

GANDHAKA SHODHANA (PURIFICATION OF SULPHUR)

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ABSTRACT

In Ayurveda the usage of various metals and minerals are explained in therapeutics. Sulphur is known since years. In *Brahatravi*, Sulphur is used in several diseases as a therapeutic agent. Explanation of its *Grahya lakshana*, therapeutic uses, dose along with *pathya* and *apathya* can be traced in various *Rasashastra* treatises. The various physical and chemical impurities present and different methods of purification of the sulphur before its usage in therapeutics are high lightened. **Aims and Objectives:** Purification of sulphur was carried out by *Dalana* (heating and poring) procedure; classical method and was assessed for its organoleptic characters. **Materials and Methods:** In Ayurveda different methods are explained by various authors for the purification process of sulphur. For the present study sulphur was heated till it melts and then poured in milk for 3 times, this is called *Dalana* method in Ayurveda. **Result and Conclusion:** Total quantity of sulphur taken was- 500g and obtained quantity of sulphur was-468g. As per following the classical method explained in the text, the procedure was carried out and organoleptic characters were assessed. It is a very easy, simple and time consuming method. It helps to remove the physical and chemical impurities, to prepare a therapeutically beneficial product.

Keywords: *Gandhaka Shodhana*, Sulphur Purification, *Dalana*, *Godughda*.

INTRODUCTION

Sulphur is known since ages, in *Brahatravi*, Sulphur is used in several diseases as a therapeutic agent. Later, after 7th century A.D. Sulphur was used extensively both in *Dehavada* (in maintaining the health and eradicating the diseases) and *Loha vada* (converting lower metals in to Gold and Silver).¹ According to Ayurveda *Gandhaka* (sulphur) is grouped under *Uparasa*. Synonym of *Gandhaka* is “*Shulbari*” i.e. *Tamra shatru*. It is an essential agent for the various processes of *Parada Samskaras* such as *Marana*, *Jarana*, and *Bandhana* etc. Mercurial prepara-

tions without *Gandhaka* are considered to be more toxic. The mythological origin² is explained as, the product obtained while churning *Ksheera Sagara* along with *Amrita* (nectar). Different synonyms³ like *Gandhapashana*, *Pamari*, *Kruragandha*, *Navanita*, *Saugandhika*, *Gandhi*, *Bali*, *Gandhaka*, *Daityendra*, *Atigandha*, *Sugandhika*, *Balivasa*, *Gandha*, *Daityendra*, *Kushtari* are found in its context. In Ayurveda the *grahya lakshana* of sulphur⁴ are explained as, the colour of genuine *Gandhaka* should resemble that of the tail of parrot (greenish yellow). It should

be smooth, hard and unctuous. It should be having the lustre of *Kapikacchu beeja* and *Navanita* (soft to touch). For *Rasayanartha* and *Loha Vadartha*, it should be translucent like the fruits of *Amalaki* (*Amalasar Gandhaka*).

The pharmacological and therapeutic properties explained in Ayurveda are; *Rasa: Madhura*⁵, *Katu, Tikta, Kashaya*⁹⁷ *Guna: Ushna, Sara, Snigdha, Virya: Ushna, Vipaka: Katu, Karma: Deepana,*

*Pachana, Vishahara, Jantughna Dosha Prabhava: KaphaVatahara, Pittavardhaka. Vyadhi Prabhava: Kandu, Visarpa, Krimi, Kustha, Kshaya, Pleeha, Rasayana.*⁶ The modern view of *Gandhaka* (sulphur)⁸ Aryans, Greeks, Romans and Indians used it for fumigation and as medicine. It is estimated as the 9th most abundant element in the universe. The general properties of sulphur are listed in table 1 below.

Table 1: General properties of Sulphur

Name	Sulphur	Boiling point	444.60C
Symbol	S	Number of protons	16
Hardness	1.5 - 2.5	Number of neutrons	16
Melting point	112.80C	Specific gravity	1.9 - 2.3
Atomic number	16	Classification	Non metal
Atomic mass	32.06	Crystal structure	Orthorhombic

Appearance of Sulphur in solid form is Rhombic and Monoclinic. The chemical properties of Sulphur are it burns with a blue flame concomitant with formation of Sulphur dioxide, notable for its peculiar suffocating odour. It is insoluble in water but soluble in carbon disulfide and to a lesser extent, in other non-polar organic solvent, such as benzene and toluene.

