



## SODHANA OF GANDHAKA (SULPHUR) WITH GODUGDHA (COW'S MILK), GOGURUTHA (COW'S GHEE): A CHEMICAL ANALYSIS

Bandari Srinivasulu<sup>1\*</sup>, P. Bhadra Dev<sup>2</sup>, P. H. C. Murthy<sup>3</sup>

<sup>1</sup>P.G. Scholar, P.G. Dept. of Rasa Shastra, Dr. N. R. S. Govt. Ayurvedic College, Vijayawada, AP, India

<sup>2</sup>Supervisor, Professor and Head, P.G. Dept. of Rasa Shastra, Dr. N. R. S. Govt. Ayurvedic College, Vijayawada, AP, India

<sup>3</sup>Co-Supervisor, P.G. Dept. of Rasa Shastra, Dr. N. R. S. Govt. Ayurvedic College, Vijayawada, AP, India

\*Email: dr.vaasu@rediffmail.com

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### ABSTRACT

According to Indian alchemy (Rasashastra) literature, Gandhaka (sulphur) has been included in 'Uparasa' group and it is the first drug, which stands next to Mercury in importance. Information on Gandhaka has been in vogue since Vedic period. In Samhita period, it has been widely used both as external and internal medication. Conventional medicine also uses sulfur-containing drugs for antimicrobial activity. In Ayurveda medicinal formulations with Gandhaka is used after Sodhana (purification) process. In the present study Quantitative chemical analysis of Gandhaka was done before and after purification with the Godugdha (Cow's milk), Gogurutha (Cow's ghee). This study revealed that before purification raw material contains 89.38% sulphur and after purification, sulphur was increased up to 97.14%. It is concluded that purification mentioned in Rasashastra text, not only remove the impurities but also improve the quality and therapeutic activity for internal and external administration without producing any harmful effects.

**Keywords:** Gandhaka, Sulphur, Purification, Godugdha (Cow's Milk), Gogurutha (Cow's Ghee), Chemical analysis

### INTRODUCTION

In Rasashastra literature, Gandhaka has been mentioned first among eight Uparasa group<sup>1,2,3</sup> and Gandhaka (sulphur) stands next to mercury in importance<sup>4</sup>. It is also considered as an essential agent for various processes of mercury such as Murcchana<sup>5</sup>, Jarana, Bandhana<sup>6,7,8</sup>, Marana<sup>9</sup> etc. when used in conjunction with Parada the potency of Parada can be increased and reduces toxic effects which are included in impure Parada<sup>10</sup>. That is the reason mercury is mostly administered internally in association with Sulphur.

The best accepted form of Gandhaka is greenish yellow in colour like the parrot's tail, lustrous as butter, smooth, hard and oily in touch<sup>11</sup>. Gandhaka is having equal splendour like turmeric, brightness and softness like butter. Since, Amalasara Gandhaka having above properties, it is preferred for therapeutic use in Rasa Chikitsa<sup>12</sup>.

When purified Gandhaka is consumed it prevents deaths, old age, increases the appetite, potency, can cure diseases like Kushta (diseases of skin) etc., diseases<sup>13,14</sup>. But raw (unpurified) Gandhaka is taken internally, it increases body temperature, mental confusion, blood related diseases. It also destroys the brightness, beauty of the body, strength as well as comfort<sup>15</sup>, produces skin diseases, Pitta disorders, destroys potency<sup>16</sup>, causes pain and loss of Ojas (immunity)<sup>17</sup>. It can destroy the body like Halahala Visha (an ultimate poison)<sup>18</sup>. Hence, purification is essential for the therapeutic use.

### MATERIALS & METHODS

Genuine raw material was procured from the local market of Vijayawada, Andhra Pradesh, India and material were thoroughly checked and confirmed by experts of Rasashastra, Dr. N.R.S. Govt. Ayurvedic College, Vijayawada, AP.

Gandhaka Sodhana will be carried out by Kurma Puta by Bhodhdhara Yantra method<sup>19</sup>.

The purification method is adopted as per the classical text Rasatarangini, in which the author himself says that by this method there is no necessary to repeat this process as this method Gandhaka can be purified in first attempt<sup>20</sup>. The

present study includes purification of Gandhaka and its analytical study through the chemical method.

### Material

1. Gandhaka (Sulphur) - 500g; 2. Gokshira (Cow's milk) - 2 litres; 3. Goghrita (Cow's ghee) - 150 ml

### Equipment

Ghata (wide mouth earthen vessel), Multani mitti (Fuller's earth), Mortar with pestle, Cloth piece, Iron wire, Upalas (cow- dung cakes).

