

ENVISIONING OF KASISA- GREEN VITRIOL IN INDIAN ALCHEMY

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Article Received on 22/09/2020

Article Revised on 12/10/2020

Article Accepted on 01/11/2020

ABSTRACT

The traditional Ayurvedic system is astoundingly complete with its eight branches of specialties covering a vast field of medicine ranging from General Medicine, Surgery, Paediatrics etc, up to Geriatrics. Rasa Shastra that is Indian Alchemy is a partially independent branch of Ayurvedic Medicine, which deals with metals and minerals to produce the drugs with higher efficacy in lower doses with good palatability. It is the pharmaceutical branch of Ayurveda and Rasa drugs that are used for treatment of various disorders are mainly herbal, animal and mineral origin in nature. In present scenario Rasa drugs comprise the major share among prescriptions of Ayurvedic physicians because of the success of treatment mainly depends upon quality of medicine prescribed to the patient. However, scarcity of raw materials is forcing the pharmacists to compromise in quality of make, which in turn is rendering the total system to disrepute. Kasisa is one of very common and most widely useable mineral origin Rasa Dravya, belonging to Uparasa Category of Rasa Shastra as per texts of Indian Iatrochemistry. Chemically it is $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ and known as Green Vitriol or Iron Vitriol. The external as well as internal usage of Kasisa are commonly practicing by Rasa physicians for many disorders like Iron Deficiency Anemia, Amenorrhea, dysmenorrhea, Premature graying of hairs, leukoderma and others Skin problems, Therapeutically Kasisa can be found in various Herbomineral formulations like Kasisa Bhasma, Kasisabadha Ras, Khageswar Rasa, Raja Pravartini Vati etc. The Bhasma of Kasisa mainly acts on blood, uterus, liver, spleen, stomach and intestines and have properties of Hematogenic, Digestive Stimulant, Emmenagogue and Anti-spasmodic.

KEYWORDS: Rasa Shastra, Kasisa, Heamatogenic.

Abbreviations

A.K	:	Ananda Kanda
A.N	:	Ashtanga Nighantu
A.P.	:	Ayurveda Prakasha
A.S.	:	Ashtanga Sangraha
B.P	:	Bhava Prakasha
B.R	:	Bhaishajya Ratnavali
B.R.R.S	:	Brihat Rasa Raja Sunder
Ch.D	:	Chakradatta
R.N.V	:	Rasarnava
R.J.N	:	Rasa Jala Nidhi
R.H.T	:	Rasa Hridaya Tantra
R.K.D	:	Rasa Kamdhenu
R.Ch	:	Rasa Chandanshu
R. Ch i	:	Rasendra Chintamani
R.Chu	:	Rasendra Chudamani
R.M	:	Rasa Manjari

R.R.S	:	Rasa Ratna Samuchchaya
R.T	:	Rasa Tarangini
R.P.S.	:	Rasa Prakasha Sudhakara
Y.R.	:	Yoga Ratnakar.

INTRODUCTION

Ayurveda, the indigenous medical wisdom, is prevalent from as early as the dawn of human civilization. Its antiquity goes back to the Vedas. It is a highly evolved and codified system of life and health science based on its own unique concepts and fundamental principles. Rasa Shastra is a specialized branch of Ayurvedic Pharmaceuticals, which deals with preparation of the drugs with metals and minerals having higher therapeutic efficacy, possessing innate qualities like quick action, less dose, tastelessness, prolonged shelf life and better palatability. This branch fulfills the aims, objectives and requirements that are laid for preparation of better formulations. Minerals are classified into Maharasa, Uparasa, and Sadaranarasa etc, in Rasa Classics, based on their use in Mercury processing and potentiation. The Uparasa group stands second in the order of their utility in potentiating Mercury. Many Rasa Shastra texts mentioned Kasisa as Uparasa varga.

