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Systemic review of *Swarna Vanga* in Ayurvedic classics - A Kupipakva Rasayana

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ABSTRACT

The word 'Rasa Shastra' comprises of two words: 'Rasa' and 'Shastra.' Rasa stands for 'Mercury' while Shastra stands for 'Science.' Therefore 'Rasa Shastra' literally stands for 'Science of Mercury' However this specialised branch of Ayurveda has a broad range of study. It deals with all the metals, minerals, mercury and other substances known as Rasa Dravayas. Swarna vanga is prepared as per reference of Rasa Tarangini Vanga (Tin), Parada (Mercury), Gandhak (Sulphur), Navasadara (Ammonium Chloride) and Kalmi Shora (Potassium Nitrate). Swarna Vanga is a type of Kupipakwa Rasayanas, indicated mainly in diseases such as Madhumeha (diabetes mellitus), Swasa (respiratory disorders), Pradara (menorrhagia), and as a Vrishya (aphrodisiac) and this is the product of complex chemical processes in which preparation of Kajjali and heating pattern plays most important role.

Key words: *Swarna Vanga, Vanga Bhasma, Kupipakwa Rasayanas.*

INTRODUCTION

The drug Svarna Vanga, an Ayurvedic preparation has been in use as a medicine since 14th century A.D. Svarna Vanga (SV)[1] is a metallic preparation which contains mainly Tin and Sulphur along with traces of Mercury, Iron and Aluminium.[2] Metals particularly the heavy metals are known to have toxic effects and therefore having limited therapeutic uses. Salts of heavy metals (except Hg) are absorbed slowly from G.I.T., but the presence of gastrointestinal lesions and particularly when the salt itself induces irritation and congestion, relatively more metal is absorbed than in normal epithelium. Slowly absorbed metals, if, excreted even more gradually may lead to tissue accumulation on repeated administration and thus to chronic toxicity.[3] Swrana Vanga is a type of Kupi Pakwa Rasayana described in Classics of Rasa Shashtra. Through the history of the branch of Rasashastra, it can be known that it developed as a special branch when morbidity and mortality were on the rise. With its advent, came new metal, mineral and herbomineral combinations, formulations and procedures. Kupipakva was one such procedure developed mainly for Gandhi Jarana. Kupi was one of such apparatus. During such procedures, it became known to the peers that the same, with some slight variations can be used for therapeutic values. More developments were done and Kupipakva Rasayana emerged to be one of the best Rasoushadhis (mercurial preparations). These are also called Sindoor kalpas as their final product is red in colour.[4]

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Types of Kupipakva Rasayana

Basically three types are seen based on the inclusion of Gandhak in the ingredients time of corking the mouth of kupi and the site of obtaining the final product;

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Ingredients

1. **Sagandha:** prepared with Gandhaka[5]

- Parad + Gandhak, e.g. Rasasindoor
- Parad + Gandhak + Metal, e.g. Tamrasindoor, Rajatasindoor
- Parad + Gandhak + Mineral, e.g. Talasindoor, Shilasindoor

2. **Nirgandha:** Prepared without Gandhak, e.g. Rasakarpura, Rasa Pushpa

Time of corking

1. **Antardhoom:** Corking of the bottle is done from the beginning, thus preventing vapors from escaping e.g. Rasasindoor.
2. **Bahirdhoom:** Corking is done after sulphur fumes subside. e.g. Hinguliya Manikya Rasa, Shilasindoor.

Site of finished product

1. **Kanthastha:** The finished product is deposited at the neck of Kupi e.g. Rasasindoor, Rasa Karpoor.
2. **Talastha:** The product is obtained from the bottom of the Kupi. E.g. Sameera pannaga Rasa, Swarna vanga.
3. **Ubhayastha:** Final product obtained from both the sites of Kupi. e.g. Purnachandrodaya, HinguliyaManikya Rasa.[6]

MATERIALS AND METHODS

Swarna Vanga is a type of Talastha type of Kupi Pakwa rasayana. In the preparation of Swarna Vanga following metals are used-

