

## BROAD SPECTRUM DYNAMIC PREPARATIONS OF SULFUR

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## ABSTRACT

*Gandhak* is the more important element in the entire *Rasashastra* than *Parad*. As per modern science, it is sulfur, having the formula *S* and atomic number 16. According to its appearance and nature, it has various names: *Gandhipashana*, *Putigandha*, *Shulbari*, etc. *Gandhak* has the ability of *bhasmikaran* for all *loha*, so it is listed in *Uparasa*. The best acceptable *Gandhak* is the *Amalasargandhak*. It is the third most useful mineral in the body, so its inadequacy creates lots of diseases. Purified sulfur has a fungicidal and anti-parasitic effect, so it is mainly used in all types of *Kushtharog*. It is also used in arthritis, *Shwas*, *Kasyadhi*, *Rajyakshama*, and many more diseased conditions. *Gandhak* has the power to enhance the qualities of *Parad*, and formulations like *Kajjali*, *Parpati*, *Higula*, *Ras sindoor*, and *Makrdhwaj* are the most potent combinations of *Gandhak*.

**KEYWORDS:** *Gandhak*, Sulfur, *Kalp*, *Aamlsar*, *Uprasa*, *Rasayan*, *Tridoshghna*.

## INTRODUCTION

*Gandhak* is listed in *Uparas* and is the second most important mineral in *Rasashastra*. It has the characteristic smell. *Keetanashan*, *Putigandha*, *Keetaghna*, *Shulbaripu*, *Bali*, *Navneet*, etc. are the synonyms of *Gandhak*. It has *Rasayan* properties and it is used as like *Krimidoshhar*, *Jantughna*, *Aamdoshhar*, and *Kusthahar*. It is found in native and compound forms like galena (PbS), realgar (As<sub>2</sub>S<sub>2</sub>), cinnabar (HgS), calcium sulfate, etc. It is a pale yellow crystalline solid, brittle, and insoluble in water. But it is soluble in benzene,

turpentine, and carbon disulfide. Sulfur is very essential to the human body. It helps to maintain the strength and flexibility of the tissues, repairs DNA, and protects cells from damage that could result in serious diseases like cancer. Additionally, sulfur supports healthy skin, tendons, and ligaments and helps to metabolize food. It has been used for the manufacture of match powder, fireworks, bleaching agents, etc. *Rasvaidya* used *gandhak* in all medicinal preparations. After appropriate *shodhan*, it has many benefits as an important agent for various procedures of *Parada-Murechana*, *Jarana*, and *Sattvapatan*.

### Mythological origin of *Gandhak*

1. According to *Ayurved Prakash*, Devi Parvati was playing near the *Ksheerabdi* river. She menstruated, and she washed the wet clothes in the river. The menstrual blood got mixed in the water and eventually converted into *Gandhak*.
2. During *Samudra manthan's* start, Vasuki Naga was used as the churning rope. He exhaled poisonous and inflammable air, which melted demon King Bali's body fat. This fat gets converted into *Gandhak*.
3. In *Samudra manthan*, *Gandhak* came out with nectar.

**Table 1: Synonyms of *Gandhak* and its meaning.**

Synonyms	Meaning
<i>Gandhak, Gandhi, and Gandhik</i>	A substance with a strong smell
<i>Gandhi Pashana</i>	Stone of sulfur
<i>Ras Gandhak</i>	Listed in <i>Uprasa</i>
<i>Sougandhika</i>	A substance with a sweet smell and fragrance
<i>Putigandha/Atigandha</i>	A substance with a powerful odor
<i>Gandhamadana</i>	A substance that is intoxicated with the fragrance
<i>Pamari/Kushtari</i>	It treats skin diseases like <i>Kustha</i>
<i>Keetnashan</i>	Has insecticidal properties
<i>Bali/ Daityendra</i>	Originates from King Bali's fat
<i>Navneet</i>	A substance with a yellow colour like fresh butter
<i>Sharbhumija</i>	Found in a small pond
<i>Shulbari/Shulbaripu</i>	Enemy of <i>TamraDhatu</i>
<i>Shukapuchha</i>	Colour like the feather on the tail of a parrot
<i>Gauripushpa</i>	Originated from the <i>Raja</i> of Parvati

**Table 2: Types of *Gandhak* According to *Ayurved Prakash*, *Rasatarangini* and *Rasratnasamucchya*.**

Name	Colour	Quality	Use	Modern correlation
<i>Shukachanchunibham</i>	<i>Raktavarna</i>	<i>Shrestha</i>	<i>Dhatuvadartha</i>	Monoclinic sulfur
<i>Shukapicchanibha</i>	<i>Peetavarna</i>	<i>Madhyam</i>	<i>Ras-Rasaynartha</i>	Rhombic sulfur
<i>Khatika</i>	<i>Shukla varna</i>	<i>Adham</i>	<i>Lepnartha</i>	Milk of sulfur
-	<i>Krushnavarna</i>	<i>Durlabha</i>	<i>Jaramruttuhar</i>	Plastic sulfur

*Amalsar Gandhak* (internal use) and *Pind Gandhak* (external use) are available on the market.

