

Research Article

Evaluation of Gandhaka Shodhan Process

Prabhakar S. Salunkhe^{1,*}, Bharati S. Patil², Pallavi L. Fule³
^{1,2,3} Professor and Head of Department

¹Dept. of Rasashastra & Bhaishajya Kalpana, Dept. of Streerog & Prasuti Tantra², Dept. of Agad Tantra & Vyavahar Ayurved³
K. D. M. G's Ayurved Medical College, Chalisgaon, Jalgaon, Maharashtra, India-424101

* **Corresponding Author:** Dr. Prabhakar S. Salunkhe, E-mail: drpssalunkhe@gmail.com

Article Received on: 26/05/2020 Accepted on: 28/06/2020 Published on: 30/06/2020

ABSTRACT:

While the evaluation of Gandhaka Shodhan Process, It is clear from the observations and inferences that the physical properties like a) Colour, b) Odour, c) Melting Point and d) Chemical properties shows some changes.

Possible reasoning for this and its significance is discussed here.

Colour: There are slight changes in the colour of Shuddha Gandhaka. It may be due to the different substances used for shodhan as Til oil and Bhringraj Swaras.

But there is no change in colour of sublimed Gandhaka as it is not treated by any other substance.

Odour: There was a notable change in the smell of Shuddha Gandhaka which is treated by Til oil and Bhringraj Swaras.

Melting Point: Changes in melting point of Shuddha Gandhaka were noted. They may be due to adherence of the material used for Shodhana as they are in the form of Carbon.

Elemental Analysis: Particle size was reduced and there was a coating of fats shown as Carbon in Shuddha Gandhaka which was treated by Til oil and Bhringraj Swaras. Gandhaka becomes more effective as per its Vyavai guna. Due to coating, it may achieve the target site as per time releasing the property.

KEY WORDS: Ghandaka, Gandhaka Shodhan, Shodhit Gandhaka.

INTRODUCTION:

Ras Shasrtra is the science, which deals with the study of Parada, Gandhaka, Minerals, Animal products and the methods of preparation of their Kalpas i.e. Rasaushdhi.

There are many references available in ancient Samhitas about the substances used in Ras chikitsa like Parada, Gandhaka etc.

The following reference expressed the importance of Gandhaka in Ras Shastra.

Parada cannot act as Roganashak (Curative) without mixing Gandhaka with it⁽¹⁾.

In Arya Chanakya's Kautilliya Arthashstra, there is a reference of Rasvedhaj Suvarna which is made from Gandhaka jarit Parada.

In Sushrut Samhita Shwitrakushthgna Lepa was described which contains Gandhaka Compounds⁽²⁾.

In Charak Samhita 'Muktadhya Churana' was described which contains Parada, Gandhaka and others⁽³⁾.

By all the above references we can see that the Gandhaka was in use from 1000 to 1500 B.C.

Aims:

1. To study of Gandhaka Shodhan given in Ayurvedic Texts by various methods.
2. To compare Shuddha Gandhaka by its physical and chemical properties obtained by different shodhan process.

Objectives:

1. To study of Gandhaka Shodhan processes given in Rasa Shastra Literature.
2. To study the Shodhana Processes of Gandhaka and their observations in Laboratory.

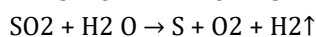
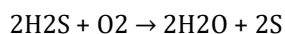
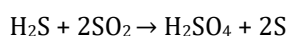
Occurrence (Origin) of Gandhaka:

1. As per Ras Taranginee Gandhaka was Artava (menstrual discharge) of Goddess Parvatee⁽⁴⁾.
2. At first Gandhaka's origin was at 'Shwetadweepa' which is at South Itali. Naturally, Gandhaka was originated from volcanos which are in Sisily. Due to its typical pungent smell, it is known as Gandhaka⁽⁵⁾.
3. As per Ayurvedic Texts Gandhaka occurs from.
 - a. Animal sources like Eggs, blood, milk, stool and bile.
 - b. Plant Sources:- Garlic, Mustard, Onion, Bark of Neem, Tomato, Grapes, Seetaphal, Pineapple, Apple and Lime etc.
 - c. Mineral Sources:- Suvarna Makshik, Raupya Makshik, Vimal, Sasyak, Manahshila, Hingula etc.

In India, it occurs in Maharashtra, Kashmir, Madras, Punjab, Bihar, Assam and Orrisa.