### Procedure

A wide mouth Ghata (earthen vessel) is taken and filled with 2 litres of Gokshira (Cow's milk) and 150 ml of Goghrita (Cow's ghee) then the mouth of vessel is covered by a cloth and tied by iron wire. Coarse powder of Gandhaka (500g) spread upon the cloth and closed with another Sharava (earthen vessel) by placing in up-down position. The edges of both the vessels are sealed with Multani mitti (Fuller's earth) smeared cloth for ten times and allowed it to dry under sunlight. This Yantra (apparatus) is kept inside a pit (1.5 feet) beneath the surface of soil in such a way that, the brim of the vessel should be at ground level. Empty space of the pit around the apparatus was filled by soil. Upalas (cow dung cakes) were kept on above said brim of the vessel and set on fire. The Sulphur, after melting by fire flows down through cloth into the vessel, which contained milk and ghee. After Svangasita (self-cooling), the apparatus is taken out from the pit and Sandhibandhana (seal) was opened carefully. Purified Gandhaka was collected from the bottom of vessel and washed with hot water till Gandhaka gets free from oiliness of ghee. After that it is shade dried, weighed (470g, in granules form) and stored in a clean jar. (Figure. 1 to 10). The same procedure was followed for another 2 batches (Table 1).

### Precaution

- Heat should be evenly distributed to all sides.
- This procedure is carried out in open space where wind is quiet.
- Less number of Upalas was taken i.e. 30 to avoid over burning of Gandhaka.

- After Sodhana, Gandhaka is washed with hot water to get rid of oiliness and smell.
  - The earthen vessel is removed from the pit and the seal is opened carefully.
- Observation**
- The Sodhita Gandhaka is of shining yellow colour with a greenish tinge. It is found in the form of granules like Jawar seeds.
  - By doing thus, Ghee absorbs the toxic materials and separation of stones and other physical impurities through filtering cloth.
  - By general purification the impurities of Sulphur are eliminated in three ways:
    - i) The fat soluble impurities are dissolved in ghee and removed with it.
    - ii) The water and milk soluble impurities are removed with milk.
    - iii) The foreign particles (sand/stone etc.) mixed with Sulphur and insoluble in ghee are held up in the cloth during filtering.

Table 1: Observations during Gandhaka Sodhana process

Parameters	Expt-1 (3-11-2006)	Expt-2 (21-02-2007)	Expt-3 (18 -01-2008)
Initial wt. of Gandhaka	500 g.	500 g.	500 g.
Cow's Milk	2 litres	2 litres	2 litres
Cow's Ghee	150 g.	150 g.	150 g.
No. of Upalas	30	25	25
Time taken to burn of Upalas	40 mints	35 mints	35 mints
Final obtained Gandhaka	480 g.	485 g.	485 g.
Loss of Gandhaka	20 g.	15 g.	15 g.
Colour of Gandhaka	Yellow granules	Yellow granules	Yellow granules
Expenditure	Rs.100-00	Rs.100-00	Rs.100-00
Temp. recorded in the Pit	±150°C	±145°C	±150°C

### Chemical Analysis<sup>21</sup>

**Place of study:** CARISM, SASTRA University, Thanjavur, Tamilnadu.

**Material:** 1. Raw (impure) Gandhaka

2. Shodhita (purified) Gandhaka.

**Aim:** to analyze the pure and impure Gandhaka using by chemical method.

### Sulphur Determination

1.0.2g of sample is taken in a conical flask; add 100ml of N/10 iodine+ 5ml of conc. HNO<sub>3</sub>. (N/10 iodine is prepared by: 14g iodine + 36g KI. Dissolve KI in water and dissolve iodine in that solution and make it to 1000ml).

2. Kept for ½ hr, add 5ml of conc. HCl and then kept it for 1hour for evaporating to dryness until the residue get

colourless. If the residue is in colour add concentrated HCl until it becomes colorless.

3. Dissolve the residues in 30ml distilled water and then add 25% BaCl<sub>2</sub>. It will get precipitated. (25% BaCl<sub>2</sub> is prepared by adding 25g BaCl<sub>2</sub> in 100ml distilled water).