Therapeutic use:⁹ when taken orally, sulphur is converted in the small intestine into alkali sulphides; thereby they attain irritant action and produce a mild laxative effect in 10-12 hours. It stimulates secreting organs like skin, bronchial mucus membrane. Externally it is used in the treatment of various parasitic skin diseases such as scabies, ringworm and pediculosis. The dose of sulphur is explained in Ayurveda¹⁰ as 1-8 *Ratti* (125-1000mg) for internal administration. The *Pathya* (do's) - *Jangala Prani Mamsa Rasa and Aja mamsa* (meat soup), *Apathya* (don't) salts, sour things, leaves of vegetables, pulses, intercourse with woman and travelling are avoided¹¹.

The *Gandhaka Dosha* (impurities of sulphur) is *Shila Churna* (physical impurities like clay, sand etc) and *Visha Dosha* (chemical impurities like arsenic, lead etc). It is therefore to be purified carefully.

Impure Sulphur gives rise to *Kushta, Tapa, Bhrama, Pitta Roga* and destroys *Roopa, Virya, Bala, Shukra*.⁷ As the concept of *Shodhana* (purification) plays a very significant role in Ayurveda as it makes the mineral less harmful, less toxic and free from impurities making it therapeutically fit for consumption. There are number of different procedures explained in classics; for purification of sulphur. Drugs used for the purification are *godughda* (milk), *Bhringaraja* (*Eclipta alba*) swarasa, Sarshapa, Tila or Kusmanda Taila.¹² Use of *Damuru yantra* and *Sharavas* are also explained by few authors.¹³ For the present study the simple procedure followed was *Dalana* in *Godugdha*, as the ingredients are easily available.

MATERIAL AND METHODS

Ingredients;

- 1) *Gandhaka* (sulphur)
- 2) Cow's milk
- 3) Ghee

The sulphur obtained from the Department of Rasa-shastra and Bhaishajya Kalpana, SDM Ayurveda College and Hospital, Hassan. Other ingredients like

milk & ghee used for purification procedures were obtained from local market of Hassan. Identification and authentication was carried out in the laboratory of Dravya Guna Department of SDM College of Ayurveda & Hospital, Hassan. The complete study was conducted in the teaching pharmacy of SDM College of Ayurveda & Hospital, Hassan, Karnataka.

Methodology

Gandhaka Shodhana (Purification of Sulphur)¹⁴

Table 2: Brief Description of Materials used for Purification of Sulphur

Started on date	Materials	Quantity	Completed on date
		Raw <i>Gandhaka</i>	
29/11/17	Cow's milk	1500 ml	29/11/17
	Ghee	500 g	

Method of Purification of sulphur:

The sulphur is taken weighed and pounded in stone mortar. A vessel containing adequate amount of milk (500ml) so that all the sulphur can be immersed in it is taken and white thin cloth is covered on its mouth and tied. In an iron ladle or a vessel equal amount of ghee is added to it and heated on mild fire. When ghee melts, powdered sulphur is added and sulphur is melted then, it is poured in a vessel containing milk through the cloth, in order to filter the impurities present in the sulphur. Each time this sulphur which gets solidified into the milk is washed with warm water and then pat dry and again pounded into powder and this procedure is repeated for 2 times with the same quantity of ingredients. The observations and colour changes were noted. **Precautions**

It was carried out as per the reference of Ayurveda Prakash. Type of procedure adopted is *Dalana* (heating and pouring) in milk, *Prakshalana* (washing) with warm water. Equipment used were steel cylindrical vessel, spoon, gas stove, cloth, iron vessel & warm water. The table 2 gives the brief description of materials and quantity used for purification of sulphur.

taken were as; one should be careful while heating sulphur as it has high affinity towards fire. The cloth tied onto the mouth of the cylindrical container should be smeared ghee for the easy passage of sulphur into milk.

OBSERVATIONS & RESULTS

Observations; During pounding sulphur has a peculiar odour. Sulphur when heated and turns to orange in colour, when melted completely. Few impurities, sand particles were seen on the cloth after filtration. Solidified spiky mass of sulphur was seen in the milk. **Duration** – For one *Dalana* (heating, melting and pouring) and *Galana* (filter) procedure – 1 hour. Total duration taken was 3 hour. The results of purification of sulphur are listed in table 3 & 4 below.