Kasisa being yellow coloured and lustrous with bluish tinge is considered as Grahya. It is Pushpa Kasisa variety used for medicinal purpose. Indian Alchemy that is Ayurvedic Rasa Shastra text have great and detail knowledge of Kasisa Guna, Karma, Vipaka, Bheda, Shodhan, Bhavna, Maran and Prayog vidhi. Rasa Classics explain very well the therapeutic application Kasisa Bhasma and its containing others Herbo minerals formulations which is indicated in many chronic diseases like Anemia, Amenorrhoea, Vitiligo and many more for example According to Bhavprakasha Nighantu it is useful in Skin disorders including Kustha, Vrana, Kandu, Phalita etc. when shodhan of Kasisa is done with Bhavana of Bhringraja swaras according to Rasa Ratna

Sammuchya than it is commonly used in Skin disorders and to prevent the premature graying of hair problems. In modern science is better known as Green Vitriol or Ferrous Sulphate, which is chemically formulated as $FeSO_4 \cdot 7H_2O$ with Molecular weight - 278.02 and Monoclinic Crystal system.

Historical Background of Kasisa: Samhita Period:

Charaka Samhitha: Charaka Samhitha included Kasisa as one of the lepana drug and is mainly indicated in disease like Kushta, Dadru, Pama and Vicharchika etc. In Charaka Samhitha, Visarpa and Dvivraniya chapters, dealt with the external application of Kasisa. Charaka formulated 14 types of preparations with Kasisa and described it in Bhaumagana in Sutra sthan. **Susruta Samhita:** Susruta Sutra sthana explains Kasisa as one among the Sodhana kalka dravyas. Two types of Kasisa are given under Ushakadi Ghana which is indicated in Asmari, Muthrakrichra etc., In Arsha chapter he formulated lepa with Kasisa along with some Herbal drugs. At least 15 types of preparations with Kasisa have been formulated by the above authority. They includes lepa, oils, etc. **Ashtanga Hridaya:** Ashtanga Hridaya Utharasthana mentioned Kasisa in Kasisadyanjanam for the treatment of Kaphothklista. He formulated 15 types of preparations with Kasisa like Churna, Lepa and Taila and so on. **Chakra Datta:** Acharya Chakrapani Datta for the first time has mentioned Kasisa for internal use for different diseases. He suggested Kasisa as linctus in Hikka chikitsa. Later on a detailed description of Kasisa was found in Rasa Shastra texts in different formulations for various treatments.

Classification of Synonyms

Table No. 01: Showing The Synonyms Of Kasisa Mention in Different Texts.

Text Name	A.P	A.K	R.M	R.T	R.S.S	R.J.N	R.K.D	R.D	B.P
Amlamrutika	+	-	-	-	-	-	-	-	-
DhatuKasisa	+	+	-	-	+	+	-	-	+
PushpaKasisa	+	-	-	+	-	-	-	-	-
PamsaKasisa	+	-	-	+	-	-	-	-	-
Hamsa lomasa	-	+	-	-	-	-	-	-	-
Kesara	-	+	-	-	-	-	-	-	-
Sodhana	-	+	-	-	-	-	-	-	+
Shubra	-	+	-	-	-	-	-	-	-
Kechara	-	-	+	-	+	-	+	-	-
Khaga	-	-	+	+	-	+	+	+	-
Kasisa	-	-	+	+	+	-	-	+	+
Danta Ranjana	-	-	-	-	+	-	-	--	-
Chakshusha	-	-	-	-	-	-	+	-	-
Dhatu Sekaram	-	-	-	-	-	-	+	+	-
Ayogandhaka	-	-	-	-	-	-	-	+	-

Origin and Availability: Kasisa is available in two forms: 1. Prakruta and 2. Kritrima

Prakruta Kasisa is obtained by the decomposition of Iron Sulphide. It is available in Bihar, Punjab, and U.P in India. It is also found in foreign countries like U.S.A, Spain, Germany and Sweden but not abundantly. (Rasa Tarangini). Artificial/Kritrima Kasisa is obtained by dissolving iron in Sulphuric acid. There are many laboratory techniques of preparation of Kritrima Kasisa.

