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AN EAGLE EYE VIEW ON THE PHARMACEUTICAL STUDY OF GANDHAKA SODHANA BY KURMA JALA YANTRA METHOD

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Abstract:

Rasasastra is an important branch of Ayurveda which deals with the use of metallic and mineral drugs which are pharmaceutically processed and rendered fit for internal administration. The Rasa medicines are known for their faster action in smaller doses, quicker assimilation, excellent therapeutic values, longer shelf life and easy preparation. Gandhaka is one among the Uparasa.

Every rasadravya should be purified before using it in a formulation. There are many methods for Gandhaka sodhana. The Sodhana process has been described to be done from one to a hundred times in various texts. Some say that for direct consumption, 100 times Sodhana should be done, whereas others say that seven times Sodhana is sufficient. 100 times Sodhana by the Dalana method removes the Gandha Dosha of Gandhaka. There are varieties of methods of purification of gandhaka mentioned in rasasastra classics. The Kurmaputa method is used for the purification of gandhaka in the present study. The principle adopted here is the indirect heating of gandhaka.

Key words: Kurma puta, Gandhaka, Sodhana, Rasasastra.

INTRODUCTION

Knowledge of Rasa has been in existence from time immemorial. Exploration of natural resources for the benefit of human beings is the object of this therapy. The medieval period can be treated as a golden age for the development of this science. It is recognised as a medical science with an independent philosophical background in the 14th century. A substance with a strong odour is called Gandhaka. In English it is known as Sulphur, and in Sanskrit, Tamil, Telugu, Malayalam, Hindi and Marathi it is called Gandhaka.

Synonyms of Gandhaka

Based on	Name
Mythology	Gauribeeja, Gauripuspabhavah, Balivasa, Lelitaka, Balibala, Daityendra, Bali.
Physical property	Navanita, Gandhapasana, Vasakara, Vasavata, Gandhopala.
Odour	Gandhaka, Saugandhika, Atigandha, Kruragandha, Divyagandha, Putigandha.

Based on	Name
Therapeutic property	Kitaghna, Kustari, Pamari, Kitari, Lekhi, Kitanasana.
Dhatukarma	Shulvari, Shulvaripu, RasaGandhaka, Sutashatru, Dhartumari.
Colour	Sukapicchakya, Sukapuccha, Sukapicchamasacchayo, Pita Gandhaka.

Gandhaka occurs both in native form as well as ore. The native form is found in Italy, Sicily, Spain and Texas. The combined form is found in Russia, Japan, Burma, USA, Chile and the Philippines. In India it is found in Rajasthan, Bihar and Assam. Mythological origin says that when Parvati Devi was playing near Ksirabdhī, she got menstruated. The clothes which were wet with Rajah were washed in the Ksirāsagara; that Rajah got mixed with water and converted into Gandhaka. During Samudra Manthana, Deva and Danava got Gandhaka along with Amṛta. The odour of Gandhaka pleased Deva and Danava very much, so they called it Gandhaka. Another story goes this way: King Bali consumed Gandhaka with the intention of acquiring immense strength. When his body came in contact with flames emitted from the mouth of Vasuki during Samudra Manthana, his Vasa got melted. The immense fragrant Vasa began to ooze from his body and was later known as Balivasa. The origin of Gandhaka is from Swetadvīpa; this Swetadvīpa is most probably the Sicily region in the southern part of Italy.

Gandhaka contains two types of impurities.

1. Shila Churna (stone powder or clay)
2. Visha (Arsenic, Orpiment etc.)

This clearly indicates that it contains both physical and toxic impurities. If these impurities are not removed before use, Gandhaka is likely to cause Kushta, Tapa, Bhrama, Paittika disorders, and diminished Bala, Varna, Sukha and Virya. According to Rasa Tarangini, it increases body temperature, causes vertigo and blood and bone diseases, and hampers the strength, lustre and beauty of the body. Ashuddha Gandhaka destroys the body just as Halahala Visha does. So, Sodhana is very important in this context. Ayurveda Prakasha specifies that only a single procedure of Dravana and Dalana is needed for Gandhaka if it is used for the preparation of a Yoga or Rasadi medicines. According to the commentary by D.A. Kulkarni, the substances used for Gandhaka Sodhana are Goghrita, Godugdha, Agni, Vastra and other herbal juices. Mainly the impurities like stone and other extraneous materials present in Gandhaka get separated when Gandhaka is melted and filtered through cloth. Other impurities that melt along with Gandhaka dissolve in Godugdha, Kanji or other herbal juices or in water and get separated. Some impurities melt and dissolve in Ghrita and are separated.

