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Classical Review of Gandhaka (Sulphur)- An Ayurvedic Perspective

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Abstract

Today *Āyurveda* is recognized worldwide as a system of medicine that provides better therapeutically measures and medicines to promote positive health to prevent and cure diseases. This traditional system of medicine of India has an unenviable position in the field of providing remedies for the ailments, as it provides satisfactory answer to all the problems the world is facing today. *Gandhaka* is the first and most abundantly used drug among *Uparasa* which has no match among the drugs of Mercurial kingdom. *Gandhaka* stands next to *Pārada* in the field of *Rasa-śāstra*.

Keywords: *Āyurveda, Rasa-śāstra, Gandhaka, Sulphur, Rasāyana*

Introduction

Health and disease are coeval with life. All societies invariably looked upon to the natural resources for maintenance of health and for attaining freedom from illness. From cradle to coffin, the journey of life is interring spread with challenges, some we try to bypass some endeavor to contest and yet other bewilder our imagination into painless numbness. This probably is what prompted Ruskin to exclaim "No human capacity has every yet saw the whole of a thing, but one can see more of it, the longer we look."¹ Vigilant observation and introspection thus form part of man's ending efforts to improve the quality of life. The quest to solve the ultimate puzzle of nature has been carried out by man himself and throughout the civilization he has gone a step forward in putting the pieces together but the goal of perfection is yet to be reached.

The development of the art of modifying the raw material rendering it fit and many a times improving its beneficial effects and eliminating the unwanted aspects. *Rasa-śāstra* evolved as a new pharmaceutical branch from 8th century onwards. The word '*Rasa-śāstra*' literally means the "Science of Mercury"^[2] Minerals and metals are the hallmark of *Rasa-śāstra* pharmaceuticals. The innate qualities like quick action, prolonged shelf life, and better palatability, and instant effectiveness, requirement of very small doses and extensive therapeutic utility irrespective of constitutional variation to *Rasa-auśadhi* have helped to conquer the demand of patients.

Some of the mineral drugs are supposed to be mythologically originated like *Pārada* (Mercury) from, *Śiva-bīja* (Semen of lord Śiva) and *Gandhaka* from *Śivāṅgī Raja* (Ovum of Goddess Pārvatī)^[3]. The concept of *Bhaisajya-Kalpanā* was embarked on viz. the concept of modification of natural substances to promote and preserve the health besides alleviating the disease.

Gandhaka is the first and most abundantly used drug among *Uparasa*^[4] which has no match among the drugs of Mercurial kingdom^[5]. *Gandhaka* stands next to *Pārada* in the field of *Rasa-śāstra*. It is considered as *Rasāyana, Rakta Śodhaka* and *Twaka-roganāśaka*. Here, the term *Rasāyana* stands for longevity. Blood is always a symbol of life and being *Rakta Śodhaka*, definitely *Gandhaka* and its properties give fortune. It is a unique concept of *Āyurveda*, which promotes the defense mechanism of the body and helps in the prevention of disease as well as their earlier cure. *Gandhaka* has also *Guṇa-dharma*^[6] like *Kṛmighna, Kuṣṭhaghna, Kaṇḍughna*.

Classical view of Gandhaka

In *Āyurveda*, *Gandhaka* has been classified under *Uparasa Varga*. *Gandhaka* is being given prime importance in *Rasa-śāstra* because of its *Rasāyana* properties and also for its *Prativiṣa* (antidote) property against *Aśuddha-Pārada* (Unpurified mercury). Ancient classics mention the therapeutic use of *Gandhaka* in treating various disorders in different therapeutic dosage

forms like *Rasāyana*, *Druti*, and *Taila* for both internal and external uses especially in skin diseases like *Kaṇḍu*, *Visarpa* and *Dadru*. It is indicated in all types of *Kuṣṭha* (skin diseases), *Nadivrana* (sinuses) and *Koṣṭhagata Roga* (GIT disorders). It reduces and dries up the undigested food in GIT and so reduces the chance of poisoning.

History

Use of *Gandhaka* in the treatment is found from the *Samhitā* period. Its detailed description is found in *Rasa-śāstra* classics. It holds an important place in *Rasa-śāstra* as can be observed from its wide of use. *Gandhaka* was used in several diseases as a therapeutic agent. Later in 7th century A.D. *Gandhaka* was used extensively both in *Dehavada* and *Lohavada*.⁷ *Gandhaka* was supposed to be one of the most important substances, which was used along with *Pārada*.