4. As per Modern Chemistry Gandhaka occurs in nature in various forms like gas, ores of metals and Sulphates.

Gandhakais produced in various chemical reactions⁽⁶⁾.

**Synonyms of Gandhaka****A. As per regional languages**

Sanskrit, Marathi, Hindi, Gujrathi :Gandhaka

English: Sulphur

Latin: Sulpurates, Succur

Arebi: Kivrit

Farashi: Gogirda

B. As per Historical Origin - Gauripushpa, Gauribeeja, Shivarajah**C. Upamatmak - Bali, Balivasa****D. Swabhavdarshak - Vaigandha, Gandhaka, Atigandha, Krurgandha, Putigandha, Gandhamadan, Lelee, Lelitak.****E. Karyadarshak - Dhatumari, Dhatuvairi, Shulbari, Vat, Rasbandhak, Sutjeet, Sutveer-yaprada.****F. Gunadarshak - Pamari, Kusthari, Krumighna.****Types of Gandhaka (Sulphur):****1. As per Ayurvedic Text:**

A. Gandhaka is of four types -

- ii. Shuklavarnee (Shwetavarnee)
- iii. Shukpichhabh (Peetavarnee)
- iv. Shuktundakhya (Raktavarnee)
- v. Krushnavarnee

Shukpichhabh Gandhaka is known as Aawalya or Aamalsar Gandhaka, which is available easily and used in Ayurvedic medicine.

B. Modern types of Gandhaka as per Ayurvedic Textbook -

- ii. Pushpa Gandhaka (Sublimed Sulphur)
- iii. Dugdha Gandhaka (Precipitated Sulphur)
- iv. Dhauta Gandhaka (Washed Sulphur)
- v. Krushna Gandhaka (Black Sulphur)

2. As per modern Chemistry:

A. Solid Gandhaka:- it is of 4 types

- ii. Cycloota Sulphur(S₈)
- iii. Cyclohexa Sulphur (S₆)
- iv. Cyclo Sulphur
- v. Catena Sulphur (S₅)

B. Liquid Sulphur

Properties of Gandhaka**1. As per Ayurveda Text:**

Ras - Madhura, Vipak - Katu, Veerya - Ushna.

It is Kandughna, Kusthagna, Dipak, Pachak, Aamnashak, Pittashodhan due to its Sara (Purgative) guna.

It acts on Rasa, Rakta, Mansa, Meda, Asthee, Majja and Shukra dhatu by its Rasayan property.

As per Modern Chemistry:

Physical Properties:-

Chemical Symbol	- S
Molecular Weight	- 32.06
Atomic No.	- 16
Melting point	- 1150C
Boiling point	- 444 ⁰ C
Specific Gravity	- 1.957

Gandhaka is pale yellow in colour, brittle and crystalline solid.

When heated it melts to yellow, mobile Liquid at 1130C; after raising the temperature it's liquidity

minimises and the colour becomes blackish. At 232°C it becomes solid and black coloured. At above 232°C it liquefies again and at 444°C it boils and brownish-red vapours come out.

Gandhaka is insoluble in Water. Soluble in Carbon Disulphide, Benzene and Turpentine Oil.

It is a bad conductor of heat and electricity. It combines directly with many metals like Copper, Silver, Iron, Parada etc⁽⁷⁾.

Grahya Gandhaka

As per Ayurved Prakash 2/18 – Parrot's tail coloured (Yellow), smooth as butter to touch, hard and Snigha Gandhak is supposed to be the best for medicine preparation. It is known as Aamalsar or Aawalya Gandhaka.

Gandhaka Doshha

1) As per Ayurved Text – Gandhaka contains two foreign matters as doshas viz. a) Particles of stone and

b) Poison (harmful properties came to Gandhaka from poisonous substances like Arsenic)⁽⁸⁾

It is therefore to be purified very carefully.

Intake of Ashuddha Gandhaka (Impure Sulphur) causes Kushtha, Dah, Bhrama, Pittaj vikar and loss of beauty⁽⁹⁾.

2) As per Modern Chemistry – Intake of impure Gandhak causes fever, skin rashes, conjunctivitis, jointpain, urticaria, Haematuria, bronchospasm, leukopenia, Epistaxis, rarely plastic Anemia.

