AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems

Review Article

REVIEW ON *SATVAPATANA*: A PROCESS OF ESSENCE EXTRACTION

Sheenam Rani[1]*, Usha Sharma[2], Shuchi Mitra[3], Khem Chand Sharma[4]
*[1]P.G Scholar, [2]Professor, [3]Associate Professor, [4]Professor and HOD, P.G. Department of Rasa Shastra & Bhaishajya Kalpana, Uttarakhand Ayurved University, Rishikul Campus Haridwar, India.

Article info
Article History:
Received: 28-12-2022
Revised: 13-01-2023
Accepted: 05-02-2023
KEYWORDS:
Satva, Beejavarta, Shuddhavarta, Satvapatana.

ABSTRACT

Rasashastra is the Iatrochemistry of Ayurveda which deals with the various pharmaceutical processes of *Shodhana* (purification/potentiation), *Marana* (incineration/calcination), *Jarana* (polling), *Murchhana* (a procedure by which substances especially mercury is transformed for therapeutic application) and other detail description of metals, minerals, poisonous plants and animal products which are of therapeutic importance in Ayurveda. *Satvapatana* is one of the processes of *Rasashastra* for achieving the *Satva* (essence) of metals and minerals from their original source. The main objective of *Satvapatana* is to obtain the active component of ore and to minimise the dose of *Dhatu* without lowering its efficacy for therapeutic uses. The process of *Satvapatana* was first described by Acharya Nagarjuna in Rasendra Mangala. It has also been mentioned in other classical texts such as Anandakanda, Rasarnava, Rasa Hridaya Tantra, Rasendra Chudamani, Rasa Ratna Samucchayam, Rasa Tarangini. *Satvapatana* occurs in two stages which are *Beejavarta* and *Shuddhavarta*. *Beejavarta* indicates the melting of material and *Shuddhavarta* indicates the time for extraction of *Satva*. *Satva* of the different drugs is of different colours. The basic requirements for *Satvapatana* include *Satvayukta Dravyas, Dravaka Varga, Musha, Koshti* etc. *Satva* after extracting out is again subjected to *Shodhana, Mridukarana* and *Marana* processes to use for various therapeutic purposes. *Mridukarana* process is mentioned only in the case of *Abhraka Satvapatana.* Various uses of *Satvas* are mentioned in different classical texts such as *Abhraka Satva* for *Charan* and *Jarana* of mercury, *Makshika Satva* for *Dehaveda* and *Lohaveda, Tuvari Satva* for *Bandhana* of *Rasa* and *Uparasa, Tuttha Satva* and *Bhunaga Satva* for relieving pain, in wound healing etc. *Satvapatana* is an utmost process of *Rasashastra* not only for therapeutic uses but also for processing of mercury.

INTRODUCTION

Rasashastra is a specialized branch of Ayurveda that deals with pharmaceutical procedures of drugs of metallic, mineral and poisonous origin[1]. Every Substance in this universe is an *Aushadh* (drug). Before using that substance as an *Aushadh* (drug) it has to pass through various processes[2]. Several processes are mentioned in Rasashastra such as *Shodhana* (purification), *Marana* (incineration), *Amritikarana* (processing the incinerated ash to imbibe more qualities) etc. *Satvapatana* is one among those processes in which *Dravyas* are treated with *Kshara* (alkaline preparation), *Amla* (sour) and *Dravaka Gana* (*Gunja, Madhu*, *Guda, Ghrita*, *Tankana, Guggulu*) and subjected to heat by which the *Satva* or essence of the mineral is obtained[3,4,5]. Before using the *Satva* for medicinal purposes, it has to be subjected to other procedures such as *Shodhana* (purification) and *Marana* (incineration). The aim of *Satvapatana* is to obtain the active principle of the ore which is free from all blemishes and further use it for therapeutic application by minimizing the dose of *Dhatu* without decreasing its efficacy in treatment.

Access this article online
Quick Response Code
https://doi.org/10.47070/ayushdhara.v10iSuppl1.1151

Website: https://ayushdhara.in

History: The history of *Satvapatana* can be traced only in Rasashastra texts. In Rasendra Mangala, first time Acharya Nagarjuna depicted the process of *Satvapatana.* Different procedures of *Satvapatana* for

eight minerals (*Abhraka, Vaikranta, Makshika, Rasaka, Hartala, Manahshila, Vimala* and *Gandhaka*) are described in this text[6]. In Anandakanda thirty-six methods of *Satvapatana* are specified for thirteen minerals. In Rasarnava, descriptions of *Satvapatana* are found for nine substances (*Abhraka, Vaikranta, Makshika, Rasaka, Hartala, Shilajeet, Gairik, Saurashtri, Rajavarta*)[7]. 19 methods of *Satvapatana* are mentioned in Rasaratnakara[8] for thirteen minerals along with their different colours of *Satva*. Various references are also found in Rasa Hridaya Tantra, Rasendra Chudamani, Rasa Ratna Samucchayam and Rasa Tarangini.