### Origin and Occurrence

Generally, *Gandhak* occurs near eruptions as a sulfur fumarole and in hot spring waters. Along with *Gandhak*, several kinds of minerals-coal, crude oil, natural gas, or oil shale are also found. Large amounts of *Gandhak* are found in both Louisiana and Texas (USA). Poland, Japan, the Soviet Union, Afghanistan, Bhutan, Russia, and Canada greatest producers of *Gandhak*. In India, Rajasthan, Andhra Pradesh, Hyderabad, and Bihar are all native to *Gandhak*.

#### World Sulfur Production (2015 estimated)

Thousand Metric Tons - Sulfur Equivalent - Data from USGS

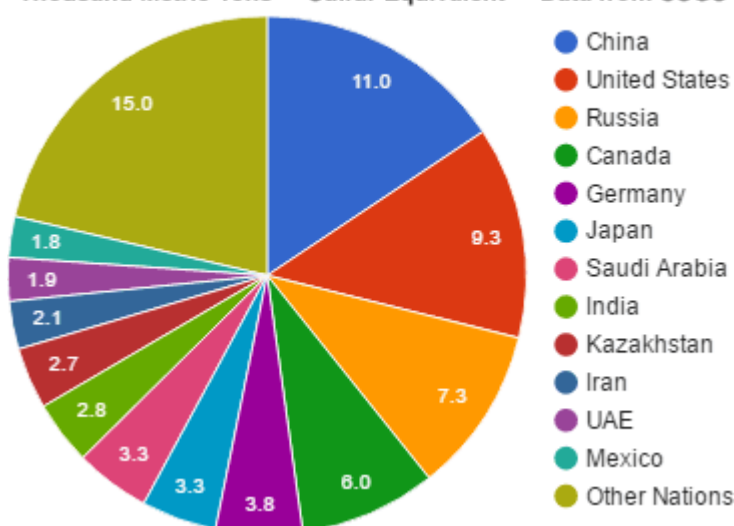


Figure 1: World sulphur production.

### Sulfur Formation

Around the lakeside solfatara, fumaroles expelled a continuous stream of gases rich with sulfur. Without oxygen, these heated gases move underground. When sulfur vapours come out of a vent and come into contact with oxygen from the atmosphere, they can ignite fire if they are hot enough. Sulfur frequently condenses, falls to the ground as a liquid, flows a short distance, and then solidifies due to the temperature being low enough. This generates a naturally occurring sulfur mineral resource. The KawahIjen Volcano in Java, Indonesia, is home to two of the planet's most peculiar phenomena. The first is an active solfatara that releases sulfurous fumes that are hot and combustible. These burst into an electric blue flame as they enter earth's oxygen-rich atmosphere. When the gas liquidize in the atmosphere, it

creat rivers of molten sulphur. And its colour is bright blue. During the day, the flames are hard to notice, but at night, they brighten the surroundings. The water's severe acidity and high concentration of dissolved metals give it its colour. With a pH as low as 0.5, it is the biggest extremely acidic lake in the entire globe. A flow of hydrothermal fluids charged with gases from a heated magma chamber below is the source of its acidity.



**Figure 2: Sulfur lake.**



**Figure 3: Blue light of sulfur.**

### **General Properties**

Symbol: *S*

Atomic no :16

Atomic weight: -32.065(5)

Electronic configuration: [Ne] 3s<sup>2</sup> 3p<sup>4</sup>

### **Physical properties of sulphur**

Standard State: Solid

Bonding Type: Covalent NetworkMelting Point: 388 K

Boiling Point: 718 KDensity: 1.96 g/cm<sup>3</sup>It is non metal.

