Diversified Uses of Mineral Origin Substances in Sushruta Samhita: An Overall Review

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ABSTRACT
Ayurveda, the science of life, is an upveda of Atharvaveda, one of the oldest scriptures of Hindus. Drugs used in Ayurveda are obtained from natural sources only i.e. from plants, animals or metals/minerals. Metals and minerals require some special techniques like shodhana, marana, jarana, satwapatana etc. before internal administration as they are mostly found associated with various impurities and toxic elements. These specific techniques are not as much elaborated and well documented in Samhitas as in classical texts of Rasashastra, so it is assumed that use of mineral origin substances were confined only upto the external application in Samhita period. Sushruta Samhita is one of the most ancient, authoritative classical book of Indian medicine especially of shalya and shalakya. In the present study an overall review of mineral origin substances regarding their therapeutic application and other uses in Sushruta Samhita is done and it is observed that the roots of this science are also embedded in Samhitas, the treasure of knowledge. Besides use of metals in manufacture of vessels, yantra, shastra, tongue scrapper and vastinetra, a good no. of references are also collected regarding therapeutic use of metals and minerals viz. 129 references regarding their use via other than oral route as compound formulation, 34 references via oral route as compound formulations, 21 references of oral route as a single drug and 9 references where single metal/mineral drug were used through other than oral route for treatment purpose by adopting different Rasashastra techniques. It clearly signifies the indepth knowledge of Acharya Sushruta in relation of application of metals and minerals in that period.

KEYWORDS
Mineral, Metal, Sushruta Samhita
INTRODUCTION

Ayurveda is a traditional system of medicine in which drugs of plant, animal and herbal origin are used along with proper diet and code of conduct to maintain health in healthy and eradicating diseases in diseased. Use of mineral origin substances in treatment is a unique feature of it. Rasaushadhis, formulations containing purified and processed metals, minerals, herbs and other elements, when used internally in proper regime and dosage have proved highly effective in curing many acute and chronic diseases and aided in promoting health of an individual. Processing techniques required for the internal administration of metals and minerals such as shodhana, marana, jarana, satvapatana etc. are documented with details in the texts of Rasashatra but roots of this science are also embedded in Samhitas, the treasure of knowledge. In Charak Samhita different type of minerals and metals were used in therapeutics through both external and internal application and for other purposes also. Sushruta Samhita is one of the most ancient, encyclopedic and authoritative classical books of Indian medicine especially of shalya and shalakya. Treatment of many surgery treated diseases are well defined here compare to that of Charak Samhita such as Arsha, Bhagandar, Ashmari, Mudhagarbha, Vrna etc. This paper attempts to screen Sushruta Samhita for references emphasizing the utilization of mineral origin substances for therapeutic and other purposes. Sushruta Samhita was scrutinised and the found references regarding use of mineral origin substances are grouped into different categories to have an clear idea about their diversified use. Obtained data is represented under following headings-

1. Classification
2. Utilization in therapeutics through oral route as Compound formulations
3. Utilization in therapeutics through oral route as Single drug
4. Utilization in therapeutics through other than oral route as Compound formulations
5. Utilization in therapeutics through other than oral route as Single drug
6. Use of metallic vessels for drug manufacture and storage.
7. Other uses

1. Classification- Mineral origin substances are placed in following vargas-

| Table 1 |

| 2. Utilization of metals/minerals in therapeutics through oral route as Compound formulations- |
Many compound formulations containing mineral origin substances are used orally in *Sushruta Samhita* to treat various disorders and for rejuvenation. Obtained references are arranged in a Table 2.

