* all for *Antardhuma* process; except *Hamsa yantra* and *Palika yantra* [51] which are used for *Bahirdhuma Gandhaka Jarana*.

**Table 1:** Showing formulations similar to *Rasasindura*

S.no	Name	Colour	Process	Time	Reference
1	<i>Mruta Suta</i>	<i>Raktabha</i>	<i>Antardhuma</i> ( <i>Angara paka</i> )	-	RHT 14/2-6
2	<i>Udaya Bhaskara Rasa</i>	<i>Kamalacchavi</i>	<i>Valuka yantra Kupipakwa</i>	3 days	RPS 3/10-12
3	<i>Rasa Bhasma</i>	<i>Rakta</i>	<i>Valuka yantra Kupipakwa (Adhastha)</i>	1 ½ day	RPS 3/15-18
4	<i>Rasa Bhasma</i>	<i>Aruna kamalacchavi</i>	<i>Valuka yantra Kupipakwa</i>	2 days	RPS 3/19-22
5	<i>Rasa Bhasma</i>	<i>Padmaraga nibha prabha</i>	<i>Antardhuma</i> <i>Valuka yantra</i>	½ day	R.C 1/5-11
6	<i>Rasa Bhasma</i>	<i>Balarka sannibham</i>	<i>Antardhuma</i> <i>Kupipakwa</i>	1 day	R.C 1/85-92
7	<i>Rasa Parpatika</i>	<i>Padmaraga nibha prabha</i>	<i>Kupipakwa</i>	1 day	R.C 1/93-95
8	<i>Kamadeva Rasa</i>	<i>Daradena sama</i>	<i>Antardhuma</i> <i>Valuka yantra Kupipakwa</i>	½ day	R.C 7/88-96
9	<i>Haragouri Rasa 1</i>	-	<i>Valuka yantra Kupipakwa</i>	2 days	RSK 4/90-92
10	<i>Haragouri Rasa 2</i>	-	<i>Valuka yantra Kupipakwa</i>	2 days	RSK 4/93
11	<i>Kamadeva rasa</i>	-	<i>Valuka yantra Kupipakwa</i>	2 days	RSK 4/94
12	-	<i>Sindura dyuti</i>	<i>Valuka yantra Kupipakwa</i>	-	Rse.C 2/13
13	<i>Rasasindura</i>	-	<i>Valuka yantra Kupipakwa</i>	-	Rse.C 2/14
14	<i>Rasa Bhasma</i>	<i>Bandhuka pushpa</i>	<i>Antardhuma</i> <i>Valuka yantra Kupipakwa</i>	3 days	RSS 1/62-64
15	<i>Rasasindura</i>	<i>Tarunaditya</i>	<i>Valuka yantra Kupipakwa</i>	½ day	RSS 1/65-67
16	<i>Rasasindura</i>	-	<i>Antardhuma (Adhastha)</i> <i>Valuka yantra Kupipakwa</i>	1 ½ day	RSS 1/68-72
17	<i>Kamadeva Rasa</i>	<i>Daradena samam</i>	<i>Antardhuma</i> <i>Valuka yantra Kupipakwa</i>	1 day	RSS 5/34-41
18	<i>Rasasindura</i>	<i>Arunabha</i>	<i>Bahirdhuma</i> <i>Valuka yantra Kupipakwa</i>	3 days	AP 1/397
19	<i>Rasa Bhasma</i>	<i>Kumkuma pinjara</i>	<i>Bahirdhuma</i>	1 ½ day	AP 1/398