Main isotopes of sulfur:  $^{32}\text{S}$ ,  $^{33}\text{S}$ ,  $^{34}\text{S}$ ,  $^{35}\text{S}$ ,  $^{36}\text{S}$  Luster: Resinous, Greasy

Transparency: Transparent, translucent

Colour: Yellow, sulfur-yellow, brownish or greenish-yellow, orange, white Streak: Colourless

Hardness:  $1\frac{1}{2}$ - $2\frac{1}{2}$  on the Mohs Tenacity: Brittle

Cleavage: Imperfect/Fair

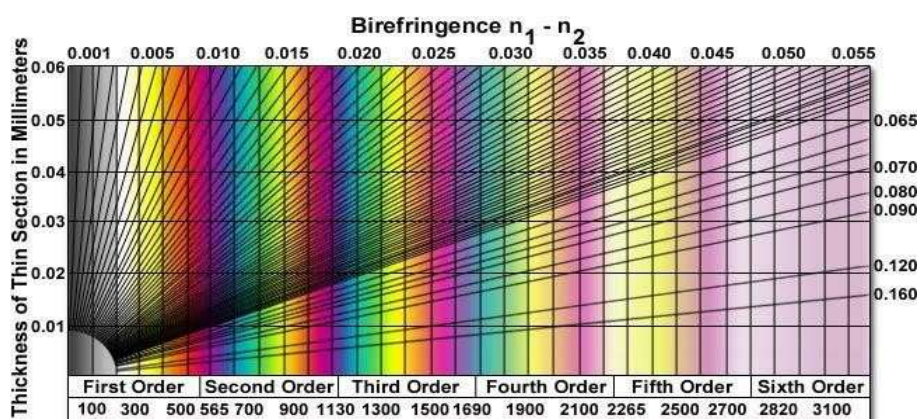
Imperfect on  $\{001\}$ ,  $\{110\}$ , and  $\{111\}$ . Parting: Parting on  $\{111\}$

Fracture: Irregular/uneven, conchoidal Comment: It can also be somewhat sectile.

Density: 2.07 g/cm<sup>3</sup> (measured) 2.076 g/cm<sup>3</sup> (calculated) Type: Biaxial (+)

Max Birefringence

$\delta = 0.287$



**Figure 4: Birefringence interference colour range of sulfur.**

Surface Relief: Very high Dispersion: Relatively weak  $r < v$  Pleochroism: Visible

Crystal System: Orthorhombic

Member of the Sulphur Group Polymorph of Clinosulfur, Rosickyite.

### Crystallography of sulphur

Crystal System: Orthorhombic

Class (H-M): mmm ( $2/m2/m2/m$ ): dipyramidal Space Group: Fddd

Ratio:  $a:b:c = 0.813:1:1.903$

Unit Cell V: 3,299.37 Å<sup>3</sup> (Calculated from Unit Cell) Z:128 Twinning: On  $\{101\}$   $\{011\}$   $\{110\}$  rare



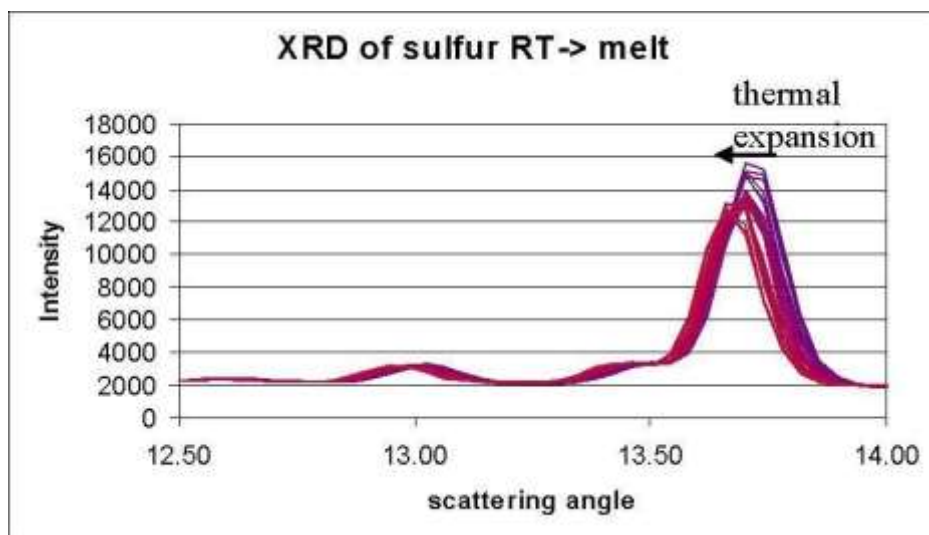


Figure 5: XRD of sulphur.