Need of *Satvapatana*: *Vaikranta* (tourmaline), *Kantapashana* (ore of magnetic iron), *Sasyaka* (Bornite ore), *Makshika* (copper pyrite), *Vimala* (iron pyrite) etc. even after purification, without the *Satva* extraction they cannot be mixed with other *Satva* and *Dhatu* as well as even *Parada* (mercury) cannot consume it[9]. For *Charana* and *Jarana Samskara* of mercury, *Satvas* are specifically recommended. *Satva* is used in mercurial processing as minerals may contain impurities. *Abhrakasatva* is considered best for cutting the wings (*Pakshachhedana*) of mercury, making the mercury thermostable[10,11,12]. If any person desired to make it thermostable without cutting the wings of mercury, it's like getting *Moksha* (liberation) without having control over the senses[13]. *Satvas* are not only useful for mercurial processing but are equally useful for therapeutic purposes after subjecting them to *Shodhana* and *Marana.* These may prove therapeutically more effective than their minerals.

Stages of *Satvapatana*

Based on temperature, *Satvapatana* occurs in two stages which are *Beejavarta* and *Shuddhavarta*. In *Beejavarta* particular colour flame is produced for the particular material, indicating the melting of the material[14,15]. According to Ananadkanda, *Beejavarta* is also known as *Rekhavarta*[16]. As per Rasaarnav, different coloured flames are produced by different *Dhatus* at a particular temperature which are as follows:

Table No. 1. Different *Dhatus* with their particular flame [17] [18]

Sr. No.	*Dhatus*	Colour of Flame
1.	*Swarna* (gold)	*Peeta* i.e., yellow
2.	*Rajata* (silver)	*Seeta* i.e., white
3.	*Tamra* (copper)	*Neela* i.e., bluish
4.	*Tikshnaloha* (wrought iron)	*Krishna* i.e., black
5.	*Naag* (lead)	*Dhumaka* i.e., greyish black
6.	*Vanga* (tin)	*Kapota* i.e., bluish grey
7.	*Shilajit* (black bitumen)	*Dhusara* i.e., brown
8.	*Aayas* (iron)	*Kapila* i.e., brownish red
9.	*Ayaskanta* (magnetite)	*Dhumra* i.e., grey
10.	*Sasyaka* (blue vitriol)	*Lohita* i.e., red
11.	*Vajra* (diamond)	*Nanavidha* i.e., different colour
12.	*Abhraka* (mica)	*Pandu* i.e., red

In the *Shuddhavarta* stage, the fire ignites properly with the white colour flame. This is the time when the substance starts releasing its *Satva*[19,20,21,22]. *Shuddhavarta* is also known as *Lohavarta*[23,24].

General method for *Satva* Extraction:

Table 2. Methods of *Satvapatana* in different classical texts:

S. no.	Classical Text	*Bhavana Dravyas*
1.	Rasa Ratna Samuchaya[25]	*Suryavarta* (*Heliotropium indicum*), *Kadali* (*Musa paradisiaca*), *Vandhyakarkoti* (*Momordica dioica*), *Koshataki* (*Luffa acutangula*), *Suradali*, *Shigru* (*Moringa oleifera*), *Vajrakanda* (*Ampelocissus araneosa*), *Jalapippali* (*Phyla nodiflora*), *Kakamachi* (*Solanum nigrum*); then combining *Amla* (sour), *Kshara* (alkaline material)
2.	Rasa Amritam[26]	*Guda* (jaggery), *Tankana* (borax), *Guggulu* (Gum of Balsamo dendron Mukul), *Laksha* (lac) and *Sarjika* (alkaline material containing soda bi carb); triturated with goat's milk.