			<i>Valuka yantra Kupipakwa</i>		
20	<i>Rasa Bhasma</i>	<i>Bandhuka pushpa aruna ishajasya</i>	<b>Antardhuma</b> <i>Valuka yantra Kupipakwa</i>	3 days	AP 1/401-403
21	<i>Rasasindura</i>	<i>Sindura Sadrus</i>	<i>Valuka yantra Kupipakwa</i>	½ day	AP 1/426-428
22	<i>Suta Bhasma</i>	<i>Tarunaditya sannibha</i>	<b>Antardhuma</b> <i>Valuka yantra Kupipakwa</i>	1 day	AP 1/428-435
23	<i>Suta Bhasma</i>	-	<b>Antardhuma</b> (Adhastha) <i>Valuka yantra Kupipakwa</i>	1 ½ day	AP 1/436-441
24	<i>Rasasindura</i>	<i>Daradakaram</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	1 day	YR (Pg:155) 1-8
25	<i>Rasa Bhasma</i>	<i>Kumkuma pinjara</i>	<i>Valuka yantra Kupipakwa</i>	1 ½ day	YR (Pg:155) 1-2
26	<i>Rasa Bhasma</i>	<i>Bandhuka pushpa aruna</i>	<b>Antardhuma</b> <i>Valuka yantra Kupipakwa</i>	3 days	YR (Pg:156) 1-5
27	<i>Rasasindura</i>	<i>Balaruna Surya sannibha</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	6 hours after sealing	RT 6/162-167
28	<i>Rasasindura</i>	<i>Arunotpala prakasha</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	6+6 hours	RT 6/168-176
29	<i>Rasasindura</i>	<i>Sona varna</i>	<b>Antardhuma</b> (Talastha) <i>Kupipakwa; Puta paka</i>	-	RT 6/177-182
30	<i>Rasasindura</i>	<i>Hingulabha</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	-	RT 6/183-184
31	<i>Rasasindura</i>	<i>Rakta kamala</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	-	RT 6/185
32	<i>Rasasindura</i>	<i>Rakta kamala</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	1 day	RT 6/186
33	<i>Rasasindura</i>	<i>Rakta Kamala</i>	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	1 day	RT 6/187-188
34	<i>Rasasindura</i>	-	<b>Bahirdhuma</b> <i>Valuka yantra Kupipakwa</i>	7 days	RT 6/189

**Abbreviations:** RHS: Rasahridaya tantra; RPS: Rasa prakasha sudhakara; RRS: Rasaratna samucchaya; RC: Rasa chintamani; Rse.C: Rasendra cintamani; RSK: Rasa sanketa kalika; RSS: Rasendra Sara Sangraha; AP: Ayurveda prakasha; YR: Yoga ratnakara; RT: Rasa tarangini

## Discussion

Processing Mercury and Sulphur to form red coloured product similar to *Rasasindura* probably started from 10<sup>th</sup> century AD. They were prepared in *Lohasamputa*, *Musha*, *Angarapaka*, *putapaka* methods, etc. *Valukayantra* (sand bath) was first mentioned in Rasahridaya tantra (10<sup>th</sup> centAD). *KachaKupi* (round bottomed glass flask) was first mentioned in Rasendra chudamani (12<sup>th</sup> cent AD) [52]. *KachaKupi* in *Valukayantra* for *Kupipakwa* was used from the period of Rasa prakasha sudhakara (13<sup>th</sup> cent AD). According to Rasendra cintamani Kupi can be made from glass, clay, gold, iron, silver [53]. *Rasasindura* word first appeared in Rasendra cintamani (15<sup>th</sup> cent AD) [54].

Maximum *yantras* mentioned for *Gandhaka Jarana* follow *Antardhuma* process. Although *Bahirdhuma Gandhaka Jarana yantras* called *Palika yantra* was first mentioned in Rasendra chudamani (12 cent AD) [55] and *Hamsapakayantra* [56] is first cited in Rasarnavam (12 cent AD), but the use of *Hamsayantra* for *Bahirdhuma Gandhaka Jarana* was mentioned in Rasapaddhati (15<sup>th</sup> cent AD) [57]. Readable reference of *Bahirdhuma Gandhaka Jarana* is seen in Rasendra Cintamani (15<sup>th</sup> cent AD) [58] and Rasa Tarangini (20<sup>th</sup> cent AD) [59]. Clear emphasis on *Bahirdhuma Rasasindura* started from 17<sup>th</sup> century AD onwards where the use of *Salaka* (rod) in cleaning the blocked mouth of *Kupi* is cited [60]. This reveals *Antardhuma* was the most common process frequently used in *Rasasastra* than *Bahirdhuma* for preparing *Rasasindura* or product similar in preparation with a different name.