Gandhaka has been classified under *Uparasa Varga* by authors of *Āyurveda Prakāśa*, *Rasa-ratna-samuccaya*, *Rasa-rakāśa-sudhākara*, *Rasārṇava*, *Rasendraisāra-Sangraha*, *Rasendra-Cūḍāmaṇi*, *Rasendra-Sambhava*, *Rasa-Hṛdaya-Tantra*, *Rasopaniṣada*, etc. The author of *Rasārṇava* praises *Gandhaka* saying that there is no elephant (*Loha*) which can't be killed by tiger (*Gandhaka*).

Caraka Samhitā: *Dadru*, *Kaṇḍu*, *Pāmā* and *Vicarcikā* for external application for dusting^[8].

Suśruta Samhitā: *Mahāvajraka-Taila* is given for all types of *Kuṣṭha*^[9].

Ashtanga Samgraha: *Gandhaka* is used in *Mustādi-cūrṇa* for treating *Dadru*, *Kaṇḍu*, *Pāmā* and *Vicarcikā*^[10].

Mythological Origin

According to *Āyurveda Prakāśa*^[11] when *Devī Pārvatī* was playing near *Kṣīrābdhi*, she menstruated. The *Raja* was very fragrant and beautiful. The cloth which was wet with *Raja* was then washed in the ocean. That *Raja* when mixed with the water converted into *Gandhaka*.

When *Deva* and *Dānava* started churning of ocean at that time *Gandhaka* came out along with nector and that *Gandhaka* having characteristic smell pleased *Deva* and *Dānava*. Hence *Deva*'s gave the name *Gandhaka* to it.

Origin and occurrence^[12].

In India, the deposits of *Gandhaka* are very much limited. The only known occurrence is that of Tsokar Lake, Leh district in Jammu and Kashmir. It is abundant in Sicily Japan, Kohisultan Mountains of Erstwhily Baluchistan, Kumaon region of India etc.

Vernacular names

English- Brimstone, sublimed sulphur, Hindi- *Gandhak*, Sanskrit- *Gandhaka*, Gujarati- *Gandhak*, Marathi- *Gandhak*, Kannada- *Gandaga*, Malayalam- *Gandagam*, Telugu- *Gandhakmu*, Assami- *Kibrit*, Bangali- *Gandhak*, Punjabi- *Gandhak*, Tamil- *Kandagam*, Katakarm, Urdu- *Kibreet*,

Synonyms^[13]

(A) Related To Mythology- *Gourībija*, *Bālarasa*, *Bālivasā*, *Vasaraka*, *Daityendra*, *Bali*, *Vasavat*, *Vatasougandhika*;
(B) Related to its Occurrence- *Śāra bhumija*. (C) Related to personality- *Lelītaka*, *Lelīna*, *Lelī*; (D) Related to colour- *Pīta gandhā*, *Gandha pītaka*.

(E) Related To Odouric Nature- *Gandha*, *Gandhaka*, *Atigandha*, *Kruragandha*, *Sugandha*, *Gandhapāśāna*, *Gandhapītaka*, *Gandhasama*, *Gandhikā*, *Rasagandhā*, and *Vigandhā*. (F) Related To Appearance- *Navanītaka*. (G) On Simile- *Śuka-Tuṇḍa*, *Śuka Piccha*. (H) On Marana Property- *Dhātuha*, *Śulvāri*. (I) On Pharmaco-Therapeutic Activity- *Kīṭaghna*, *Kuṣṭhāri*, *Pāmāri*.
(J) Anya- *Vikruntaka*, *Lekhī*.

Etymology of synonyms related to *Gandhaka*^[14].

Various Synonyms of *Gandhaka* reveals its physical, chemical, therapeutic as well as its Mythological origin as: *Atigandhā*- With Pungent Smell; *Balī*- *Balya* in nature, King *Bali* had used it; *Bālivasā*- Originated from fat of king *Bālī*; *Daityendra*- King *Bālī*; *Gandhamādāna*- Characteristic sharp odour; *Gandhaka*- That which produces smell; *Gandha Pāśāna*- Hard like stone with distinct odour; *Gouri Puṣpa*- Originated from *Devī Pārvatī*; *Kīṭaghna*- Anti microbial/Bactericidal; *Krūrāgandhā*- That which is having intolerable smell; *Lelītaka*- Originated from fat of *Leleehan*; *Navanīta*- Smooth and soft like butter; *Pāmāri*- Enemy of *Pāmā*; *Pūti Gandhā*- That which is having putrid smell; *Rasagandhā*- That *Uparasa*, which is having smell; *Śulbāri*- Enemy of *Tamra*; *Sugandhā*- Having good Smell; *Sougandhika*- That produces good smell; *Śāra bhumija*- Originated from *Shara Bhumī* (*Jangala*).