Ores of Sulphur

Sulphide ores	Sulphate ores
Copper pyrite	Copper sulphate
Galena	Ferrous sulphate
Iron pyrite	Gypsum
Stibnite	Zinc sulphate
Cinnabar	Heavy spar
Realgar	Epsom
Orpiment	Globular salt

Sulphide ores	Sulphate ores
Zinc blend	Slitstone
Hydrogen sulphide	Kieserite

Sulphur in humans: When taken orally, Sulphur is converted into alkali sulphides in the small intestine; thereby they attain irritant action and produce a mild laxative effect in 10–12 hours. Sulphur makes up 0.25% of body weight, meaning an average adult human body contains around 170 grams of Sulphur. Sulphur is involved in the formation of bile acids, which are essential for fat digestion and absorption. It also helps to keep skin, hair and nails healthy. It is purgative. Deficiency of Sulphur is linked to the skin disorder eczema and improper development of nails and hair.

Types of Gandhaka

Sl no.	No. of types	Name of types	References
1	4	Sweta (Khatika), Peeta (Sukapicha), Raktha (Sukatund), Krishna varna	Rasendra Chudamani, Rasa Prakasha Sudhakara
2	2	Loniya, Amlasara	Rasendra Sara Sangraha

Grahya Gandhaka Lakshana

Sl no.	Ayurveda Prakasha	Rasa Tarangini
1	Suka pucha sama chaya	Rajani sama prabha
2	Navaneeta prabha	Navaneeta komala
3	Masruna	Nirmala
4	Katina	-
5	Snigdha	-

Properties of Gandhaka: Rasa – Tikta, Katu, Kasaya, Madhura; Guna – Ushna, Snigdha, Sara; Virya – Ushna; Vipaka – Katu/Madhura; Doshaghnata – Vatakapha Nashaka, Rakta Sodhana, Krimighna, etc. Prabhava – Twakvikaranasaka, Dadrunasaka, Kusthanasaka; Karma – Garavisahara, Dipana, Amapacana, Kandughna.

Dose

Dose	References
1 Karsa	Vangasena
2 Nishka	Rasa Ratna Samuchaya
1 Nishka / 1 pala	Ayurveda Prakasha
1–8 Ratti	Rasa Tarangini

Anupana

Triphala Kwatha – ENT diseases, Agnimandya

Vasa Kwatha – Nutana Kshaya

Kantakari Kwatha – Shwasa, Kasa

Pakwa Kadalipatra – Skin disease

Chitraka mula Churna – Debility

Gandhaka Sevana Pathya – Apathya

Pathya: Ahara – Godugdha, Goghruta, Jangala Mamsa, Chaga Mamsa, Wheat, Rice, Saindhava, Sarkara, etc. **Vihara** – Warm water for bath, coconut oil for massage, wandering and staying in a cold place, etc.

Apathya: Ahara – Ati Lavana, Amla Rasa Dravyas, Dwidala, Taila, Kanji, etc. **Vihara** – Maithuna, Arohana, etc.

Gandhaka Vikara Santhi: Godugdha with Goghruta.

GANDHAKA SODHANA

Evamekena varena gandhaka nirmalo bhaveth

This procedure has been mentioned first in Anandakanda and Rasaprakasa Sudhakara. For puta, the author of Rasaprakasa Sudhakara used 20 upalas, and the number of upalas was mentioned for the first time. How much time heat should be given was mentioned first by Rasadhyaya as jwalayeth ghatika dwayam. The author of Rasendra Chintamani termed laghuputa as kurmaputa and was the first to use kanji instead of dugdha. The mouth of the liquid-containing container has been tied with woollen cloth, i.e., jeerna urna vastra or karpasa vastra, as per Rasa Paddhati.