It causes CNS disturbances like confusion, depression, ataxia, tetanus, fatigue, acute psychotic episodes. Rarely peripheral neuritis, Goitre and Hypothyroidism⁽¹⁰⁾.

So Gandhaka must be used as Ras or Rasayan after proper shodhan process.

MATERIALS AND METHODS:

To study the different methods of Gandhaka Shodhan as prescribed in Ayurvedic texts and compare the Shuddha Gandhaka from different shodhan processes by its physical and chemical properties. We have selected four different methods of Gandhaka Shodhan to obtain harmless Gandhaka.

The material used for these methods were easily

available and the procedures were easy to perform. So I have chosen these methods.

In our study, native Gandhaka was to be subjected to 'Shodhan' by two methods. Samples of Gandhaka were drawn from each procedure. Changes were observed by their physical and chemical properties. Comparison was noted in their reported properties to each other and with Ashuddha Gandhaka.

1. Method No. 1:

Material – i) Ashuddha Gandhaka 50 gms., ii) Til oil 50 gms., iii) Godugdha 450 ml, iv) Water as required.

We have taken 50 gms of Ashuddha Gandhaka powder. 50 ml of Til oil was taken in an iron pan and heated it. Ashuddha Gandhaka was added into hot Til oil. Melted Gandhaka immediately poured into a pot through cloth containing 150 ml of Godugdha. Gandhaka was taken out from godugdha. Washed it with hot water and dried. Thus Shuddha Gandhaka was collected.⁽¹¹⁾ This Sample is labelled as C-1.

After this shodhan process, 47.6 gms of Shuddha Gandhaka was collected. There was 4.8% loss in weight of Ashuddha Gandhaka.

Shuddha Gandhaka appears light greenish-yellow coloured, having an oily smell.

2. Method No. 2 :

Material – i) Ashuddha Gandhaka 100 gms., ii) Bhringraj Swaras 2100 ml., iii) Water as required.

Taken 100 gms Ashuddha Gandhaka powder in an iron pan and heated on medium fire. Melted Gandhaka immediately poured into a pot, containing 300 ml of Bhringraj Swaras. Got the Gandhak out from the pot. Washed by hot water. Dried and powdered finely. This sample is labeled as D-1.

Second-time sample D-1 Gandhaka powder was taken into the iron pot and heated. Melted Gandhaka immediately poured into a pot containing 300 ml of Bhringraj Swaras. Taken out Gandhaka from the pot and washed by hot water. Dried and powdered. This was sample D-2.

Thus this procedure was repeated for a total 7 times. For each procedure, Gandhaka was used obtained by the previous method. Fresh Bhringraj Swaras was used for each procedure. After the last 7th procedure Shuddha Gandhaka was obtained and labelled as 'D-7'⁽¹²⁾.

After this Shodhan process, 86.7 gms. of Shuddha Gandhaka was obtained. There was 13.3% loss in weight of Ashuddha Gandhaka.

Shuddha Gandhaka appears pale yellow coloured, reduced pungent smell.

Above study was conducted in the Department of Ras Shastra & B.K., K.D.M.G.'s Ayurved Medical College & Hospital, Chalisgaon, Dist. Jalgaon.

OBSERVATIONS:

1. Colour:

There was a change in colour between 4 samples and Ashuddha Gandhaka.

4. Free Sulphur % in various samples :

Table No. 1: Showing free Sulphur % in various samples:

Sr. No.	Sample	Free Gandhaka%	Carbon %
i	Ashuddha Gandhaka	97.05	0.28
ii	Sample C-1	95.08	1.92
iii	Sample D-7	92.07	4.74

4. % Loss after Shodhan Process:

Table No. 2: Showing % Loss after Shodhan Process:

Sr. No.	Sample	Before Shodhan Weight	After Shodhan Weight	% Loss
i	Sample C-1	50 gms	47.6 gms	4.8%
ii	Sample D-7	100 gms	86.4 gms	13.3%

DISCUSSION:

1. Colour:

There are slight changes in the colour of the samples. There is no objective parameter to detect a slight difference in colour.

2. Odour:

Some changes are there in the smell of various samples. Sample C-1 shows Goghruata's and oily smell were due to Goghruata and Til Oil used for Shodhan. Both of the Shuddha Gandhaka samples reduced pungent smell may be due to substances used for shodhan as Goghruata, Til Oil, Bhiringraj Swaras.