3. **Utilization of metals/minerals in therapeutics through oral route as Single drug**

Intake of various mineral origin substances such as *Shilajatu, Suvarnamakshika, Suvarnagairik, Loha* etc. with suitable *anupana* is indicated to treat different disorders. Found references are arranged in tabular form. Table 3

4. **Utilization of metals/minerals in therapeutics through other than oral route as Compound formulations**

A large no. of references indicating use of mineral origin substances in therapeutics through other than oral route such as *lepa, abhyanga, pratisaran, avchurnan, nasya, dhumapana* and *vasti* are also represented in the table. Table 4

5. **Utilization of metals/minerals in therapeutics through other than oral route as Single drug**

References regarding use of mineral origin substances as single drug through *nasya, dhumapana, anjana, karnapooran* and *lepa* are collected in the table. Table 5

6. **Use of metal vessels in drug preparation and storage**

Specific metal vessels were used in drug preparation and for their storage also to improve their properties due to *Kalprakarsh* and *Bhajan samskara*³. Some of the examples are listed below-

1. Gold and Silver vessels are mentioned for storage of *Gangajala*⁴.
2. Vessels made from Gold, Silver, Copper, Bronze and *Manis* are used to keep drinking water treated with flowers⁵.
3. According to food serving rules, Iron vessels should be used to serve ghee, Silver vessels for drinking items, Gold vessels for dry and moistured items, Copper vessels for water, *Sphatik* vessels for water, *panaka, madhya* and *Vaidurya* vessels are mentioned to serve various types of *Raga, Shadava* and *Sattaka*⁶.
4. Gold and Silver vessels are mentioned to store *Shatpaka taila* indicated in *Vatavyadhi* of Kings⁷.
5. Copper lamp is mentioned to prepare *kajal* which is used in a formulation indicated in *Kilasa kushtha*⁸.
6. Iron vessels are mentioned to collect *Khadirasara* indicated in *Kushtha*⁹.
7. Gold and Silver vessels are indicated to store *Balataila* indicated in *Sutikaroga*¹⁰.
8. *Nili taila* indicated in *Palitya* should be kept in Iron vessel for one month¹¹.
9. Iron vessel is mentioned to store *Dvitiya Vidangatandula yoga*¹².
10. Different type of vessels are mentioned to keep various type of Somas such as Gold vessel for Anshuman, Silver vessel for Chandramas and Copper vessel for other types.13

11. Gold, Silver, Copper and Mani vessels are mentioned to keep sneha used in nasya karama.14

12. For preparation of Netrapakhar anjana, Ghee and Saindhav lavana/ Maireya/ dadhi are kept in a copper vessel (preferably made of a thin sheet) for one month and afterwards material along with vessel is subjected to trituration.15

13. Copper vessel is used in the preparation of various anjanas indicated in Aklinna and Praklinnavartma roga.16

14. Different type of vessels are mentioned to keep various types of anjanas such as Gold vessel for Madhuranjana, Silver vessel for Amlanjana, Copper and Iron vessel for Kashayanjana, Vaidurya vessel for Katukanjana and Bronze vessel for Tiktanjana. For application of these anjanas, shalaka (applicator) must be of same metal.17

15. Sphatik vessel is mentioned to store Bhadrodaya and Tagradhya anjana.18

16. Ghee kept in Kamsya vessel for more than ten days is considered as Karmavirudhha and should not be consumed.19

7. Other Uses-

1. For Paittik shoola treatment, it is mentioned to put cold water filled Silver, Copper and Mani vessels at pain site.20

2. Sparsha and dharan of Sphatikmanis is indicated in Moorchha treatment.21

3. Ratnas are used to worship God, Brahmin and Vaidhyas.22

4. Iron vessels are counted among the essential tools required for shastrakarma.23

5. Yantras and Shastras are manufactured with Iron.24

6. Sphatik maniis included in Anushastra.25

7. Gold, Silver and Copper metals are used as tools in Agnikarma.26

8. Suvarna and Rajata nirvapita jala is mentioned for Trishna treatment and for neonatal bath.27

9. In Jalodar treatment, Vanga nalika (tin tube) is used to drain water from abdominal cavity.28

10. Iron rod is used for vimlapana karma in Kaphaj granthi and gharshan karma in Medoj granthi.29

11. Agnikarma by red hot iron rod is indicated in Apachi.30

12. Both sided open Iron rod is indicated for prasaaran karma in treatment of Niruddhprakash.31

13. Jihvanirlekhni (Tongue scraper) made up of Gold and Silver metal are indicated.
14. Gold, Silver, Copper, Iron, Riti, Sphatik are used to manufacture Vastinetrā and Dhumanetrā.
15. Iron metal is included in the vrna bandhan dravya.
16. Kamsya and Lohapinda is indicated in Taap and Ushma sveda respectively.
17. Hartala and Manahshila are used as Balidravya in treatment of Shakuni graha and Hartala, Manahshila, Anjana and Parad are mentioned as balidravyas for Mukhmandika balgraha.