Table 3: Showing Results of Purification of Sulphur

Sr. no	Parameters	Results
1.	Total duration (in hours)	3 hours
2.	<i>Ashudda Gandhaka</i>	500g
3.	<i>Shuddha Gandhaka</i> obtained	468g
4.	Weight loss	32g
5.	Weight loss in percentage	6.4 %

Table 4: Results of Organoleptic parameters of Purified Sulphur

Sr. no.	Parameters	Sulphur
1.	Colour	Bright yellow
2.	Odour	Peculiar
3.	Appearance	Amorphous
4.	Consistency	Smooth and fine

DISCUSSION

Sulphur has a tremendous therapeutic value in Ayurveda. The process followed for the purification of it is very simple, less time consuming and easy to perform. After the purification of sulphur it can be used safely for internal administration, can be used as an ingredient in any herbo mineral formulations. During purification of Sulphur it was powdered because it increases effective surface area which facilitates quick melting. Crystalline sulphur after purification turned to amorphous nature. Loss of its translucency and lustre represent its amorphous nature. The repeated heating, melting and sudden cooling of sulphur by pouring it into liquid media may cause the loosening of the bonds between the molecules, making it amorphous in nature. This loosening of the bonds may be helpful in dissolving the impurities in the media thus separating it from the sulphur, making it pure. With each procedure it changes from orange colour to bright yellow colour suggesting removal of impurities. Also during heating the sulphur until it melts some of the impurities might have removed through oxidation process.

Ghee and milk both is *Madhura Rasa* and *Jeevaniya Dravya*, purification in these drugs might have removed *Visha Dosha* present in sulphur and thus incorporating the unctuous property in it, thus dissolving the fat soluble impurities present in sulphur.

The properties of milk as per Ayurveda are; *Rasa: Madhura. Guna: Guru, Mridu, Snigdha, Bahala, Picchila, Shlakshna, Manda, Prasanna. Virya: Sheeta. Karma: Jeevaneeya, Brumhaneeya, Rasayana, Ojo Vriddhikara, Vrishya, Balya. Rogagnatha: Pandu, Gulma, Shosha, Udara, Shwasa, Kasa* etc.¹⁵ Milk is generally considered as cooling,

nutritive, strengthening and vitalizing, also demulcent and emollient. These properties might have incorporated into the sulphur after poring it into the milk thus making it therapeutically more potent. Milk containing various salts and minerals like calcium sulphates, potassium, magnesium phosphates, sodium chloride and trace of phosphate of iron & mineral salts as compounds of calcium, potassium, sodium, phosphorus, iron and chlorine present in the milk might have reacted with the constituents present in sulphur thus separating out the impurities or toxic matter from it.¹⁵ The 6.4% weight loss was observed. This loss could be because of removal of physical and chemical impurities in the form of sand particles and loss during washing. Need of hour is to conduct detailed researches to prove the efficacy of these purification procedures explained in Ayurveda to make the metals or minerals less toxic and therapeutically beneficially to mankind.

CONCLUSION

Sulphur is used widely in therapeutic hence it's important to use it after purification. To get desired therapeutic effect and to lessen the untoward, toxic or harmful effect caused after its internal administration. The colour changes occurred can suggestive of removal of some of the physical and chemical impurities from sulphur in the form of sand particles and loss during washing. After purification it has a smooth and fine consistency with a peculiar odour. The weight loss also indicates the removal of impurities from the sulphur during the procedure making it therapeutically beneficial. Detailed researches are required to prove the efficacy of the removal of the

toxic matter making it therapeutically potent through these procedures.

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PHOTOGRAPHS SHODHANA OF GANDHAKA (SULPHUR)



Figure 1: Sulphur Pounded



Figure 2: Sulphur Heated



Figure 3: Sulphur Melted



Figure 4: Milk in vessel

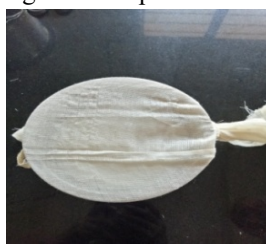


Figure 5: Cloth tied to vessel



Figure 6: Melted Sulphur poured



Figure 7: Sulphur taken out from milk



Figure 8: Sulphur dried



Figure 9: Purified sulphur

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