Review of *Gandhaka* in various texts

- In *Kuṣṭhādihikāra*- Use of *Gandhaka* with *Amalakarasa* and *Madhu*^[15].
- In *Kuṣṭhacikitsā*- *Gandhaka* is one of the ingredients of *Mahāvajra taila*^[16].
- *Lepa yoga* prepared out of *Cakra taila* along with *Guggulu*, *Gandhaka* etc. is to be applied over affected part and exposed to sunlight^[17].
- Explanation of *Gandhak Śodhana*, its *Mātrā* and different *Yoga* is mentioned^[18].

Gandhaka Bheda (Type)

According to *Āyurveda Prakāśa*^[19] it has four type (1) *Śukatuṇḍanibha* (Red in colour) and use for *Dhātuvāda*. (2) *Śukapiccha* (Yellow in colour) and use for *Rasāyana Karma*. (3) *Śweta-Khaṭikā* (White in colour) and use for *Lauha-māraṇa*. (4) *Kṛṣṇa* (Black in colour) and use for *Jarā*, *Mṛtyu nāśana*, and said *Uttama*, *Madhyama*, *Adhama* and *Durlabha* accordingly.

According to *Rasārṇava*^[20] and *Rasaratna-samuccaya*^[21] there are three types of *Gandhaka*- (1) *Śukacūcunibha* (Red in colour) and said best in medicinal properties. (2) *Pitta-varṇa* (Yellow in colour) and said better in properties. (3) *Śweta-varṇa* (White in colour) and said inferior in qualities.

Gandhaka Karma (action)^[19-21].

Śweta Gandhaka is called *Khaṭikā-Gandhaka* and used for internal application as well as *Māraṇa* of Metals. Yellow coloured *Gandhaka* is called *Śukapiccha*. It is best among the *Rasa Rasāyana*. Red variety is called *Śukatuṇḍa* & is useful for *Dhātuvāda* (*Lohasiddhi*). *Kṛṣṇa* variety is unobtainable but can ward off senility and death.

Gandhaka Grāhya Lakṣaṇa^[22, 23].

Gandhaka which is *Pīta varṇa* (yellow in colour), shiny, *Mṛdu*, resembles like ripe *Āmalakāi* colour is *Grāhya*.

Importance of Gandhaka Śodhana

Gandhaka contains two types of impurities [24]

1. Śīlacūrṇa (physical impurities like stone powder or clay);
2. Viṣa (Arsenic, lead etc.)
- 3.

This clearly indicated it contains both physical and chemical impurities. If these impurities are not removed before use Gandhaka is likely to produce following disease. Tāpa (fever), Raktajanya Vikṛti (blood related disorders), Cittavibhrama (vertigo), Kuṣṭha (leprosy), Pittaja vyādhi (Pitta associated disorders), Śukrahāni (seminal loss),

Kāmalā (jaundice) so must be purified before use [25, 26].

Prativiṣa (antidote)-

Gokṣīra (cow milk) and Goghṛta (butter) acts as antidote in relieving symptoms of Gandhaka (sulphur) poisoning [26].

Pharmacological Properties of Gandhaka-

Diseases like Kuṣṭha & senility as well as untimely death are repelled by taking Śodhita Gandhaka. It increases Dīpana and is extremely Ūṣṇa. It also enhances the vitality in the body.

Table 1: The Pharmacological Properties

Properties	Rasaratna-sammuccaya [27].	Āyurveda-Prakāśa [28].	Rasatarāṅgiṇī [29].
Rasa	Madhura	Kaṭu, Tikta	Kaṭu
Vīrya	Ūṣṇa	Ūṣṇa	Ūṣṇa
Vipāka	Kaṭu	Kaṭu	Kaṭu
Karma	Rasāyana, Dīpana	Pittakara, Rasāyana, Kaphavātahara	Rasāyana, Agni dīpaka
Rogaghnatā	Kaṇḍu, Kushta, Visarpahara, Ādhmāna, Kṛmīrogahara	Kaṇḍu, Visarpa, Kṛmī, Kṛṣṭha and Plīhāroga nāśaka	Garaviṣahara, Twagarogahara, Kāśaswāharara,

Viśuddha Gandhaka mātra

According to Rasatarāṅgiṇī [30]- 1-8 Rattī; Rasa-darpaṇa [31]- 2-8 Rattī; Rasabindu [32]- 2-8 Rattī; Rasaratna-sammuccaya [33] Śāna.

Gandhak Anupāna and Amayika Prayoga [34].