DISCUSSION
From above data it is clear that many mineral origin substances like Makshika, Shilajatu, Sasyak, Gairik, Kasis, Kankshi, Hartala, Manahshila, Anjana, Parada, Manis and Metals like Suvarna, Rajata, Tamra, Vanga, Kamsya, Lohakitta are used in Sushruta samhita for therapeutic purpose with suitable anupana. Cow urine is used widely here for this purpose. Different metal vessels are mentioned to prepare and store food items and medicines so as to impart their special properties indicates the scientific knowledge of that era. Ayaskriti method which enables the metals for internal administration by converting them in fine colloidal form with the help of mardana and nisheka techniques using different medias is described in Sushruta Samhita with detail. Metals are administered in the form of powder (raja) only prepared by ayaskriti method and the concept of processing bhasmas was not developed during this period. The word bhasma mentioned in Sushruta Samhita indicates only the ashes of vegetable drugs but the concept of puta appears to be developed for the first time by Sushruta and the references regarding Tuvarak rasayana reflects about it. The pulp of Tuvaraka is to be burnt in closed vessels without letting out the smoke and put into oil and used with rock salt and strotanjana as acollyrium. Suvarna is an ingredient of various rasayana and medhya yogas mentioned for both children and adults. Suvarna with honey and ghee is used in Suvarnaprashan sanskara. Single reference of internal administration of Tamra churna is as an ingredient of Salsaradi leha used in treatment of Prameha. Tamra churna and Tamra patra is also used to prepare various anjana yogas. Lohachurna is used widely both in the form of single and compound formulations in Pandu, Mandagni, Kushtha, Meha, Meda and Shotha. Regarding other than oral routes Lohachurna is also used for its ranjak guna (ingredient of lepa used in Shvitra and Saireyakadi taila used in Palita and Khalitya) and lekhana karma (ingredient of various lekhana anjana and putapaka).
Naga (lead) is placed in trpvadi gana along with other metals but no other reference related to its use could be found. Intake of Vanga rubbed in dadhimastu is mentioned in treatment of Krimi. Use of Kansya in therapeutics is done only through other than oral route such as in anjana yogas, lepa yogas for Shvitra and avpidana naya in Shirogat krimi.