3.	Rasa Hridya Tantra[27]	*Guda* (jaggery), *Tankana* (borax), *Guggulu* (Gum of Balsamo dendron), *Oon* (wool of sheep); triturated with goat's milk

After combining with the *Bhavana Dravyas* and a bolus is prepared and subjected to heat by which the *Satva* is obtained

Basic Requirements for *Satvapatana*

A) *Satvayukta Dravyas*: Only those metals and minerals are used for *Satvapatana* which have *Satva* in them. *Satva* which is extracted can be either in metal form or in mineral form. There are different techniques for extracting different *Satva*. For e.g. Herbal extracts are obtained by crushing and macerating in water and then sedimentation. Metals with lower melting points or low vaporizing points, their *Satva* are extracted by sublimation e.g. *Parada*. Metals having higher melting points, their *Satva* are extracted by using *Dravaka gana.*

B) *Dravaka varga*[28]: *Dravaka Varga* is mentioned in the different texts of Ayurveda. These are *Gunja (Abrus precatorious), Madhu* (honey), *Guda* (jaggery), *Ghrita* (clarified butter), *Tankana* (borax) and *Guggulu* (Gum of Balsamo dendron)[29,30]. They help in extracting *Satva* from their source as they reduce the melting point of the material.

C) Heat: Generally, *Satvapatana* is done in a closed *Musha* by applying intense heat. It is not necessary that all the procedures require strong heat. It again depends upon the *Dravya* whose *Satva* is to be extracted such as *Tivragni* (high heat) is required for *Abhraka*, *Vaikranta*, *Makshika*, *Khadirangara* (heat with coals of *Khadira* plant) for *Rajavarta* (lapis lazuli[31]) etc. Acharyas have mentioned that Charcol of *Khadira* (*Acacia catechu*) and *Mahua* (*Madhuca longifolia*) plants are used for the *Satvapatana*[32,33].

D) *Musha*: *Musha* (crucibles) are containers which are inert and can also resist high temperatures. They are prepared with temperature-resistant organic and inorganic materials. There are different *Mushas* for different temperature patterns such as for the resistance of high-temperature *Vajra Musha* is used[34] whereas, for the extraction of *Satva* of *Kharparadi Dravyas*, *Vrintaka Musha* is opted[35].

E) *Koshti*: The fireplace is also important as it provides the necessary temperature required for *Satvapatana*. There are different *Koshtis* depending upon the nature of *Dravya* such as *Angara koshti*[36,37] is for *Satvapatana* of *Katina* (hard) *dravyas, Patala koshti*[38,39] for *Mridu* (soft) *dravyas* and *Gara koshti* is for *Mishra dhatu Satvapatana*.

Colours of *Satva*: Different *Rasa Dravyas* have a different colour of *Satva* which are as follow:

Table 3: Different *Rasa Dravyas* and Colours of their *Satva*[40]

Rasa Dravyas	**Colours of *Satva***
Abhraka (Mica)	*Lohanibha* (like *Loha*), *Swarnavarna* (colour of gold), *Kamsyanibha* (like bell metal)
Vaikranta (Tourmaline)	White like *Shankha* (chonch shell), *Kunda* and *Chandra* (moon)
Makshika (Chalcopyrite)	*Gunjanibha* (red colour)
Vimala (Iron Pyrite)	*Sisha sannibha* (white or greyish), *Chandrika Samkasaha* (white)
Adrija (Black bitumen)	*Lohasannibha* (like iron)
Sasyaka / Tuttha (Blue vitriol)	*Indragopa samkasha, Kinshukprabhama, Kirtundasaprabhama, Shobhanam, Tamrakam, Tamramayam, Tapayajsamam (Rakta & mridu), Shonitabindu, Shuka Picchanta, Kanchanbindhubhi, Tamrarupa* (red in colour[41])
Rasaka (Zinc ore)	*Sishopama, Vangabha* (white colour)
Hartala (Orpiment)	White
Gauripashana (White Arsenic)	White
Hingula (Cinnabar)	*Sutasamkasha* (White)
Mriddarashringa (Litharge)	*Nagasankasha* (like lead)
Bhunaga (Earthworms)	*AbharvataSatva (vyomvat), Sushobhanama, KharSatvama, Ravakana sukshmana, Nagatamra, Shonitabindu, Tamravata* (like copper)[41]
Mayurapiccha (Peacock's feathers)	*Nagatamra, Tamraabham, Tamravata Satvam* (like copper) [41]

Before using the *Satva* for medicinal purposes, it has to be subjected to procedures such as *Shodhana* (purification), *Mridukarana* (softening) and *Marana* (incineration).