4. Stand for overnight and filter the solution using whatman 41 filter paper.

5. The filter paper with residue are kept in incinerator at 500 c for 6 hrs.

6. Ash of the filter paper weight was taken and calculated the sulfate content present in sample.

Table 2: Analysis of raw Gandhaka and Purified Gandhaka

Sample Name	Chemical assay (Sulphur Content %)
Impure Gandhaka	89.38
Pure Gandhaka	97.14

### Steps of Purification of Gandhaka



Fig 1. Raw (Impure) Gandhaka



Fig 2. Earthen vessel with Milk and Ghee



Fig 3. Covered by a cloth and tied by iron wire



Fig 4. Spread of Gandhaka over the cloth



Fig 5. Closed and sealed with another vessel



Fig 6. Cow dung cakes with fire



Fig 7. Burned cow dung cakes



Fig 8. After self cooling opened seal



Fig 9. First wash with hot water



Fig 10. Purified Gandhaka

## RESULT

Percentage of 'Sulphur' is increased by 8% in chemical analysis after Sodhana process. This reveals that Sodhana of Gandhaka removes the impurities and increases the quality of Sulphur (Table 2).

## CONCLUSION

This study revealed that before purification raw material contains 89.3880% sulphur and after purification, sulphur was increased up to 97.1428%. It is concluded that purification mentioned in Rasashastra text was to remove the impurities and improve the quality of material and by the internal and external administration, it does not produce harmful effects.

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## REFERENCES

1. Rasaratna Samuccaya Translated by Dr. Ashok. D. Satpute, Published by Chaukhamba Sanskrit Pratishthan, Delhi. Reprint 2006, p.86
2. Acharya Shri Madhava, Ayurveda Prakasha Edited by Shri Gulrajsharma Mishra, Varanasi, Published by Chaukhambha Bharati Academy, reprint 2007, p.252
3. Rasarnavam or Rasatantram A semi Dialogue Between Parvathi & Parameshvara Edited by Dr. Indradev Tripathi, Chowkhamba Sanskrit Series Office, Varanasi, 4<sup>th</sup> Edition 2001, p.95
4. Rasaratna Samuccaya Translated by Dr. Ashok. D. Satpute, Published by Chaukhamba Sanskrit Pratishthan, Delhi. Reprint 2006, p.87
5. Sadananda Sharma, Rasatarangini, edited by Kashinatha Shastri, Motilal Banarasidas Publications New Delhi, Reprint 2004, p. 103-104
6. Ibid p. 102
7. Rasarnavam or Rasatantram A semi Dialogue Between Parvathi & Parameshvara Edited by Dr. Indradev Tripathi, Chowkhamba Sanskrit Series Office, Varanasi, 4<sup>th</sup> Edition 2001, p. 96
8. <sup>1</sup>Rasaratna Samuccaya Translated by Dr. Ashok. D. Satpute, Published by Chaukhamba Sanskrit Pratishthan, Delhi. Reprint 2006, p.87
9. Bharat Bhaishajya Ratnakar- Encyclopaedia of Ayurvedic Formulations, Vol-4 Compiled by Vaidya Nagin Das Chhaganlal Shah, B.Jain Publishers (P) Ltd, Newdelhi- 110055, Reprint 1985, p. 543, 546, 548
10. Sadananda Sharma, Rasatarangini, edited by Kashinatha Shastri, Motilal Banarasidas Publications New Delhi, Reprint 2004, p. 181-182
11. Acharya Shri Madhava, Ayurveda Prakasha Edited by Shri Gulrajsharma Mishra, Varanasi, Published by Chaukhambha Bharati Academy, reprint 2007, p.61
12. Sadananda Sharma, Rasatarangini, edited by Kashinatha Shastri, Motilal Banarasidas Publications New Delhi, Reprint 2004, p. 175
13. Ibid p. 97-98
14. Acharya Shri Madhava, Ayurveda Prakasha Edited by Shri Gulrajsharma Mishra, Varanasi, Published by Chaukhambha Bharati Academy, reprint 2007, p. 260
15. Ibid Pp. 175-176
16. Acharya Shri Madhava, Ayurveda Prakasha Edited by Shri Gulrajsharma Mishra, Varanasi, Published by Chaukhambha Bharati Academy, reprint 2007, p.260
17. Rasayanasara 1<sup>st</sup> Part by Pandit. Shyamsundaracharya Vaishya, Shri Umedilal Vaishya, President, Shyamsundar Rasayanashala, Gayaghat, Kashi, 4<sup>th</sup> Edition, p.117-118
18. Rasaratna Samuccaya Translated by Dr. Ashok. D. Satpute, Published by Chaukhamba Sanskrit Pratishthan, Delhi. Reprint 2006; p.91-92
19. Ibid
20. Sadananda Sharma, Rasatarangini, edited by Kashinatha Shastri, Motilal Banarasidas Publications New Delhi, Reprint 2004, p. 177-178
21. Vogel's Textbook of Quantitative Inorganic Analysis, Arthur Israel Vogel (Author), John Bassett (Editor) 3<sup>rd</sup> edition, p. 153-154.

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