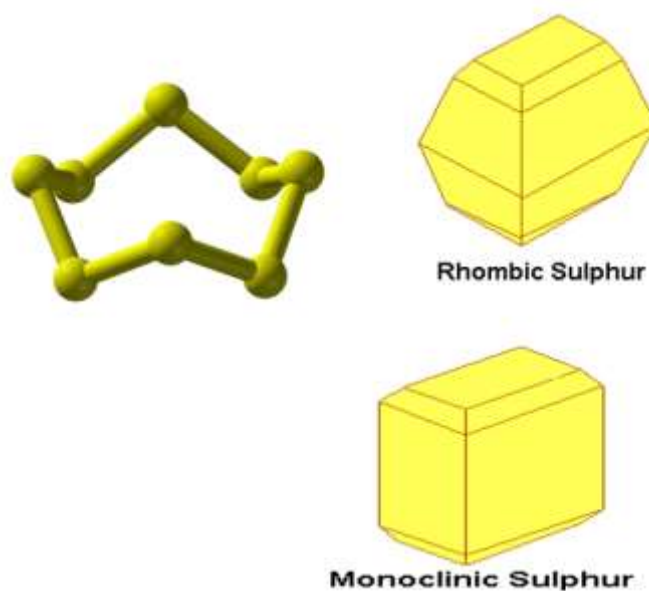


Figure 6: Atomic structures of sulfur.

### Ores of sulfur

In sulfide form ( $S_2$ ) commonly found in minerals, ores, and living organisms.

1. Copper and iron pyrite (*Swarnamakshika*, *Roupyamakshika*, *Vimala*)
2. Galena (*Neelanjana*)
3. Antimony sulfide (*Srotonjana*)
4. Orpiment (*Harataal*)
5. Realgar (*Manahshila*)
6. Cinnabar (*Hingula*)

Sulfate ( $\text{SO}_2$ ) is commonly found in minerals, salts, and water bodies.

1. Copper sulfate (*Sasyaka*)
2. Ferrous sulphate (*Kaasisa*)
3. Zinc sulfate (*Yashada*)
4. Gypsum/calcium sulfate
5. Heavy spar
6. Silestone
7. Kieserite
8. Ferrous sulphate
9. Copper sulphate
10. Glouber salt

**A simple compound of sulfur** Nitrides: Tetrasulphurtetranitride

Fluorides: Sulfurdifluorides Disulphurdifluorides Sulfur hexafluoride Sulfurdifluoridesulfate

Chlorides: Sulfur dichloride Disulphur dichloride Trisulphur dichloride Iodides:

Disulfurdiiodide Oxides: Sulfur dioxide Sulfur trioxide Disulphur oxide Disulphur dioxide.

### **The major role of sulfur in the human body**

Sulfur is an prime mineral in the human body. Almost all functions of the human body need sulfur, so it's third in importance. Sulfur is present in amino acids. Methionine can't be generated on its own; rather, it needs to be obtained from protein based foods. However, the human body can produce cysteine. It is not required to be consumed directly, but sulfur must be consumed in forms that allow it to transform into this compound. Human skin, hair, and nails are made up of amino acids, which maintain the strength and flexibility of the tissues. Sulfur is also detected in biotin (vitamin H) and thiamin (vitamin B-1). Sulfur is necessary for the human body to build up and repair DNA as well as protect cells from damage that could result in serious diseases like cancer. Sulfur can be in the form of chondroitin sulphate, glucosaminesulfate, and methylsulfonylmethane.

### **Sulfur rich dietary food**

1. Eggs and non vegetarian food items like the meat of turkey, fish, and chicken are animal sources of methionine. It is an essential amino acid that can't be synthesized by the human body.
2. Veg food items like nuts, seeds, grains, and legumes are great plant based sources of aminoacids.

3. Chickpeas, couscous, lentils, oats, and walnuts are good sources of cysteine.
4. Allium vegetables are one of the primary sources of dietary sulfur. This class of vegetables is abundant. Insulfides, thiosulfates, sulfoxides, vinylthins, and ajoenes, amongst other forms of sulfur.
5. Cruciferous vegetables like broccoli, cauliflower, cabbage, arugula, and kale are sources of sulfur in the form of glucosinolates.
6. Sulfur can be found in whole grains as a thiamin or vitamin B-1.
7. Sulfur is found in leafy green vegetables as biotin, which is necessary for the synthesis of fatty acids.