***Shodhana* (Purification):** *Kach Lavana* (a type of salt), *Tankana* (borax) and *Shipra* (pearl) are called *Shodhaniya Gana*. The constituent of this *Shodhaniya Gana* help in the eradication of impurities of *Satvas* of *Rasa* and *Maharasa*[42]. The purification of *Abhraka satva* is done as *Loha Dhatu Shodhana* and the purification of *Swaranmakshika* (chalcopyrite) is same as *Tamra* (copper) *Dhatu Shodhana*. The *Satva* of *Kharpara* (zinc carbonate), *Hartala* (orpiment), *Manahashila* (reaglar), *Tutha* (copper sulphate) and *Kenchua* (earthworm) are purified by *Swedana* with *Kshara* and *Amla Dravyas* in *Dola Yantra* for one day[43]. *Gostani Musha* is used for melting and *Shodhana* of *Satvas*[44].

***Mridukarana* (Softening)[45]:** *Mridukarana* is mentioned in case of *Abhraka Satva. Mridukarana* of the *Satva* is done by treating them with *Madhu* (honey), *Taila* (oil), *Vasa* (fat) and *Ghrita* (clarified butter). In this, *Satva* is melted in *Musha* and quenched in *Madhu, Taila, Vasa* and *Ghrita.* Every time fresh *Ghrita, Taila, Vasa* and *Madhu* are taken. *Mridukarana* is mentioned before *Abharaka Satva Marana.*

***Marana* (Incineration):** After *Shodhana* and *Mridukarana* process, *Marana* of *Satva* is done to make it useful for therapeutic purposes. After *Marana, Satva Bhasma* acquires *Dehavaad* (making the body free from diseases and old age), *Dhatuvaad* (converting lower metals to noble metals) and *Chikitisavaad* (for medicinal purposes) properties.

Uses of *Satva*: *Abhraka Satva* is used for the purpose of *Rasa* and *Rasayana* (rejuvenator)[46] as well as in *Charan* and *Jarana* of mercury. In Rasa Ratna Samuchaya, it is mentioned that there is no other better substance in the world than *Abhraka Satva,* which is harmless, highly potent and superior in properties and effect. *Makshika Satva* for *Dehaveda* (making the body free from diseases and old age) and *Lohaveda* (converting lower metals to noble metals)[47], *Vimala Satva* when used with *Parada* acts as a good *Rasayana* (rejuvenate)[48]; *Rasaka Satva* is used for various purposes[49]. The *Satva* of *Tuvari* (alum) is used for the *Bandhana* of *Rasa* and *Uparasa* and also for *Kramana* (process of mercury)[50]. The *Satva* of *Gairika* (red ochre) mixes well with mercury and has more qualities[51] and the *Satva* of *Chapala* (Bismuth) for multiple effects. The *Mudrika* (ring) is prepared with *Tuttha Satva* (blue vitriol) and *Bhunaga Satva* (copper extracted from earthworms) when placed in water and when this water is taken internally, it is said to relieve *Shoola* (pain) and is also useful in curing *Charachara Visha* (poison), *Bhutadibhaya* (fear), *Netraruja* (pain in eyes), in wound healing etc.[52]

Various studies on *Satvapatana*:

A comparative pharmaceutical study on *Mridu* and *Khara Satva* w.s.r to *Tuttha*, *Mayura Piccha* and *Bunaga Satvapatana*[41]: The study revealed that for *Beejavarta* and *Shudhavarta*, *Tuttha* needed 1280°C and 1320°C temperature respectively, *Mayura Piccha* needed 1420°C and 1590°C temperature respectively whereas *Bhunaga* needed 1440°C and 1620°C temperature successively. The yield percentage of *Satva* is higher (5%) in *Tuttha*, while it is lower and lowest in *Mayura Piccha* (0.5%) and *Bhunaga* (1%) respectively.

Pharmaceutical study of *Kasis Satva*[53]: The study demonstrated that the maximum temperature required for *Kasisa Satva* is 1600°C. The percentage of iron in raw *Kasisa* was 20.88% and in *Kasis Satva* was 81.21%.

Pharmaceutico-analytical study of *Bhunaga Satva*[54]: The study displayed that in *Bhunaga Satva*, a high percentage of Fe (75.3%) along with Cu 18.8% and Zn 2 % was found.