Some references [61-66, 67, 68] did not mention any verse in their process which could be concluded as *Antardhuma* or *Bahirdhuma*. Basing on the superior attributes and predominant use of *Antardhuma* they can be placed under *Antardhuma* method. Many such preparations named as *Parada Bhasma* can also be correlated with *Rasasindura*.

This can be justified from a quoted text which says, *Parada Bhasma* is actually *Maha Murchana* (mega swooning) of Mercury [69].

*Gandhaka Jarana* refers to the contact duration of melted Sulphur with Mercury followed by bond formation and subsequent burning or evaporation of free Sulphur depending on *Bahirdhuma* or *Antardhuma* process. In *Bahirdhuma* during *Jarana* process Sulphur reacts with oxygen and burns out, therefore final product is HgS (artificial Cinnabar). In *Antardhuma* during *Jarana* process Sulphur evaporates to form a sublimate and is evenly it may mix with the HgS compound physically (not chemically). Hence *Antardhuma Rasasindura* could be a well-blended mixture of Cinnabar and Sulphur. According to the theoretical estimation the final *Antardhuma* compound may also yield more than *Bahirdhuma* process.

Modern science listed Mercury under highly toxic metals. But the toxic levels of oral administered Mercury in the form of Cinnabar (HgS) are considerably low. Absorption of Cinnabar from the gastrointestinal tract is < 0.2%, very less compared to other non-Sulphur Mercurial compounds. Solubility of Cinnabar is 0.001g/L at 20 °C, which is quite low compared with other Mercurial compounds like Mercuric chloride (30-70g/L at 20 °C) [70]. Detoxification of Mercury is done with chelating agents like Dimercaptosuccinic acid (DMSA) (C<sub>4</sub>H<sub>6</sub>O<sub>4</sub>S<sub>2</sub>), Dimercapto-propane sulfonate (DMPS) (C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>S<sub>3</sub>). All these compounds contain Sulphur. Food supplements containing Sulphur are also recommended. Mercury has higher affinity towards Sulphur especially to thiols which leads to detoxification. Our body's natural detoxification system also works under this relation with the help of thiol complexes like glutathione (C<sub>10</sub>H<sub>17</sub>N<sub>3</sub>O<sub>6</sub>S). In *Rasasastra* advantages of Mercurial medicines containing Sulphur and side effects of non-Sulphur Mercurial medicines are mentioned [29]. Sulphur may considerably decrease the

accumulation of Mercury in the body in addition increases the efficacy of Mercurial therapeutic attributes. Mercury is considered to be *Yogavahi* (fast acting), particularly as a stimulant which penetrates quickly to minute parts of the body and increases the properties of herbal drugs in the formulation with its catalytic activity even in minute quantities. So, Mercury need not be available for a longer period in the body to show its action. *Rasa pushpa*, *Rasa karpura* are non-Sulphur products which are toxic in higher doses compared to *Rasasindura* and cannot be used for a longer periods even in therapeutic doses due to the risk of accumulation of Mercury. *Samaguna* (equal quantity Sulphur) *Gandhaka Jarana*, *Dviguna* (double), *Shadguna* (six times), *Astaguna* (eight times), *dwadasaguna* (twelve times) <sup>[71]</sup>, *Sataguna* (hundred times) and *Sahasraguna* (thousand times) are therapeutically superior in increasing order of *Jarana*. So, more the Sulphur content safer and effective is the Mercurial medicine especially in relation to *Antardhuma Rasasindura*.

### Conclusion

As per the critical literary study *Antardhuma* method was most commonly followed by the practitioners for *Jarana* (digestion) and *Sa Agni* (heat applied) *Murchana* of Mercury with Sulphur. References on the importance and therapeutically superior attributes of *Antardhuma Gandhaka Jarana* are cited in the texts. Sulphur percentage could be higher compared to *Bahirdhuma*, which ensures the safety of *Antardhuma Rasasindura*. *Antardhuma* process is also eco-friendly as it is a concealed procedure. The yield of the final *Antardhuma* product may be high due to the sublimate of Sulphur and cost effective when compared to *Bahirdhuma*. Thorough Pharmacological, Analytical, Toxicology and Clinical studies should be conducted to standardise the therapeutic dose and usage of *Antardhuma Rasasindura*.

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