1. Vanga

2. Gandhaka

3. Parada

1. Vanga (Tin)

During the extreme fighting stage between goddess Durga, lion of the goddess and the demon Sumbha, the earth was badly dug. Vanga's origin is believed to be from that foot marks of all the three, i.e. the goddess, lion and the demon. In samhita period Charaka has described Vanga in the metals and the use of it in making some Yantras like Vasti Yantras.[7] He also mentioned a therapeutic use of Vanga churna as an external application for Mandala Kustha. In Sushruta samhita, Sushruta has described - Trapu as one metal, and also its external application and uses for Yantra, he has also utilized Vanga as a Krimighna (vermicides).[8] The common method that is being used now a day to purify mercury is given in Rasarnava to remove Vanga and Naga Doshas.[9] Vanga can be used for preparation of 900 types of colour shades. Many processes of Khota Bandha are given to make metallic alloys. It is utilized for processing Hema Bija and Rajata Bija for alchemy. On fire Vanga gives flame resembling to Kapotvarna. Vanga bhasma is used in the treatment of genitourinary disorder, diabetes, anemia, asthma gastric ulcers and urinary diseases.[10]

Types of Vanga

a) Khuraka

b) Mishraka

In the context of therapeutic purpose, Khuraka Vanga is best one. In Rasakamdhenu, on the basis of colour, Vanga is classified in Shweta and Krishna. In which Shweta Vanga is best for the medicinal purpose

Properties of Vanga

a) **Khuraka Vanga -** Khuraka Vanga is white in color, soft in touch, easily melts, heavy in weight.

b) **Mishraka Vanga -** Mishraka Vanga did not melted easily, rough in touch and when mixed with other metals it becomes dull black in colour and hard in nature.

Table 1: Formulations[11],[12]

SN	Formulations	Indications
1	MuktaPanchamrita	Jirnajwar
2	Laxmivilas Rasa	Kshaya,Tridoshaja, padu, Kamla, Arsha, Swasa, Kasa, Kushtha
3	Mahakaleshwara Rasa	Kshaya, Swasa, Kasa, Rajyakshma

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4	VasantTilaka Rasa	Kshaya, Pandu, Swasa, Kasa, Prameha, Jwar
5	Unmadabhanjan Rasa	Unmada, Apasmara Raktapitta
6	Nageshwara Rasa	Pleehavriddhi, Pandu, Shotha
7	Tarkeshwara Rasa	Mutrakriccha
8	Vasantkusumakara	Prameha, Kshayakasa, Swasa
9	Vangeshwara Rasa	Prameha, Mutrakriccha, Pandu
10	Apoorvamalinivasanta	Jirnajwar, Prameha, Mutrakriccha
11	Chudamani Rasa	Jwar, Kasa, Swasa, Grahani, Kamala, Mutrakriccha,
12	Sarvanga Sunder Rasa	Vataroga, Kapharoga.

Dose: 1-2 Ratti

Oxidation state: In general its oxidation state is +4. But, also show +2 oxidation state due to inert pair effect. Allotropy: It shows allotropy. i. e. Sn exists in more than one form. So, Tin occurs in three forms which are described previously.

Action with air: It does not react with air at ordinary temperature. On heating in air, there is a formation of Oxide layer on the surface of the metal and on strongly heating in air at 1500 °C it burns with a white light. so form , SnO2

$Sn + O_2 \rightarrow SnO_2$

Action with acids: It reacts with diluted. Hcl or diluted. H_2SO_4 to form H_2.

Action with alkalies: It can react with alkalies to form Hydrogen. The dioxides of this element are amphoteric and dissolve in both acids and alkalies to form salts.