Pharmaceutico-analytical study of *Tuttha Satva*[55]: The study showed that out of 120gm of the mixture compound of *Tuttha*, 20gm *Satva* was obtained. XRD revealed that 100% copper sulphate pentahydrate was detected in *Shudha Tuttha* and Cu-79%, Cu_2O-10% & Mn_2O_3-11% in *Tuttha Satva.*

Physicochemical analysis of *Shilajatu* (*Shodhita, Marita* and *Satwapathita*)[56]: Raw, *Shodhita, Marita* and *Satwapatita Shilajatu* all these four samples were subjected to organoleptic, physical constants, chemical, HPTLC, XRD and elemental analysis (XRF). The study showed that the colour of raw, *Shodhita* and *Marita* is shiny black and *Satwapathita* is black, odour- *Gomutra Gandi* (Raw and *Shodhita*) and odourless *(Marita* and *Satwapathita*), taste- Astringent (Raw and *Shodhita*) and tasteless (*Marita* and *Satwapathita*), touch- smooth (Raw, *Shodhita, Marita* and *Satwapathita*), Appearance- lump (Raw and *Shodhita*) and powder form *(Marita* and *Satwapathita*). On elemental analysis, elements like K, Ca, O, Cl, S, Na, Mg, Si, Al, Pb and oxides like K_2O, Cao, SO_3, MgO, Na_2O, Al_2O_3, SiO_3, P_2O_5, PbO, CuO, Cl were found in all the four samples. Cu is present in all samples except *Shodhita Shilajatu.* R*aw Shilajatu* showed the presence of Pd, Hg, Cr, Mo, Sr, *Shodhita Shilajatu*- Zn, *Marita Shilajatu*- Cu, AS_2O_3 and SO_3, *Satwapatita Shilajatu*- Cu, Ti and TiO_2. Pd, Hg, Cr, Sr, Mo were absent in *Shodhita whereas* Pd, Hg, Cr, Sr, Rb were absent in *Marita* and *Satwapatita Shilajatu.* XRD study showed a spherical shape (*Raw, Shodhita, Marita* and *Satwapathita*), Particle size for Raw *Shilajatu* (minimum 4.49µm and maximum 11.08µm),

Shodhita Shilajatu- (minimum 3.20µm and maximum 21.00µm), *Marita Shilajatu*- (minimum 18.59µm and maximum 64.80µm), *Satwapatita Shilajatu*-(minimum 5.11µm and maximum 19.07µm).

An *In-vitro* study on *Navasadara Satvapatana*[57]: *Navasadara Satvapatana* was subjected to organoleptic, physicochemical, quantitative analysis and anti-microbial study. The quantitative analysis of *Navasadara Satvapatana* showed the presence of NH_3 (3.68%), NH_4Cl (79.01%), Cl (48.65%), Ca (0.38%) and Silica (1.73%). The study also revealed that *Navasadara Satvapatana* showed significant anti-microbial activity against *S. aureus, E. coli, S. pneumonia* and *K. pneumonia.*

Studies on *Satva Bhasma*

Standard Manufacturing Procedure of *Makshika Satva Bhasma*[58]: The study showed that *Bharjana* of *Makshika* with *Nimbu Swarasa* was the most suitable method for *Shodhana*. Out of 1000gm of the mixture of *Shudh Makshika* (800gm) and *Shudh Tankana* (200gm), 185gm of *Satva* and 500gm of slag was obtained*. Marana* of *Makshika Satva* with *Kajjali* and Four *Puta* were given to make *Makshika Satva Bhasma.* The colour of *Makshika Satva Bhasma* obtained was black.

Standard Manufacturing Procedure of *Abhraka Satva Bhasma*[59]: The study demonstrated that the preparation of *Satva Bhasma* involved many procedures like *Shodhan* of *Abhraka,* extraction of *Satva*. *Pindikaranam, Satva Shodhana* and *Churnikaran*, *Satva Marana*. The method described in Rasa Tarangini was adopted for *Satvapatana* and *Satva Marana.* The total yield of *Satva* obtained was 10% from its raw material. There was 2.5% weight gain in *Satva* after *Shodhana.* There are two methods for *Satva Marana* in Rasa Tarangini and both were adopted. There was 31.66% of weight gain in *Satva* in *Satva Bhasma* after *Kupi Paka* process and no significant weight gain in *Satva* after the *Puta Paka* process. The colour of *Abhraka Satva Bhasma* obtained was light *Ishtika Varna.*

Preparation and Physicochemical analysis of *Rasaka Satva Bhasma*[60]: Atomic Absorption spectrophotometry of *Rasaka Satva Bhasma* showed that Zn (58.08%) is the main content in *Rasaka Satva Bhasma.* Other elements include *Na* (1.06%), K (0.87%), Fe (1.24%).

The effect of *Bhasmas* of *Makshika* and *Makshika Satva* on the blood profile of Rabbits[61]: The study showed that both *Bhasmas* has a significant effect on haemoglobin level. TLC, DLC, SGOT and SGPT all have shown changes within the normal parameters.

