

## EFFECT OF DIFFERENT SHODHANA MEDIA ON GANDHAKA

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### ABSTRACT

Sulphur is a most important drug to convert mercury into its therapeutically effective form, as mentioned in Rasashastra. It gets medicinal value soon after it is purified. Various gandhaka shodhana methods are mentioned in classics. A qualitative (organoleptic characters) and quantitative estimation (temperature, quantity of media, weight of sulphur and elapsed time) of Gandhaka was carried to assess the effect of different media and the results are discussed.

**Keywords:** Sulphur(Gandhaka), Shodhana, Purification, Media

### INTRODUCTION

Sulphur<sup>1</sup> is the most important non-metallic element that occurs in both combined and free states and is one of the most abundant elements found in a pure crystalline form. In mineralogy Sulphur is called as "Brim stone". In Latin it means "burning stone and was used almost interchangeably with the term fire. Because of its combustibility, Sulphur was used for a variety of purposes at least 4,000 years ago (Cunningham 1935). In Rasashastra Gandhaka holds an important place next to *Parada*(Mercury) and is extensively used to prepare *sagandha Paradeeya kalpas* (Sulphur supplemented Mercurial formulations). *Shodhita Gandhaka* (therapeutically purified Sulphur) is directly put to therapeutic use and does not need any marana or satvapātana as it is the only biologically active chemical ingredient present. There are various shodhana procedures mentioned for processing

Sulphur, however characteristic features of therapeutically purified Sulphur are not described anywhere in classics. An attempt is made to assess the effect of different media in various methods; qualitatively and quantitatively with available resources.

### SELECTION OF RAW DRUG FOR SHODHANA

Though in classics four varieties of Gandhaka are mentioned but the available varieties are only *shweta* and *peeta*. For medicinal purpose, the *peeta* (yellow variety) *Gandhaka* is mainly used. The Gandhaka which is clear (transparent or translucent), yellow in colour just like *Shukapiccha* and as smooth and glistening as butter (*navaneeta samaprabha*) is known as "*Amalasara Gandhaka (pakwa Amalakiphalawat)*" and is recommended for *Rasakarma* and *Rasayana karma*.

### NECESSITY OF SHODHANA

According to ancient and modern texts *Gandhaka* contains two types of impurities:

a. *shila churna* (stone powder) b. *visha* (arsenic). The greatest quantity of naturally occurring Sulphur by far is combined with other elements, most notably the sulfides of copper, iron, lead, and zinc, and the sulfates of barium, calcium (commonly known as gypsum), magnesium, and sodium.

Practically pure Sulphur may contain traces of selenium, tellurium and arsenic sometimes mixed with bitumen and clay. If these impurities are not removed before use, *Gandhaka* is likely to produce many diseases. Hence, *Shodhana* should be adopted.

### **MATERIALS**

**Drugs:** *Gandhaka*, *Goghrita*, *Godugdha*, *Bhringaraj*, *Tila taila*, *Kusumbha taila* and *Sarshapa taila*.

**Equipments:** *Loha Darvi*, *Paatra*, Gas stove, Cloth, *Damaru yantra*, *Bhudhara yantra*.

### **METHODS OF GANDHAKA**

**SHODHANA:** Based on the classical references, various procedures of *Gandhaka shodhana* were adopted for the study;

#### **METHOD I<sup>2</sup>:**

1. 100 grams of *ghrita* (cow's ghee) was taken in a *lohadarvi* (iron vessel) and heated on mild fire.

2. Equal quantity (100 gms) of *Gandhaka* was added and continued heating till it liquefied.

3. Liquefied *Gandhaka* was poured in *Godugdha* through a cloth.

4. The same procedure was repeated for two more times.

#### **METHOD II<sup>3</sup>:**

1. 100gms of *goghrita* (cow's ghee) was

taken in a new and clean mud pot, containing 300ml *Godugdha* (cow's milk).

2. A thin clean cloth was tied to the brim of the vessel.

3. Powdered *Gandhaka* was placed on this clean cloth and covered with a mud lid of equal diameter and *sandhi bandhana* was done.

4. The vessel was placed in a pit up to its neck and covered with 16 *vanopalas* (cow dung cakes) and lit.

5. *Gandhaka* liquefied and dripped into the cow's milk.

6. After *swanga sheeta* (self-cooling) it was taken out and washed with hot water.

#### **METHOD III:**

Same as method I but instead of *Goghrita*, different tailas were taken such as *Tila taila*, *Kusumbha taila*, *Sarshapa taila* and the procedure was carried out.

#### **METHOD IV<sup>4</sup>:**

1. Powdered *Gandhaka* was taken in a well cleaned iron vessel and heated on mild fire.

2. On liquefying, it was poured into a vessel containing *Bhringraja swarasa*.

3. After self-cooling, it was washed with hot water.

4. The procedure was repeated for 7 times.

#### **Method V<sup>5</sup>:**

1. 4 *palas* of finely powdered *Gandhaka* was placed in *Damaru yantra* and *sandhi bandhana* was done.