### Deficiency of sulfur

Insufficient oxygen through respiration, convulsions, migraine, headache, depression, memory loss, arthritis, rashes, gastrointestinal issues, acne, brittle nails and hair, and slow wound healing are the symptoms of a deficiency of sulfur.

### SHODHAN OF GANDHAK

#### The necessity of *shodhan*

अशुद्धगन्धः कुरुतेचकुष्ठंतापंश्चमपितरुजंतथैव।

रूपं सुखंवीर्यबलं निहन्ति तस्माद्विशुद्धो विनियोजनीयः॥ (Ayu. Pra 2/18)<sup>[8]</sup>

In *Gandhak*, there are two main impurities: *Sila* and *Visha*. If *ashudhagandhak* is administered, it causes skin diseases, burning sensations, giddiness, and *pitta* diseases and destroys life. So *shodhan* is important before using *gandhak*.

### SHODHAN METHOD

According to *Rasaratnasamucchya*

पयःस्विन्नो घटीमंत्रंवारिधौ तोहि गन्धकः ।

गल्याज्या विद्रुतो वस्त्राद्युद्धि मृच्छति ॥ (R.R.S3/20)<sup>[5]</sup>

Take *AshudhaGandhak* and *Goghruta* in *Lohapatra*.



Give *mandagni* and when it melts, pour into *godugdha*.



After it cools down, rinse it with hot water.



Repeat the procedure seven times.



**Guna**

गन्धाश्मातिरसायनःसुमधुरःपाकेकटूष्णोमतः।

कण्डूकुष्ठविसर्पदद्रुदलनोदीप्तानलःपाचनः॥

आमोन्मोचनशोषणोविषहरःसुतेन्द्रवीर्यप्रदो

गौरीपुष्पभवस्तथाकृमिहरः सत्यात्मकः सूतजित्।

बलिनासेवितः पूर्वप्रभूतबलहेतवे ॥ (R.R.S3/16)<sup>[18]</sup>

*Rasa: Madhura*

*Virya: Ushna*

*Vipaka: Katu*

*Doshagnata: Tridoshaghna*

*Karma: Deepana, Pachana, Aama pachana, and Krimihara*

**Qualities of Shudha Gandhak**

गन्धःशुद्धोगर-विषहरःक्षुद्रकुष्ठेभसिंहः ।

कासंश्वासंहरतिनितरांदद्रुदावानलश्च ॥

आधिव्याधिप्रशमनपटुः काममामंनिहन्त्यात्।

दिव्यांष्टितितरतिरांजाठराग्निप्रसूते ॥

सुगन्धिकः सुनिर्मलःसरोरसायनोत्तमः ।

कटूष्णवीर्यपाचनोरसेन्द्रवीर्यवर्द्धनः ॥

विकाराग्नाशयत्याशुदुष्टसुताशनोत्थितान् ।

दुष्टाहिभक्षणात्थांश्वशिरोदाहादिकानपि ॥ (Rasatarangini 8/36-38)<sup>[14]</sup>

**Table 3: Gandhak action on particular disease.**

Name of the disease	Modern correlation	Strotas	Gandhak action
<i>Kshudrakustha</i>	Skin diseases	<i>Ras, Rakta, Mansa, Meda, Manovahastrotas</i>	<i>Krimihar, Vishaghna</i>
<i>Kas</i>	Respiretory disease	<i>Pranvahastrotas</i>	<i>Lekhan, Rasayan</i>
<i>Shwas</i>	Respiretory disease	<i>Pranvahastrotas</i>	<i>Lekhan, Rasayan</i>
<i>Gar vishhara</i>	Antitoxic	<i>Ras, Rakt, Pranvaha strotas</i>	<i>Vishaghna action</i>
<i>Dadru</i>	Ring worm	<i>Ras, Rakta, Mansvha strotas</i>	<i>Krimihar, Vishaghna</i>
<i>Agnipradipta</i>	Digestive fire	<i>Annavahastrotas</i>	<i>Agnipradipak</i>
<i>Drusthivardhk</i>	Improves eye sight	<i>Majjavaha, Raktvaha</i>	<i>Rasayan, Kledagna</i>

**Matra**

रक्तिकातः समारभ्यरक्तिकाष्टकसंमितम्।

प्राणाचार्यः प्रयुक्तीतगन्धकं तु विशोधितम् ॥ (Rasatarangini 8/39)<sup>[3]</sup>

Shudha Gandhak Matra is 1-8 रत्ति (182 mg-1.46 g).