First, Iron pieces are mixed in concentrated Sulphuric acid till they dissolve in a flask. The mixture is then heated on a spirit lamp until green crystals of Kasisa are formed. This substance contains Iron, Sulphur, Oxygen and Hydrogen.

Types of Kasisa: Various types of Kasisa are mentioned in Rasa Shastra texts. Broadly they can be classified on the basis of Akrti and Varna as follows:

Table No. 02: Showing Types of Kasisa According To Akrti.

Text	Kasisa	Churna Kasisa	Pushpa Kasisa	Pamsu Kasisa	Dhatu Kasisa	Valuka Kasisa	Hira Kasisa
R.T	-	+	+	-	-	-	-
A.P	-	-	+	-	+	-	-
R.D.T	-	-	+	-	-	-	+
R.R.S	-	-	+	-	-	+	-

Table No. 03: Showing Types of Kasisa According To Colour.

Text	Harita	Sukla	Peeta	Rakta	Krishna
R.K.D	+	-	-	-	-
A.K	+	+	+	+	-
R.N	-	+	+	-	+
R.C	-	+	+	-	-
R.K.D	-	+	+	-	-
R.T	-	-	-	-	+

Grahyagrahyata: Kasisa being yellow coloured and lustrous with bluish tinge is considered as Grahya. It is Pushpa Kasisa variety used for medicinal purpose. In Rasasamrita, Yadavaji has mentioned two varieties of

Kasisa- one is artificially prepared and the other is of a natural form. The artificially prepared Kasisa is useful for therapeutic purpose.

Pharmacological Properties of Kasisa

Table No. 04: Showing Guna Karma Of Kasisa.

Text	Rasa	Guna	Veerya	Vipaka	Dosha	Karma
A.K	Kashay Amla, tikt				VK ↓	Chakshushya
R.Ch	Amla Kashaya	Guru	Ushna		VK ↓	Kesa Ranjana
R.R.S	Amla Kashaya	Guru	Ushna	Katu Madhur	VK ↓	Keshya
R.S.S		Snigdha				Rasavad Gunakarma
RAS.M		Seeta Snigdha				Rasavad Gunakarma
A.P	Amla Madhura		Ushna			Netrya Kesaranjana
R.T	Kashaya	Grahi	Ushna		VK ↓	Netrya Rajapravartika
B.R.R.S	Amla Kashaya	Guru	Ushna			Keshya Rasavatkarma
R.AM	Kashaya Amla		Ushna			Netrya Balya

Classification

Minerals are classified into Maharasa, Uparasa, Sadaranarasa etc. based on their use in Mercury processing and potentiation. The Uparasa group stands second in the order of their utility in potentiating Mercury. Many Rasa Shastra texts mentioned Kasisa as Uparasa varga. But in Rasamritam it is mentioned under Loha or Dhathu varga, Rasatarangini includes Kasisa under Upaloha or Upa dhathu varga. In Charaka Samhita, Kasisa is described under Bhouma Gana and mentioned as Ushakadi Gana in Susruta Samhita. In Astanga Hridaya it is described as Parthiva dravya.

Table No. 05: Showing The Classification of Kasisa.

Text	Uparasa	Dhathu	Upadhathu
R.H.T	+	-	-
Rasarnava	+	-	-
R.Ch	+	-	-
R.P.S	+	-	-
R.R.S	+	-	-
R.S.S	+	-	-
R.M	+	-	-
RA.K	+	-	-
A.P	+	-	-
R.T	-	-	+

Shodhana: The metals and minerals occur with so many impurities. These impurities might have derived from the minerals, water, soil, moisture etc. The metals and minerals having such impurities cannot be used as medicine without proper purification. Purification means the removal of physical and chemical impurities from the drug.