Regarding use of Parad and other minerals, external use of Parad is mentioned here as an ingredient of ghrita used for facial massage in Vyanga, Nilika and Sfota. Parad is also mentioned as balidravya in daivavyapashraya chikitsa of mukhmandika balghraha. Many minerals like Makshika, Shilajatu, Sasyak, Gairik, Kasis, Kankshi, Hartala, Manahshila, Anjana are used here in therapeutics. No reference of Gandhak could be found out whereas it is mentioned in Charak samhita for skin disorder treatment. Intake of Suvarna and Rajata makshika is advised in Pandu, Kushtha,Jara and Prameha. Makshika is also an ingredient of two anjana yogas. Detail description of Shilajatu about its origin, types according to relationship with metals (Naga and Vanga shilajatu are addition to the types mentioned in charak), properties and approval features are in chikitsa sthana. Internal administration of Shilajatu as a single drug and as an ingredient of compound formulations is advised in Medogat kushtha, Madhumeha, Pandu, Sannipatik mutrakrichha, Urustambha, Ashmari, Antarvidradhi, Sthoulya and Kshya. Shilajatu is also used in an anjana mentioned in Rakta abhishyanda. Tuttha is used at various places due to its vrna ropana, vrna shodhana and ranjak property. It is used almost eleven times to prepare anjana yogas indicated in various eye disorders. Kasis secured an important place in vrna treatment owing to its various properties like shodhana, ropana, avsadan, ranjan and romsanjanan. It is also used in treatment of Khaliyta, Palitya and Indralupta due to its ranjak and romsanjanan karma. Besides it is also used in various formulations mentioned in Arsha, Ashmari, Sharkara, Nadivrna and Akshirolga. In Charak samhita, internal administration of Kasis and Tuttha are not mentioned but here these both are used as kalka dravyas in snehapaka used orally in Kaphaj ashmari. Single use of Kasis with kapittha churna and madhu is mentioned in Hikka. Oral intake of Gairik churna as single drug is indicated in Garbhasrava and Hikka. Dushivishari agada, Mahasugandhiagadraj and a churna yoga used in Pandu are orally administered Gairik formulations. Gairik is also used in various Lepa yogas (indicated in Samyak dagdha, Pittaj visarpa,Vatrakta, Ksudra
roga, Akshiroga, Shiro-roga and Tvak roga), Anjana yogas (specially for Pittaj-raktaj akshi roga) and in Avchurnan yogas (to check bleeding and in Updansha vrna). Gairik is also used as an ingredient of niruha vasti dravya at two places mentioned in Pittaj jvara and Raktapitta respectively. Externally Sfatika is used as an ingredient of Churna, Varti and Rasakriya indicated in Vrna chikitsa and in Mahavajrak tailapaka mentioned in Kushtha, Bhagandar, Gandmala. Oral administration of Sfatika is mentioned in Medogat kushtha. Eladighritam is also an sfatika containing formulation. Hartala and Manahshila both are used due to their properties like vrna shodhana, vrna avsadana, vrna ropana and pandukarma of vrna. Hartala and Phenaishma (Gauripashana) are mentioned as Dhatu visha. Rompatana karma of Hartala is also mentioned here which is not described in Charak Samhita. Both of these are also used to prepare Lepa yogas indicated in Kshudra rogas, Kushtha and Shvitra. Manahshila is used more in Anjana yogas in comparison to Hartala. Manahshila is also an ingredient of Anjana mentioned in Vishama jvara. Mustaadi varti mentioned in kasa contains both Hartala and Manahshila. Manahshiladi dhooma and use of Manahshila containing dhumavarti in Hikka, Shvasa shows that Manahshila is used for its Shvasahara action. Karnapoorana with Hartala churna in gomutra in Karnakrimi, Manahshila containing avpidana nasya formulation in Ardhavbheda are the other mentioned routes. Regarding internal administration both are used as kalka dravyas in snehapaka which may be used orally in Unmaada, Apsmara and Grahadosha and are ingredients of a Churna yoga mentioned in Mutravisha dushta lutatreatment. Mahasugandhiagadraj is a Manahshila containing formulation indicated in Sarpavisha. Anjana is also used internally through various formulations mentioned in Pandu, Raktapitta, Hikka, Kasa.

CONCLUSION
So, it may be concluded that minerals and metals are used in Sushruta Samhita in a diversified manner. In treatment of Vrna, mineral origin substances had secured an important place since that time. Various techniques like Nisheka (eg- Indication of suvarna and rajata nirvapita jala in Trishna and for neonatal bath, use of Suvarna nishechita dugdha in treatment of Pravahika and use of Akshkasathadagdha mandoor in Pandu), Nimajjana (Intake of Lohakitta which was kept in cow’s urine for one month inPandu), Bhavana (Use of Salsaradi gana kvatha bhavit Shilajatu in
Madhumeha) and Mardana are used here which are the markers of their pharmaceutical approach converting a substance more suitable for internal administration. Reference of *Riti* suggests that *Satvapatana* technique is also known in that period as *Riti (Pittal)* is a *mishra loha* formed by combination of *Tamra* and *Yashada* in a specific proportion. *Yashad* was not known in that period which indicates the use of Kharpasatva in its place. Use of metals and minerals are not only confined upto the external or other than oral routes like *lepa, anjana, varti, vasti, karnapooran, nasya, avchurnan, abhyanga* but a good number of references regarding their internal administration through single form or compound formulations certifies the fact that metals and minerals are an important part of *Ayurvedic* treatment since *Samhita* period.
REFERENCES