2. The *Damaru yantra* was heated on *madhyamagni* for 4 *yama* (12 hours).

3. After *swanga sheeta* the *peeta varna Gandhaka* adhered to the upper surface was collected.

### OBSERVATIONS OF GANDHAKA SHODHANA (DURING THE PROCESS)

Sl No.	Method	Temperature of liquid used	Qty of Ghruta/ Taila (in ml)	Qty of Dugdha / Kwatha	Time of Swanga sheeta	Weight of Gandhaka (in g)
1	Ghruta /Dugdha	60° C	100, 90, 70	200 ml	25 min	88, 75, 66
2	Tilataila/ Dugdha	60° C	100, 90, 80	200 ml	25 min	90, 77, 70
3	Sarshapa taila /Dugdha	60° C	100, 90, 75	200 ml	35 min	88, 75 71
4	Kusumbha taila /Dugdha	60° C	100, 90, 80	200 ml	25 min	88, 79, 71
5	Bhringraj kwatha	50° C	--	200 ml	15 min	100, 99, 98, 97, 96, 93, 91
6	Bhudhara yantra	--	--	200 ml	75 min	85
7	Damaru yantra	--	--	--	1 day	68

### ORGANOLEPTIC CHARACTERS OF SHODHITA GANDHAKA

Sl	Method	Odour / smell	Collision sound	Colour	Physical Appearance	Fragile character
1	Ghruta /Dugdha	Odourless	Metallic	Pale bright yellow with black spots	Thin flake like	Fragile
2	Tilataila/ Dugdha	Typical	Metallic	Pale yellow with occasional black spots	Thin slab like	Fragile
3	Sarshapa taila /Dugdha	Ghruta	Metallic	Dull yellow with black tinge	Thicker slab like	Hard
4	Kusumbha taila /Dugdha	Odourless	Stone like	Spotless bright yellow	Thin slab like	Most Fragile
5	Bhringraj kwatha	Odourless to faintly	Metallic	Pale yellow with	Thicker flake like	Fragile

		characteristic		scattered black spots		
6	<i>Bhudhara yantra</i>	Typical <i>Gandhaka</i>	Amorphous	Bright granulated yellow	<i>Manibhakara</i> {like granules}	Less Fragile
7	<i>Damaru yantra</i>	Odourless	----	Bright greenish yellow	Monoclinic (needle like)	--

## DISCUSSION:

Sulphur has a property of "Allotropism". This property is its important characteristic. Physical state is same, chemical is same, but forms and physical properties are different. Sulphur usually melts at 120°C, but if heated slowly melts at 113° C. It boils at 444.8° C. At temperature above 150°C, Sulphur becomes thick and viscous, above 250°C it becomes more fluid again and its colour changes from yellow to red. It is dark-brown at its boiling point. Sulphur is a very reactive element. At 250°C it ignites with air. As it burns, it combines with oxygen to form SO<sub>2</sub>, a colourless gas.

In the procedure, the *Gandhaka* gets dissolved in the *goghruta* (cow's ghee), during which *vishas* (toxins) get dissolved in *ghruta*, thereby *ghruta* simultaneously detoxifies the *Gandhaka*. The *goghruta* pacifies the *pittadosha*. The substances which are insoluble in ghee are filtered off from the *Gandhaka*. The *vishas* present in *Gandhaka* are lipid soluble (*Ghruta*, *Dugdha*, *Taila*) and have affinity towards protein present in *dugdha*.

When transferred into *dugdha*, the temperature of the *Gandhaka* drops down and it gets solidified again into a solid slab and the traces of *ghruta* float on the surface

of the *dugdha*. If *sheeta dugdha* is taken for the *nirvapana* of *Gandhaka*, then cavities are formed inside which *ghruta* and *dugdha* gets filled. If *atyushna dugdha* is used, it forms a solid slab without any cavities. The *Gandhaka* should be heated on *mandagni* or otherwise *kharapaka* will destroy the *guna*, *varna* of *Gandhaka*.

After *swanga sheeta* the *snigdha* of *Gandhaka*, because of *ghruta*, is washed out with hot water. Similarly in other *Dhalana* procedures using different *Tailas*, similar changes do occur along with *Gunavardhana* of *Gandhaka* with respect to the *Tailas* used. Few texts have mentioned to liquefy *Gandhaka*, in such cases it is directly heated on *Mridvagni*. In other context it is mentioned that *Gandhaka* to be poured in the *Swarasa* of *Bhringraj*, which alleviates the *pittadosha*.

The basic concept, to detoxify the *Gandhaka* and to process it with *Pittashamaka* substances, remains the same. In II method, 16 *vanopalas* weighing 1.5 kgs were put around the mud pot to fire. The total time required for *swanga sheeta* of the mud pot was about 02.05hrs. The temperature ranged between 120-150°C. This procedure separates the *pashana* etc impurities above

Cloth and the *visha* in *Gandhaka* dissolves in the *ghruta* and *dugdha*.

*Rasa* texts describe that, *Bhringaraja rasadwara shodhita Gandhaka* is useful in preparing *parpati*. In *Damaru yantra* procedure the texts mentioned to maintain *madhyamagni* for 4 *yamas* ranges between 360-380°C. The *Gandhaka* obtained by this method is bright, devoid of *sneha* and is useful in preparing *swarna vanga* and *makaradhwaja*.

### SCOPE OF THE STUDY

1. The presence of organic alkaloids has to be evaluated using sophisticated instruments.
2. Analytical studies of *Dugdha*, *Ghruta*, *Kwatha* and *Tailas* may describe the presence of *visham* in *Gandhaka*, to highlight therapeutic attributes of *Gandhaka* in *Rasa yogas*; it needs to be evaluated clinically.
3. This study further requires suggestions for *Gandhaka shodhana* at industrial level.

### CONCLUSION

This study highlights the *shuddha Gandhaka laxanas* done in different media through organoleptic and preliminary chemical analysis. Conclusion on this experiment about *shuddha Gandhaka laxanas* is that, the *Gandhaka* should be odourless, fragile and should be having thin flakes and metallic sound. At a glance, after *shodhana*, *Gandhaka* retains its *Peeta varna*, Percentage yield of *shudha Gandhaka* as a final product validates the method to be adopted in *Rasa-Rasayana karmas*. The quantum of *Agni* ascribed to *Gandhaka* as *Mandagni* falls between 113-120°C. Similarly the *Madhyamagni* for *Gandhaka* falls between 360-400°C.

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