The Aim of Shodhana:

1. Elimination of harmful matter.
2. Modification of undesirable physical properties of drug.
3. Enhancing the therapeutic property of drug.

Table No. 06: Showing Kasisa Shodana And Its References.

S. No.	Shodhana Dravya	Procedure	Yantra	Reference
1	Nimbu	Bhavana	Khalva	R.S, B.R.R.S, R.J, N.R
2	Jambira	Bhavana	Khalva	B.R.R.S, R.P
3	Pancha pitta	Nimajjana Bhavana	Khalva	R.R.S, B.R.R.S, R.K.D
4	Stri shonita	Klinna	Khalva	R.R.S, B.R.R.S, R.J, R.P.S
5	Kasamarda	Bhavana	Khalva	R.K.D
6	Rajakosataki	Bhavana	Khalva	R.K.D
7	Bringaraja	Klinna Bhavana Swinna	Khalva Khalva Dola yantra	R.R.S, R.J, N.R, R.T, Rasamritam

Kasisa shodhana was done according to R.R.S, Rasa Jala Nidhi, Rasamritam and Nighantu Ratnakar, by selecting Bhavana with Bhringaraja swarasa for 3 days. The reason to select Bhringaraja as Bhavana dravya is that it acts like Switragna agent, to obtain these qualities in Kasisa, Bhringaraja swarasa Bhavana is considered as the best choice. Reason to select Bhringaraja swarasa Bhavana is that increased alkaline value enhances the absorbable capacity in the system, main chemical

composition of Bhringaraja is Ecliptine, Nicotine, Wedelolactone etc are alkaline in nature.

Administration of Shuddha Kasisa: The administration of shuddha Kasisa in various disorders is found in the classics with different Anupanas. In those days only shuddha Kasisa was used as medicine. The mode of administration of shuddha Kasisa is shown in the following table.

Table No. 07: Showing Internal Administration of Kasisa.

S. No	Drug	Disease
1	Shuddha Kasisa	Pleeha vridhhi
2	Shuddha Kasisa	Kastarthava
3	Shuddha Kasisa + Twaka	Raktalpata
4	Shuddha Kasisa + Tankana + Kumari	Rajorodhodbhava Ruja
5	Shuddha Kasisa 1 ratti + Kapittha 4 ratti	Hikka
6	Kasisa Drava (Basti)	Arshas

Table No. 08: Showing External Application of Kasisa.

S.No	Drug	Disease
1	Shuddha Kasisa + Dhatura Beeja + Gunja	Shwitra
2	Shuddha Kasisa jala	Visarpa shotha
3	Shuddha Kasisa + Sphatika + Hingu + Devadaru	Krimi Danta
4	Shuddha Kasisa + Bakuchi + Shuddha Gairika	Shwitra

Table No. 09: Showing The Different Methods of Kasisa Marana.

S.No.	Procedure	Yantra	Putra	Reference
1.	Bhavana with Kanji Nimbu, Snuhipatra	Khalva	Laghu	R.T
2.	Nimbu	Khalva	10 Prasta Vanotpala	R.R.S
3.	Amalaki + Bringaraja Langali, Dadima	Khalva	Half Gajaputa	S.Y.S
4.	Triphala, Bringaraja	Khalva	Varaha Putra	R.Tantra
5.	Frying in Bringaraj Swarasa	Khalva	Laghu Putra	R.T.S

Classical Dose of Kasisa Bhasma

65 mg - 250mg - Rasa Tarangini

125 mg - 250mg - Rasamritam

125 mg - 375 mg - RA.TA.SA

Ferrous Sulphate or Green Vitriol: There are three scientifically approved Iron salts available for oral administration of Iron in various diseases. Among this Ferrous sulphate is widely used and is considered as a standard variety compared to the other two salts Ferrous fumarate and Ferrous gluconate. Ferrous sulphate occurs as pale, bluish, green crystals or granules which are odourless. It is a decomposition product of iron sulphide mineral. It does not occur abundantly in nature. It has a saline, styptic taste and is efflorescent in dry air. On exposure to moist air it is oxidized and becomes brown in colour due to the formation of basic Ferric sulphate. It contains seven water molecules. On heating, it loses its water content and that water is known as water of crystallization. It is on the World Health Organization's list of essential medicines, the safest and most effective medicines needed in a health system. In 2017, it was the 92nd most commonly prescribed medication in the United States, with more than eight million prescriptions.