$SnO_2 + 2NaOH \rightarrow Na_2SnO_3 + H_2O$

Importance ores of tin

- Cassiterite : SnO2 (tin stone)
- Cylindrite : Pb3Sn4FeSb2 S14
- Stannite : Cu2SFeSnS2
- Tealite : PbSnS2
- Canfieldite : Ag8SnS6

2. Parada

Herbs, minerals, and metals are used in Ayurvedic herbal medicine products. Ayurvedic theory attributes important therapeutic roles to metals such as mercury and lead. In Ayurveda mercury was an important constituent of drug for centuries as an ingredient in many diuretics, antibacterial, antiseptic skin ointments and laxatives. In modern medicine mercurial drugs are almost replaced in recent decades except thimerosal in vaccines as preservatives. It occurs in nature as organic or elemental form. Salts of mercury occur in two oxidative states (1) mono-valent mercurous and (2) divalent mercuric salts. In the Ayurvedic Formulary of India, the authentic text for ayurvedic drug preparation and practice, there are about 55 formulations for mercury for various ailments.[13]

Types of Parad:[14] According to the origin of Parada. It is classified in to 5 types viz- Rasa, Rasendra, Suta, Parada and Mishraka.

Parad Gati: Parad has 5 types of gati which is considered to be the main cause of loss of parada while manufacturing parada containg kalpas or while doing parada shodhna. They are-

1) Jala Gati

2) Hansa Gati

3) Mala Gati

4) Dhooma gati

5) Jeeva Gati or Adrushya Gati

Doshas of Parada: There are mainly 3 doshas in Parada;

1. Naisargika - Visha, Vahni, Mala
2. Yogika - Naga, Vanga
3. Aupadhik - Parpati (Bhumij), Patni (Girij), Bhedi (Varij), Dravi, Malkari (Naga), Andhkari, Dhwankshi (vanga)

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Ayurvedic Pharmacological and Therapeutic Properties of Parada[15]

- Rasa - Shadarasa
- Guna - Snigdha, Sara, Guru
- Virya - Ushna
- Vipak - Madhura

3. Cinnabar (Hingula or Chayilyam)

In Sanskrit cinnabar is known to be Hingula or Chayilyam. Cinnabar is an important ore of mercury. Its chemical composition is mercuric sulphide (HgS). According to modern science cinnabar is known to be highly toxic.[16] It is widely used in Traditional Chinese medicine (TCM) and Ayurvedic drug preparation in India. Although cinnabar is not used in Western medicine, TCM practitioners sometimes prescribe it as part of a medicinal mixture, often on the basis of the concept of using poison to cure poison. Used internally, cinnabar is believed to clear away heat and tranquilize the mind. It is also used as a tonic to reduce the incidence of heart palpitations, restlessness, and insomnia, and to treat some sore throats and cold sores that occur in the mouth and tongue. In addition, cinnabar is applied externally to treat certain skin disorders and infections.[17]

Name of the variety

1. Rakta (Shukachanchunibha, Shukatunda) like parrot's beak
2. Pita (Amlasara, Shuka Picchhanibha) like parrot's wing
3. Shukla (White)
4. Krishna (Black

Physical Properties

Sulphur forms polyatomic molecules with different chemical formulas, the best known allotrope being octasulphur, cyclo-S8. The point group of cyclo-S8 is D4d and its dipole moment is 0 D. Octasulphur is a soft, bright-yellow solid that is odorless, but impure samples have an odor similar to that of matches. It melts at 115.21°C (239.38°F), boils at 444.6°C (832.3°F) and sublimes easily. At 95.2°C (203.4°F), below its melting temperature, cyclo-octasulphur changes from α-octasulphur to the β-polymorph.

Preparation of Swarna Vanga:[18]

Swarna vanga was prepared as per reference of Rasa TaranginiVanga (Tin), Parada (Mercury), Gandhak (Sulphur), Navasadara (Ammonium Chloride) and Kalmi Shora (Potassium Nitrate)

Processing (Shodhana) of Raw Materials: [19]

Samanya Shodhana of Vanga, method of melting followed by pouring (Dhalana) sequentially in liquid media viz. Tila taila, Takra, Gomutra, Arnala, Kulattha Kwatha as depicted in Rasa Ratna Sammucchya. Similarly Vishesha Shodhana was done adopting the same procedure of melting followed by pouring. For this, Churnodak was taken asliquid media. Itwas found that after Shodhana, For Parada Shodhana, double distilled Mercury from Merck company, was taken in a mortar. Paan Svaras Guice of Piper betel, Aadrak Svaras (juice of Zingiber officinalis) and Kshartray (combination of Yavakshara, Sarjikshara and Tankana) were added and triturated. The process was continued for three days and Parada was then washed with potable water. For Shodhana of Gandhak, traditional method using cow's milk and clarified butter was employed. In this method, Gandhak was heated up to its melting temperature and was poured through a double layered cloth into a vessel containing boiled milk. Gandhak settled on the bottom and assiduously