3. Melting Point:

- Ashuddha Gandhaka's melting point is lowest as 114°C.
- Til oil Shodhit Gandhaka's melting point increases by 7°C.
- Bhiringraj Swaras Shodhit Gandhaka's melting point increases by 7°C.

- Yellow – Ashuddha Gandhaka
- Light Greenish Yellow – Shuddha Gandhaka by Til Oil.
- Pale Yellow – Shuddha Gandhaka by Bhiringraj Swaras

2. Odour:

- Pungent Smell – Ashuddha Gandhaka
- Oily Smell reducing pungent smell – C-1
- Reduced pungent Smell – D-7

3. Melting Point:

- Ashuddha Gandhaka – 114°C
- Sample C-1 – 121°C
- Sample D-7 – 121°C

4. % Loss after Shodhan: Minimum % Loss in Til Oil and Goghruata Shodhit Gandhaka.

CONCLUSION:

Amongst many methods of Gandhaka Shodhan can be used in drug preparation, two methods were selected.

Commercially available Gandhaka was used for Shodhan Sanskar by these methods.

Physical and Chemical properties were tested by i) Colour, ii) Odour, iii) Melting Point, iv) Elemental Analysis.

1. Colour of Shuddha Gandhaka shows some changes. They may be due to the different substances used for Shodhan.

2. Melting point of Gandhaka shows increased after shodhan. These differences may be due to adherence of material used for shodhan.

3. Odour: The change in the smell of Til Oil shodhit

and Bhringraj Swaras shodhit Gandhaka was mostly due to substances used for shodhan.

4. Elemental Analysis:-

- a. Til oil Shodhit Gandhaka particle size was reduced and coated by fat as in the form Carbon. So it has Vyavai and time-released property. As it is having less Carbon i.e. 1.92%, it would absorb earlier.

Til oil would increase the properties of Gandhaka by its Madhur, Vikasi and Ushna properties. Hence Gandhaka becomes more efficient by these properties.

- b. Bhringraj Swaras Shodhit Gandhaka's particle size was reduced and coated by organic material in the form of Carbon. This Gandhaka may act as its Vyavai and time released property.

As per Ras Shastra Texts Gandhaka treated for 7 times can be use in other Kalpas as Parpati as it has maximum Carbon i.e. 4.74%. But 3 times Shodhit Gandhaka by this method can be used only as a single drug as it has less Carbon i.e. 3.17%.

Bhringraj Swaras could increase properties of Gandhaka by its Katu Vipaki, Ushna Veerya, Kushthagnha, Krumighnha and Aamnashak properties.

With these two methods of Gandhaka Shodhan we cannot correlate the properties mentioned in modern chemistry books. For this purpose further study of Shodhit Gandhaka is essential. That is out of scope at this stage.

All these conclusions cannot be taken as concrete and final, because the observations were tried to correlate with Ayurvedic references.

REFERENCES:

1. Madhav Upadhyay, Ayurved Prakash, Ed. 1925 - 1/12.
2. Kaviraj Dr. Ambikadatta Shastri, Sushrut Samhita, Ed. 1989, Chikitsasthan - 19/25-28.
3. Vd. J. T. Acharya, Charak Samhita, Ed. 1984, Sustrasthan - 17/125-127.
4. Kaviraj S. Sharma, Ras Taranginee, Ed. 1979 - 7/57-66.
5. Vagbhat / Kulkarni, Ras Ratna Samucchaya - Part - I, Ed. 1969 - 3/11.
6. Cotton and Wilkinson, Advanced Inorganic Chemistry - Ed. 3rd.
7. Teray A.L., Contemporary Organic Chemistry.
8. Bhudeo Kukharji, Ras Jal Nidhee - Part - II, Ed. 1984 - 2/2.
9. Madhav Upadhyay, Ayurved Prakash, Ed. 1925 - 2/18.
10. Satoskar & Bhandarkar, Pharmacology and Phamarcotherapeutics - Part - II, Ed. IXth.
11. Kaviraj S. Sharma, Ras Taranginee, Ed. 1979 - 8/18-20
12. Kaviraj S. Sharma, Ras Taranginee, Ed. 1979 - 8/21-22.

Cite this article as:

Prabhakar S. Salunkhe, Bharati S. Patil, Pallavi L. Fule, Evaluation of Gandhaka Shodhan Process, ADJIM 2020: 5(2), p. 06-10.