Characteristics of Ferrous sulphateChemical formula - $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$

Other Names - Iron Sulphate, Green vitriol, Iron Vitriol

Molecular weight - 278.02

pH - 3.7

Crystal system - Monoclinic

Fracture - Conchoidal, Brittle

Luster - Vitreous

Transparency - Sub transparent to translucent

Hardness - 2

Specific gravity - 1.8 - 1.9

Boiling point - 300°C Melting point - 57°C

Solubility: It is completely soluble at the rate of 1 in 1.5 of water, 1 in 0.5 of boiling water. Practically it is soluble in alcohol. **Uses and Doses:** Most widely used in Iron deficiency Anemia, Ferrous sulphate oxidized with Nitric and Sulphuric acids yields Ferric sub sulphate solution also known as Monel's solution which is used as haemostatic. It is administered at the rate of 300 mg (equivalent of elemental iron) twice or thrice a day. The usual dosage range is from 300 mg to 1 gm depending on the condition. When Iron sulphate is administered in large doses, it produces poisonous symptoms and may even cause exogenous Hemosiderosis as manifestation

of chronic poisoning.

Fatal dose and fatal period: Ferrous sulphate has rarely proved fatal to adults. It has produced fatal poisoning in children under the age of four years. An Infant-1 gram, In children - 2 to 5 gram, Adult- 20 to 40 gram, Death from ferrous sulphate poisoning occurs in children in thirty hours or more.

Treatment

1. Stomach wash is given with Sodium bicarbonate 5% solution.
2. Plenty of eggs and milk should be given to form Iron protein complex to delay absorption.
3. For delayed symptoms Calcium di-sodium versanate I.V. is to be used.
4. In severe iron poisoning Deferri-oxamine is the treatment of choice.
5. Dialysis may be life saving.

SUMMARY AND CONCLUSION

Ayurveda, the Indian system of medicine uses drugs from three main sources i.e. plant, animal and mineral. Initially plant materials were frequently used for medicinal purposes due to their abundance and easy processing techniques. Later, the therapeutic utility of mineral materials were identified and incorporated in therapeutics. Rasa Sastra is the pharmaceutical branch of Ayurveda which deals with preparation of drugs using metals and minerals. Several specialized pharmaceutical procedures like Shodhana, Jarana, Marana, Murchhana are adopted for these mineral materials to convert them into safe, nontoxic and efficacious forms. Rasa Shastra has a glorious past regarding Good Manufacturing Practices (G.M.P.) Standardization, Standard Operating Procedure (S.O.P) etc. as their fossils are found in the description of Rasa Mandapa. Kasisa is Ferrous Sulphate with water component that is $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. As per Rasa texts Pushpa Kasisa is the best variety of Kasisa that carries the properties of Amla, Kashaya, Guru, Snigdha, Ushna, Vatakaphahara, Vishahara. Keshranjana, Raktavardhan, Switraghna, Kandugna and Kushtahara, And the Bhasma of Kasisa has a rich content of Iron. The preparation method of Kasisa Bhasma involves reduction and calcinations under high temperature and triturating with Aloe Vera Gel. It increases haemoglobin levels and reduces symptoms of extreme fatigue, weakness, pale skin, frequent infections, light-headedness and dizziness. All these symptoms occur when an individual is deficient in Iron or have Anemia. Thus all the Rasa dravyas like Kasisa are highly potent, fast acting and capable of

alleviating dreadful and incurable diseases, and have more shelf life as compared to herbal formulations.

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