Triphalā-kwātha- Karna, Akṣhi, Gala rogas, Agnimandhya; Vasa kwātha- Nutana Kṣaya; Kantakari kwātha- Swasa, Kasa; Pakwa Kadalīpatra- Twak rogas; Citrakamula Curna- Weakness, Debility; Gandhaka lepa- Amavata and Grudhrasi; Gandhaka with Vasasvaras- Kṣhaya roga; Gandhaka with Coconut oil lepana- Pāmā; Gandhaka with Madhu- Galīta kushta.

Apathya [35].

One who consumes purified Gandhaka should avoid the following - Kshara, Amla, oil, fermented liquids, fried and roasted food stuff and pulses of all kinds.

Sulphur [36].

Sulphur is a Latin term for Burning Stone. Sulphur is yellow, non-metallic element occurs in sedimentary and volcanic deposits and exists in several different forms.

Sulphur means– Sul: Salt & Fur:- Fire

Salt which is having capacity to catch fire Sulphur occurs in nature as lemon colored material, as spherical or globular masses and in crystals. Its color varies from yellow to yellowish brown, greenish, grey, etc. according to the character and amount of impurities it contains.

Ores of Sulphur [37].

Sulphides: Iron Pyrites (FeS₂); Copper pyrites (Cu₂SfeS₃); Galena (Pbs); Zinc blend (Zns); Realgar (As₂S₃); Cinnabar (HgS); Hydrogen sulphide (H₂S)

Sulphates: Gypsum/Calcium sulphate; CaSo₄2H₂O; Heavy spar (BaSO₄); Selestone (SrSO₄); Kiestite (MgSO₄H₂O); Ferrous sulphate (FeSO₄7H₂O); Copper sulphate (CuSO₄H₂O)

Physical Properties [38].

Appearance: Crystal, granular; Form: Orthorhombicbipyramidal; Streak: Yellowish white;

Cleavage: Indistinct (Poor); Colour: Usually yellow; Symbol: 'S'; Atomic no.: 16; Atomic wt: 32.064; Specific gravity: 1.9 - 2.3; Valency: +2; Configuration: 2,8,6; Melting point: 112.8 °C; Boiling pt. : 444 °C; Hardness: 1.5-2.5; Action on heat: Nonconductor; Fracture: Conchoidal; Luster: Resinous; Tenacity: Brittle; Transparency: Translucent Chemical Properties [39].

Effect of Heat: On burning a small quantity in a crucible, Gandhaka partially melts with evolution of brownish Sulphur fumes. Gandhaka melts at about 110 °C where as it burns at 270 °C in air with a bluish flame yielding sulphur-di-oxide (SO₂). Solubility- Insoluble in water as well as any acid, but soluble in carbon-disulphide. Assay- Should contains not less than 90% Sulphur, when analyzed by gravimetric method (Appendix-3.1.8). Heavy metals and Arsenic- Should not contain more than the stated limits for the following: Arsenic = 1 ppm and Cadmium = 2 ppm.

Physiological aspect of sulphur

Sulphur is essential for life. It is constituent of all the proteins. The Sulphur content of average adult human body is 100mg. Most of the Sulphur presents in the human body in 3 amino acids- Cysteine, Cystine and Methionine. Besides being a constituent of protein, Sulphur is involved in formation of bile acids, which are important for fat digestion & absorption. The presence of Sulphur in human body is also necessary for blood clotting, formation of several enzymes. Sulphur is a component of vitamin- B Thiamine and Biotin. It plays part in reaction that helps cells to utilize oxygen. Sulphates are important in detoxification mechanism in the body.

Conclusion

Gandhaka is required in human body for proper functioning. It is the third most abundant mineral (after calcium and phosphorus) based on percentage of total body weight. It is the sixth most abundant macro mineral in breast milk. It is present in saliva, bile, protein, amino acids and insulin. Sulphur is mainly present in sulfur containing amino acids like Cystine. In human body Gandhaka purifies blood, aids healthy digestion and prevents toxic build-up. Gandhaka is

the first and most abundantly used drug among Uparasa which has no match among the drugs of Mercurial kingdom. *Gandhaka* stands next to *Pārada* in the field of *Rasa-śāstra*. It is considered as a *Rasāyana* drug, *Rakta Śodhaka* and *Twaka-roganāsaka*. It is an important ingredient in many formulations prescribed in skin infections such as *Gandhaka Druti*, *Gandhakādyā-Malhara*, *Gandhak-Rasāyana*, *Gandhaka- Taila*, *Ārogyavardhinī Vaṭī*, *Simhanāda Guggulu* etc.

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