Modern techniques of metal extraction: In modern science, *Satvapatana* is compared with metallurgy. There are different phases involved in metal extraction. These phases are Concentration, Calcination, Roasting, Reduction to free metal and Refining/Purification.

1. **Concentration of ore-** The concentration of ore, also known as dressing, benefaction or ore enrichment, is the process of removing gangue particles from ore in order to enhance the percentage of metal in the ore. There are various processes for the concentration of ore such as hand picking, gravity separation, magnetic concentration, electrostatic concentration and froth flotation process.
2. **Calcination:** It is a process of heating of ore to a high temperature below its melting point in the absence or in a limited quantity of air. Organic matter, moisture and volatile impurities such as carbon dioxide and sulphur dioxide are expelled from the ore.
3. **Roasting:** Ore is heated to a high temperature below its melting point in the presence of excess air. Moisture escapes and impurities of sulphur, arsenic, phosphorus are oxidized to volatile oxides.
4. **Reduction to free metal:** Reduction of metal oxides means the removal of oxygen to refine the metal to its free state. There are some methods for refining of the metal such as smelting, heating in air, reduction by aluminium, electrometallurgy, amalgamation method and hydrometallurgy.
5. **Refining/Purification**: Refining is method of removing impurities in order to obtain metals of high purity. Various methods of refining are liquation, distillation process, electrolytic refining, vapour phase refining etc.

DISCUSSION

Satvapatana is one of the salient processes of Rasashastra for achieving the *Satva* (essence) of metals and minerals from their original source. *Satvas* are not only useful for mercurial processing but are also useful for therapeutic purposes after subjecting them to *Shodhana*, *Mridukarana* and *Marana. Satvapatana* occurs in two stages which are *Beejavarta* and *Shuddhavarta*. *Beejavarta* indicates the melting of material and *Shuddhavarta* indicates the time for extraction of *Satva*. For the extraction of *Satva*, the amount of heat required and the type of *Mushas* used depends upon the nature of *Dravya.* Different *Dravyas* exhibit different coloured *Satvas.* These *Satvas* possess various uses such as *Abhraka Satva* is used as *Rasayana*, *Mudrika* (ring) prepared with *Tuttha Satva* and *Bhunaga Satva* are used to relieve *Shoola*, in *Netraruja*, in curing *Charachara Visha* (poison) etc. Before using the *Satva* for therapeutic purposes, it has to be subjected to procedures such as *Shodhana*

(purification), *Mridukarana* (softening) and *Marana* (incineration).

For the extraction of *Satva,* Acharyas have mentioned *Dravaka Gana* which includes *Gunja (Abrus precatorious), Madhu* (honey), *Guda* (jaggery)*, Ghrita* (clarified butter), *Tankana* (borax) and *Guggulu* (Gum of Balsamo dendron). In this, *Tankana* (borax) act as a flux which helps in the formation of slag as well as reduces the melting point of the metal. During reduction, a substance called flux is added to the ore which combines with impurities to form an easily fusible product known as slag which is called *Kitta* in Ayurveda. Poling is a method used to purify metals that have oxidized impurities. In the past, trees are used as wooden poles. The sap in these poles acts as a reducing agent. The metal oxides that are formed are reduced by reacting with hydrocarbon gases that are liberated*. Guggulu* which is a plant material could help to accelerate this process. The organic compounds like *Guda* and certain organic acids of *Gunja* are turned to carbon in their purest form which further acts as reducing agents. Organic acids of *Gunja* might also act as catalysts because its extracts are thermostable. *Kasisa* is ferrous sulphate on being heated first losses its water then it melts and get converted to anhydrous Ferrous sulphate. On further heating, it get converted into ferric oxide which is red in colour which exactly look like *Kasisa Bhasma* to avoid this formation we need to use carbon, the reason behind it carbon is more reactive than iron so it displaces iron from iron compounds. *Bhavana* of *Dravakagana* is given to get organic carbon to *Kasisa*, so it would not react with oxygen and would restrict the formation of *Bhasma*. So, addition of *Dravakagana* is most important thing in pharmaceutical study of *Kasisa Satvapatna*.

In modern science, *Satvapatana* is compared with metallurgy. But the aim of *Satvapatana* is entirely different from the aim of metallurgy. *Satvapatana* aims at extracting therapeutically active material whereas metallurgy aims at extracting the purest form of metal for commercial purposes.

CONCLUSION

Every science matures when it achieves an understanding of its basic phenomena. *Satvapatana* is a process of extraction of essence from its original form. *Satvas* are used for mercurial processing as well as for therapeutic purposes. These may prove therapeutically more effective than their minerals. Thus, *Satvapatana* is an extensive area which needs to be further explored.