**Toxicity and antidote**

विकारो यदि जायेत गन्धकाचेतदापि वेत्।

गोघृतेनान्वितं क्षीरं सुखिरस्यात्स च मानुषः ॥ Rasatarangini 8/39)<sup>[2]</sup>

If the toxic effects of *Gandhak* are seen, give them *Gomruta* and *Godugdha*. Both are the antidotes of *Gandhak*.

**Pathya**

जाङ्गलानितुमांसानि छागलानि प्रयोजयेत्। (Ayu. Pra 2/49)<sup>[7]</sup>

Meat from dry land animals, birds, and goats should be taken.

**Apthya**

क्षारम्लतैलसौवीरविदाहिद्वितलंतथा शुद्धगन्धकसेवायां त्याज्यं योग्यतेन हि ॥ (R.R.S 3/35)<sup>[5]</sup>

*Kshara*, *amla rasa*, *taila*, *souvira (kanji)*, *vidahiahara*, and *dvidalahara* should be avoided.

**Adverse effects of heavy sulfur consumption**

Enough sulfur in your diet is vital for your health, but too much sulfur might have a few adverse effects like diarrhea, ulcerative colitis, and chron's disease.

**Table 4: Gandhak Kalpa's in Rasshastra literature.**

No.	Kalp	Gandhak proportion	Rogadhikar	Specification of kalpa	Key rule of sulfur in kalp
1.	Kanaksundar Ras <sup>[15]</sup>	Sambhaga	Balroga	Raskalpa	Yogvahi, Rasayana
2.	Gandhakrasayan <sup>[13]</sup>	Only Gandhak is used	Sarvvyadhihar	Kharaliya, Rasayana	Vishagna, Kusthagna, Rasayan
3.	Pratapankeshwar <sup>[45]</sup>	1 part	Sutikajwar	Kharaliya, Gutti	Hrudya, Rasayan
4.	Panchamrutparpati <sup>[46]</sup>	2 part	Grahani, atisar. kshaya.	Parpatikalpna	Tridoshghna, Krumighna, Rasayan
5.	Hemgarba Pottali <sup>[44]</sup>	2 part	Atyayikchikitsa	Pottali	Yogvahi
6.	Sameerpannaga <sup>[41]</sup>	Sambhag	Unmad	Kupipkwa	Balvardhak, Ras, Rakta, Mansdusthinashak
7.	Agnigarbhavatika <sup>[20]</sup>	2 part	Gulma, Udarrog, Pliharog Halimak, Pandu, Krumi, Kustha, Shleshmaj	Vatika	Kaphaghna, Agnivardhan

			Grahani		
8.	Abhrakharitaki <sup>[21]</sup>	1/4th part of Abhrak	Tridoshajarsha	Vatikalpana	Tridoshnashak, Klednashak
9.	Sihnadguggul <sup>[39]</sup>	2 Tola	Aamvat, Shirogatvayu	Guggulkalpna	Agnidipti, D hatu, Bal, Aayuvrudhi
10.	Achintyashaktiras <sup>[23]</sup>	Sambhag	Mashtishkashul, Sannipatakjwar	Vatikalpna	Shulghna
11.	Ekanvir ras <sup>[15]</sup>	Sambhag	Pakshaghat, Aardit, Dhanurvad, Grudhrasi, Vishwachi, Avbahuk, Vatajrog.	Rasakalpa	Vatvyahinadibalpradan
12.	Kamagnisandipano Modak <sup>[16]</sup>	Sambhag	Kamvardhak	Modak	Rasayan, Tridoshaghna
13.	Kakmachitailam <sup>[17]</sup>	Sambhag	Arunshika, Pama, Vicharchika	Taila	Kandu, Kusthaghna
14.	Kustharakshas tailam <sup>[18]</sup>	Sambhag	Leucodarm, Aadumbar kustha, Fistula, Vatrakta	Siddha Taila	Prakrutvarnanirmiti
15.	Kanksindur Ras <sup>[19]</sup>	Sambhag	Rajyakshma	Rasayankalpa	Saptadhatupushtikr, Trishoghna
16.	Gandhakyog <sup>[24]</sup>	Only Gandhak	Kamrudhi	Tailam	Kandunashan
17.	Gandhakdruti <sup>[25]</sup>	5Tola	Bala, Varna, Saundaryarudhi	Tailam	Tridoshnashak
18.	Gajkesariras <sup>[38]</sup>	2 part	Asadhyashoola	Kharaliyakalp	Shulaghna
19.	Chintamaniras <sup>[26]</sup>	Sambhag	Sannipatvayu, Vishamjwar, Agnimandya, Atisar, Shotha	Vishakalpa	Agnivardhak, Tridoshaghna
20.	Chudamani ras <sup>[27]</sup>	2 part	Vatpittaj yakshma	Raskalpa	Vat, Pittaghna
21.	Chulika Vati <sup>[27]</sup>	Sambhag	Shothodar, Kamla Panddu, Amvat, Halimak, Bhagandhar, Kustha, Gulma	Vishakalpa	Tridoshaghna
22.	Chaitanyabhairav Ras <sup>[27]</sup>	Sambhag	Sannipatjwar, Murcha, Tandra	Raskalpa	Tridoshaghna
23.	Chardyantak ras <sup>[28]</sup>	5 part	Amlapitta, Rakta pitta, Chardi, Gulma, Aamvat, Aruchi, Yakshm, Hridrog	Raskalpa	Tridoshaghna
24.	Jatiphaladiputpak <sup>[29]</sup>	Sambhag	Atisar	Putpak	Agnidipan, Aampachan
25.	Jwarnashak anjan <sup>[30]</sup>	Sambhag	Jwar	Anjan	Jwarghna
26.	Jantughni gutika <sup>[31]</sup>	Sambhag	Kustha, Krumi	Gutika	Raskalpa