Preparation of Vanga Pishti

Shuddha Parada was taken in mortar and purified molten Vanga was added to it quickly. The mixture was triturated vigorously up to a homogenous form Saindhav lavana was added in Vanga pishti and this mixture was triturated with Nimbu Swarasa. After 10-15 minutes of trituration, Nimbu Swarasa turned black; it was removed with the help of suction syringe and washed with hot water. Above procedure was repeated till black colour of Nimbu Swarasa was completely disappeared. The colour of mixture after 40 hours of trituration was light silver grey. Obtained material was again washed with hot water and kept for drying in sunlight for 2 days.

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Preparation of Kajjali for Swarna Vanga

Shuddha Gandhak was added to Vanga pishti and was subjected to the process of continuous trituration. During this process, the mixture changed from grey colour to dark grey colour. Trituration was done till this mixture became black, very fine and attains uniform consistency. Shuddha Navasadara was added in above mixture and again ttiturated properly. Lastly, Shuddha Kami Shora was added in above mixture. This mixture was triturated properly. Trituration was done till mixture became black, very fine, uniform and lustreless.

Preparation of Swarna Vanga

Prepared Kajjali was slowly filled in mud smeared bottle (Kanchkupi) upto 1/3rd level of Kanchkupi. The inner surface of the bottle was cleaned thoroughly before filling the Kajjali. The Kanchkupi containing Kajjali was put in a special apparatus known as Baluka Vantra (sand bath), for paka (heating). Heat treatment was given in gradual increasing way (Kramagni), The whole procedure took 18 hrs. After completion of Paka, corking of Kanchkupi was done cautiously and temperature was further maintained for 2 hrs. There after, the Kupi was left for self cooling. Next day after achievement of Swangashita (self cooled) state, Kanchkupi was taken out from the Baluka Yantra (sand bath) and Kapadmitti over the Kupi was removed carefully. On gentle tapping at the level of string, the Kanchkupi broke into two parts. The material deposited at the base was collected by gentle tapping and with forceps. Absolute golden and light weighted material was collected. The obtained Swarna vanga was washed with water to remove excess of Kshara added during preparation.

Discussion

For the preparation of Kupipakwa rasayana, Dhatu pishti nirmana, preparation of Kajjali and heating pattern are the most important factors to obtain best quality and maximum quantity of yield without any untoward effects. The Samanya and Vishesha Shodhana of Vanga was done with the intention of eliminating doshas from raw drug Vanga and to make it suitable for further Procedure. During Process the system of applying Kramagni or ladder step heating procedure is recommended to give uniform, slow and steady rise in temperature. By this, the ingredients are given enough time at each range of temperature allowing them for any kind of reaction to take place. After 2 hours, slight white colour fumes with ushna, tikshna gandha came. This may due to burning of Navasadara. After 3 hours, when red hot shalaka inserted, semisolid state of Kajjali felt. This may be due to melting of Kajjali, which is usually between 420°C - 430°C. After 4 hours, dense yellow coloured fumes with smell of tikshna Gandhak came. This may be due to the temperature, which reaches the boiling point of Gandhak i.e. above 444°C. At final stages, when temperature was increased up to 650°C, sand like feeling was observed when copper wire was inserted inside the Kupi. Corking was done and temperature was maintained for 2 hrs and then was kept for self cooling.

Conclusion

Swarna vanga is prepared as per reference of Rasa Tarangini Vanga (Tin), Parada (Mercury), Gandhak (Sulphur), Navasadara (Ammonium Chloride) and Kalmi Shora (Potassium Nitrate). Swarna Vanga is a type of Kupipakwa Rasayanas and this is the product of complex chemical processes in which preparation of Kajjali and heating pattern plays most important role. Preparation of Swarnavanga requires only Mridwagni and Madhyamagni. Corking of the mouth of the bottle is not required.

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