Aim & Objectives

By doing this method, the finally obtained gandhaka will be thushakara or pindakara (streaks or globular); by doing it 100 times, gandhaka loses its gandha and becomes nirgandha (RRS 3/25). Since gandhaka passes through different grades of temperature, it attains visesha sudhi.

Materials & Methods

Dimensions of mud pot – Diameter: 20.5 cm, Circumference: 65 cm, Depth: 21 cm, Height: 18 cm, Brim thickness: 2 cm. Dimensions of pit – Diameter: 21 cm, Circumference: 66 cm, Depth: 23 cm.

Total quantity taken – 500 gm per sample.

Number of upalas used – 12 upalas for each sample.

Procedure

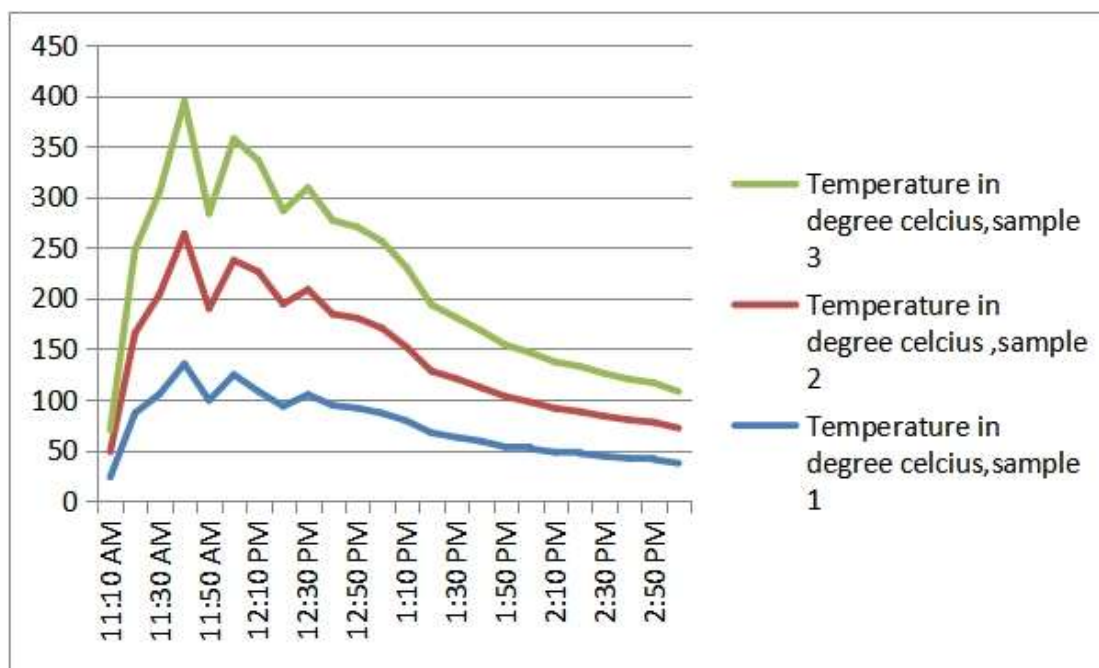
Kurmaputa: The sample is kept inside the Bhudhara Yantra, and a sufficient amount of vanopalas are burnt over it. Due to the heat produced, self-pouring of molten gandhaka takes place through a cotton cloth into the container containing milk. By doing this one time itself, gandhaka gets purified.

Observations & Results

Table showing temperature readings of the upper pot for Gandhaka sodhana – Sample 1, 2, 3

Time	Temp (°C) Sample 1	Temp (°C) Sample 2	Temp (°C) Sample 3
11:10 am	23.5	25	21.4
11:20 am	86.7	78.9	82.4
11:30 am	105.6	98.7	100.8
11:40 am	135.3	128.4	130.7

Time	Temp (°C) Sample 1	Temp (°C) Sample 2	Temp (°C) Sample 3
11:50 am	99.3	90.6	93.8
12:00 pm	124.6	112.8	120
12:10 pm	108.1	118	109.8
12:20 pm	93.4	100.9	92
12:30 pm	105	103.7	100.5
12:40 pm	94.3	90	92.6
12:50 pm	91.6	88.9	89.7
1:00 pm	86.6	83.8	85.9
1:10 pm	79	72.7	78.6
1:20 pm	67.2	60.8	65.6
1:30 pm	62.8	57.9	60.3
1:40 pm	59	52.9	56.3
1:50 pm	53.2	49.8	50.9
2:00 pm	51.4	46.1	48.9
2:10 pm	48.1	43.3	45.7
2:20 pm	46.8	41.3	44.7
2:30 pm	44.1	39.4	42.3
2:40 pm	42	38	40.1
2:50 pm	40.8	36.8	38.9
3:00 pm	37.2	34.7	36