27.	Jaymangal ras <sup>[31]</sup>	2 Part	All type of jwar	Raskalp	Jwarghna
28.	Jayras <sup>[31]</sup>	2 part	Shit jwar	Raskalpa	Jwarghna, Agnidipan
29.	Jay vatic <sup>[31]</sup>	Sambhag	Kapha, vatjwar, Pandu, Shwas, Arsha	Vishakalpana	Jwarghna, Agnidipan
30.	Jaysundaro ras <sup>[31]</sup>	2 part	Infertility	Kupipakwa	Vajikara, Supraja
31.	Jaya gutika <sup>[31]</sup>	Sambhag	Shwas, Kas, Kshya, Gulma, Prameh, Grahani, Pandu	Vishakalp	Kasghna, Vishakalp
32.	Jaramaranharo ras <sup>[31]</sup>	Sambhag	Jaranashan	Raskalpa	Jaranashan
33.	Jatiphaladyaa vatika <sup>[31]</sup>	Sambhag	Shwas, Kas, Kshya, Grahani, Pandu	Vatika	Kasghna, Agnimandyahar
34.	Jwarnagmayur Churna <sup>[32]</sup>	sambhag	Visham, kshayaj jwar	Churna	Jwarghna, Tridoshaghna
35.	Jwarbhairavchurna <sup>[32]</sup>	Sambhag	Visham, Sannipatak, Bahirgat jwar	Churna	Jwarghna, Tridoshaghna
36.	Jwarraj ras <sup>[32]</sup>	3 part	All type of jwar	Churna	Jwarghna
37.	Jwarshulharo ras <sup>[32]</sup>	Sambhag	Chathurdikadi jwar	Churna, Lep	Jwarghna, Tridoshaghna
38.	Jwarsinha Ras <sup>[32]</sup>	Sambhag	Jwar	Churna	Jwarghna, Tridoshaghna
39.	Tankanadi vati <sup>[34]</sup>	Sambhag	Agnimandya	Vati	Agnimandyahar
40.	Dadruvidravan Malhar <sup>[35]</sup>	1 Tola	Dadru	Malhar	Kusthghna
41.	Gandhakadya Malhar <sup>[35]</sup>	1/5 Tola	Pama	Malhar	Kusthghna
42.	Gandhak tail <sup>[36]</sup>	Only Gandhak	Visarpa, Kshudra Kustha	Tailam	Kusthghna
43.	Gandhak tail <sup>[36]</sup>	1 part	Tivraagimandy, Aamvat, Shwas, Kas, Grahani	Tailam	Tivraaampachan, Shwaghna, Kasghna
44.	Gandhak drav <sup>[36]</sup>	100 Pal	Kustha, udar, Visuchika, Atisar, Jwar	Arka kalpan	Krumighna
45.	Bolparpati <sup>[42]</sup>	Sambhag	Raktpradar, Raktpitta, Arsha	Parpati	Raktashodhan
46.	Suvarna parpati <sup>[42]</sup>	Sambhag	Grahani, Shosa, Kshya, Pandu	Parpati	Bal, Virya, Agnivardhan
47.	Kajjali <sup>[48]</sup>	Sambhag	Sarvrogahar	Kajjali	Rasayan
48.	Gandhak rasayan <sup>[40]</sup>	1 part	Kustha, Updansha, Pradar, Puyshukra, Arsha, Nadivrana	Vati	Raktshuddhikar, Rasayan, Yogvahi, Kusthghna
49.	Sarvangsundar ras <sup>[43]</sup>	Sambhag	Maha aushadha	Raskalp	Tridoshghna
50.	Vijayparpati <sup>[37]</sup>	4 part	Grahani, Atisar, Arsha, Rajaykshyama, Kamala	Parpati	Vrushya, Jara, Vali, Pali, Vyadhi nakshak.