Graph showing temperature pattern of the three samples of gandhaka

After swangaseetha, at 4:10 pm, all the samples were collected. Small granules of gandhaka were found under the lower pot, which were collected, washed well in hot water three times, and dried in sunlight.

Table showing results of Gandhaka sodhana

Results	Sample 1	Sample 2	Sample 3
Sodhita gandhaka	481.5 gm	484 gm	480.2 gm
Weight loss	18.5 gm	16 gm	19.8 gm
Percentage loss	3.84%	3.30%	4.12%

Discussion

Sulphur is a chemical element with symbol S, atomic number 16. It is multivalent and non-metallic. Sulphur atoms form cyclic octatomic molecules with the chemical formula S₈. Elemental Sulphur is a bright yellow crystalline solid at room temperature. Chemically, Sulphur can react either as an oxidising agent or a reducing agent. Sulphur is one of the core chemical elements needed for biochemical functioning and is an essential macronutrient for all living organisms. History reveals that the Aryans, Greeks, Romans and Indians used it for fumigation and as medicine. The Bible refers to it as brimstone, a principle of fire. On earth, elemental Sulphur can be found near hot springs and volcanic regions in many parts of the world, especially along the Pacific Ring of Fire; such deposits are found in Indonesia, Chile and Japan. Significant deposits of elemental sulphur are being synthesised by anaerobic bacteria on sulphate minerals like gypsum, and exist in salt domes along the coast of the Gulf of Mexico, in Eastern Europe and in Western Asia. Native Sulphur may also be produced by geological processes alone. Fossil-based sulphur deposits from salt domes are found in the United States, Russia, Turkmenistan and Ukraine.

Physical properties: Appearance – Crystalline, granular, fibrous; Colour – Yellow; Form – Solid (Rhombic and Monoclinic), Liquid (Amorphous); Atomic No. – 16; Symbol – S; Atomic weight – 32.064; Configuration – 2, 8, 6; Valency – +2; Hardness – 1.5–2.5; Specific gravity – 1.9–2.1; Boiling point – 444°C; Melting point – 112.8°C. Action on heat – Non-conductor of heat. When heated, Sulphur first melts to a yellow, mobile liquid at 113°C. On further raising the temperature, the colour darkens; the liquid loses its mobility and becomes viscous. At 250°C, it becomes almost solid and nearly black. Above 250°C, it again becomes mobile, and at 444°C it boils and gives off brownish-red vapours.

Methods of Sodhana

Sl no.	Method	Drava dravyam	References
1	Swedana and Dalana	Swedanam in Godugdha; Dalana in Goghrita	Rasendra Chudamani
2	Dalana	Bringaraja Swarasa	RasaChandamsu
		Godugdha	Ayurveda Prakasha
		Kanji, Godugdha	Rasa Tarangini
		Kurma Puta in Sudha jala	Rasa Ratna Samuchaya
3	Swedanam	Bringaraja Swarasa (7 times)	RasaChandamsu
		Godugdha	Rasa Manjari
4	Kurmaputa vidhi	Godugdha, Goghrita, Kanji	Rasa Manjari

Sl no.	Method	Drava dravyam	References
5	Bhavana	Tankana, Nimbu Swarasa followed by rubu thaila	Rasendra Chudamani
6	Dravana and Dalana	Dravana in Goghrita; Dalana in Godugdha	Ayurveda Prakasha

By opting for the kurmaputa method, the finally obtained gandhaka is thushakara or pindakara, as mentioned in the classics.

Conclusion

The whole procedure was completed within 5 hours, and for preparing kajjali, the gandhaka obtained was perfect. Twelve upalas are enough for the purification of one sample. The method is quite easy, affordable and eco-friendly.

Gandhaka sodhana by kurma jala yantra method (process photographs)



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