### Uses of Sulfur

Fertilizers	Sulfur is an essential nutrient for plants and is used in the form of sulfuric acid to promote plant growth.
Pharmaceutical	Sulfur is used in various medicines to treat skin disorders such as acne and psoriasis.
Rubber industry	Sulfur is used to increase its strength, durability, and elasticity
Pesticides	Sulfur is used in the production of fungicides and insecticides
Petroleum industry	Sulfur is the byproduct of refining crude oil and is used to produce gasoline, diesel, fuel, and other petroleum products.
Food preservation	Sulfur dioxide is used to preserve dried fruits, vegetables, wine, and other foods.
Matches	Sulfur is a key component of the striking surface of a matchbox.
Gunpowder	Sulfur is a main ingredient of gunpowder.
Batteries	Sulfuric acid is used in the production of batteries which is used in cars.
Chemical manufacturing	Sulfur is used to produce sulfuric acid, carbon disulfide, and hydrogen sulfide.
Construction	Sulfur is used in the production of concrete as a component of the mineral gypsum.
Water treatment	Sulfur components are used to treat wastewater and drinking water to remove impurities and harmful substances.
Textile industries	Sulfuric acid is used in the production of textiles to bleach and dry fabrics.
Paper production	Sulfuric acid is used in the production of paper to break down wood fibers and improve the strength of paper.
Mining	Sulfur is used in the mining industry to extract metals from ores.
Metal production	Sulfur is used in the production of zinc, copper, and lead.
Photography	Sulfur is used in the production of photographic film to sensitize the emulsion of light.
Insect repellents	Sulfur is used in the production of insect repellents in the form of sulfur powder or sulfur soap.
Fireworks	Sulfur is used in fireworks it gives bright yellow color
Cleaning product	Sulfur is used in the cleaning products such as detergents, soap and bleach.

### DISCUSSION

*Rasashastra* has two purposes. One is *Lohavada*, which is the conversion of mercury to gold or silver, and the second is *Dehavada*, which is the internal use of metallic preparations. *Gandhak* is an important mineral in *Rasashastra*. Without sulfur, no single *Rasakalpa* will be prepared. Sulfur is used for *Kajjali* preparation and then for various *kapla*'s like *Kupipakva*, *Pottalli*, *Parpati*, and *Khalvirasa*. Sulfur reduces the nephrotoxic and allergic effects of mercury. All acharya's use sulfur in their treatments; they are well known for their therapeutic properties. Almost all *Rasashastragrantha*'s are mentioned in detailed descriptions. Mythological origins can be interpreted in terms of the consequences of the sedimentation of volcanic exudates. Therapeutically, sulfur is used for *Deepan*, *Pachan*, *Rasayana*, and destroys skin diseases, *Krimi roga*, *Swasa*, arthritis, and many more diseases.

It is used as a fungicide and an anti parasitic. *Gandhak* contains impurities like *shila* and *visha*, so *shodhan* is necessary before use. *Gandhak* is essential for *Sattvapatan* of various minerals, and it is believed that only *gandhak* can convert all types of *Lauha* into *Bhasma*.

## CONCLUSION

*Gandhak* has the most significant role in the preparation of all *Raskalpas*. *Amlasar Gandhak* is the best one. It has a yellow color. It enhances the qualities and reduces the toxicity. *Panchamrut partpati*, *Hemgarbha pottali*, *Makardhwaj*, *Rassindur*, *Sinhanad guggul*, *Gandhak druti*, and *Ekgangvir Ras* are popular preparations of *Gandhak*. Pure sulfur does not affect normal skin, but when it is mixed with greasy substances that convert into sulfide form, it probably has therapeutic effects. If an excessive amount of sulfide is absorbed from the intestine, it may produce cyanosis due to the formation of sulphaemoglobin, produce asphyxia, and paralyze the nervous and muscular systems. It may be concluded that *Gandhak* and its preparations are widely used for their salutary importance.

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