REFERENCES

1. Ranade AV, Acharya R. Arka and its pharmaceutical attributes in Indian alchemy (Rasashastra): A comprehensive review. International Journal of Ayurvedic Medicine. 2015 Sep 1; 6(4): 280-8.
2. Shastri K.N, Vidyotini Hindi commentary on Charka Samhita of Agnivesha revised by Charka and Dridhbala, Chaukhambha Publications, New Delhi, Edition 8th, 2004, Part 1, Chapter 26, Verse 12, P 335.
3. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 8, Verse 34, P 151.
4. Shastri R.K, Anandakandam, Published under the Authority of Government of Madras, 1952, Chapter 25, Verse 36, Page No. 485.
5. Shastri K.N, Rasatarangini written by Sadanand Sharma, Motilal Banarasidas, Delhi, Chapter 2, Verse 32, P 17.
6. Sharma H.S, Hindi commentary on Rasendra Mangala of Nagarjuna, Part First, Chaukhambha Orientalia, Varanasi; 2003, Edition 1st, Chapter 2, Verse 18-36, Page No. 34-40.
7. Tripathi I.D, Rasachandrika Hindi Commentary on Rasaarnav or Rasatantram, Chowkhambha Sanskrit series office, Varanasi, Edition Fourth; 2001, P 66, 87, 89.
8. Mishra S.N, Shashiprabha Hindi Commentary on Rasaratnakara by Nityanath Siddha, Chaukhambha Publishers, Varanasi, Edition Second; 2003, Chapter 13, P 192- 211.
9. Shastri D.R, Hindi commentary on Rasa Hridya Tantram of Govind Bhagavat Pada, Chaukhambha Publishers, Varanasi; 2014, Chapter 10, verse no. 1, P 133.
10. Mishra G.S, Hindi commentary on Ayurveda Prakasha of Acharya Shri Madhava, Chaukhambha Bharati Academy, Varanasi, Reprint 2014; Chapter 1, verse no. 248, P 126.
11. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 16, Verse no. 4, Page No. 311.
12. Shastri D.R, Hindi commentary on Rasa Hridya Tantram of Govind Bhagavat Pada, Chaukhambha Publishers, Varanasi; 2014, Chapter 4, verse no. 3, P 60.
13. Shastri D.R, Hindi commentary on Rasa Hridya Tantram of Govind Bhagavat Pada, Chaukhambha Publishers, Varanasi; 2014, Chapter 4, verse no. 4, P 60.
14. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 8, Verse 57, P 154.

15. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 4, Verse 80, Page No. 53.
16. Shastri R.K, Anandakandam, Published under the Authority of Government of Madras, 1952, Chapter 25, Verse 79, P 490.
17. Tripathi I.D, Rasachandrika Hindi Commentary on Rasaarnav or Rasatantram, Chowkhambha Sanskrit series office, Varanasi, Edition Fourth; 2001, Chapter 4, Verse no. 49-51, P 51.
18. Mishra G.S. and Sharma S.K, Suvariti Hindi commentary on Rasakamadhenu by Shri Chudamani Mishra, Chaukhambha Orientalia, Varanasi, Edition third; 2007, Part First, Chapter 2, Verse 14-16, P 68.
19. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 8, Verse 56, P 154.
20. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 4, Verse 79, Page No. 52.
21. Shastri R.K, Anandakandam, Published under the Authority of Government of Madras, 1952, Chapter 25, Verse 78, P 489.
22. Shastri K.N, Rasatarangini written by Sadanand Sharma, Motilal Banarasidas, Delhi, Chapter 2, Verse 41, P 19.
23. Tripathi I.D, Rasachandrika Hindi Commentary on Rasaarnav or Rasatantram, Chowkhambha Sanskrit series office, Varanasi, Edition Fourth; 2001, Chapter 4, Verse no. 49-51, P 52
24. Mishra G.S. and Sharma S.K, Suvariti Hindi commentary on Rasakamadhenu by Shri Chudamani Mishra, Chaukhambha Orientalia, Varanasi, Edition third; 2007, Part First, Chapter 2, Verse 20, P 69.
25. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 3, Verse 118-119, P 63.
26. Joshi D. and Rao G.P, Rasamritam of Vaidya Yadavji Trikamji Acharya, Chaukhambha Sanskrit Bhawan, Varanasi; Edition second, Appendix 7, P 282.
27. Shastri D.R, Hindi commentary on Rasa Hridya Tantram of Govind Bhagavat Pada, Chaukhambha Publishers, Varanasi; 2014, Chapter 10, verse no.14, P 139.
28. Agnihotri Pradeep, Chemistry of Satvapatana, International Journal of Applied Ayurved Research, 2015, Vol 1, Issue 10.
29. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 9, Verse no. 30, Page No. 133.
30. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 10, Verse 95, P 201.
31. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 4, Verse 11, P 87.
32. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 8, Verse 36, P 141.
33. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 4, Verse no. 41, Page No. 44.
34. Shastri K.N, Rasatarangini written by Sadanand Sharma, Motilal Banarasidas, Delhi, Chapter 3, Verse 8-9, P 29.
35. Shastri K.N, Rasatarangini written by Sadanand Sharma, Motilal Banarasidas, Delhi, Chapter 3, Verse 19-20, P 32.
36. Shastri K.N, Rasatarangini written by Sadanand Sharma, Motilal Banarasidas, Delhi, Chapter 3, Verse 28, P 33.
37. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 5, Verse no. 133, Page No. 63.
38. Shastri K.N, Rasatarangini written by Sadanand Sharma, Motilal Banarasidas, Delhi, Chapter 3, Verse 31, P 34.
39. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 5, Verse no. 137, Page No. 64.
40. Hussain G. Concept of Satvapatana: a review. Journal of Drug Delivery and Therapeutics. 2019 Jan 15; 9(1): 271-2.
41. Patel MK, Archana, Lalchand, Parhate S, A comparative pharmaceutical study on Mridu and Khara Satva w.s.r to Tuttha (Mridu) Mayura Piccha and Bunaga (Khara) Satvapatana, IAMJ: Volume 6, Issue 7, July – 2018
42. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 9, Verse no. 28, Page No. 132.

43. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chintamani written by Dhundhuk Nath, Chaukambha Orientalia, Varanasi, 2006, Chapter 6, Verse 18, Page No. 72.
44. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 5, Verse no. 90, Page No. 90.
45. Mishra S.N, Sidhiprada Hindi Commentary on Rasendra Chudamani, Chaukhambha Orientalia, Varanasi, Reprint 2017, Chapter 10, Verse no. 46, Page No. 145.
46. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 2, Verse 39-44, P 25.
47. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 2, Verse 90, P 31.
48. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 2, Verse 105-108, P 33.
49. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 2, Verse 169-172, P 42.
50. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 3, Verse 64, P 52.
51. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 3, Verse 50, P 49.
52. Kulkarani D.A, Vigyana Bodhini Hindi commentary on Rasa Ratna Samuchayam, Mehar Chand Lachhmandas Publications; New Delhi, Reprint 2020, Chapter 2, Verse 140-141, P 38.
53. Kailas VK, Arati VD. Pharmaceutical study of Kasisa Satva. Journal of Ayurveda and Integrated Medical Sciences. 2020 Feb 29; 5(01): 81-6.
54. Patel MK, Parhate S. A Pharmaceutico-Analytical Study of Bhunaga Satva. Journal of Ayurveda and Integrated Medical Sciences. 2018 Jun 30; 3(03): 79-85.
55. Patel MK, Archana, Lalchand, Parhate S, A Pharmacetico-analytical study of Tuttha Satva, International Journal of Creative Research Thoughts (IJCRT), Volume 6, Issue 2 April 2018.
56. Sarashetti RS. Physico Chemical Analysis of Shilajatu (Shodhita, Marita and Satwapathita). International Journal of Ayurveda and Pharma Research. 2022 Apr 5: 16-25.
57. Raghuveer, Dindore P.P., Nageswara Rao V., Gavimath C.C., Navasadara Satvapatana: An In-Vitro study, International Research Journal of Pharmacy, 2012 April, 3[4].
58. Singh S, Dwivedi LK, Gupta RK, Rana S, Standard manufacturing procedure of Makshika Satva Bhasma, International Journal of research in Ayurveda and Pharmacy, 2015 Jan; 6(1): 43-46.
59. Singh S, Rana S, Standard manufacturing procedure of Abhraka Satva Bhasma, International Journal of Pharmacy and Pharmaceutical Research, 2 016 January, Vol 5, issue 2.
60. Kadam SA. Kadam AA, Inamdar S, Preparation and Physicochemical analysis of Rasaka Satva Bhasma, Indian Journal of Research, 2021 June, Vol 10, Issue 06.
61. Choudhary AK, Dixit SK. The effect of Bhasmas of Makshika and Makshika Satva on the blood profile of rabbits. Ancient Science of Life. 1997 Oct; 17(2): 83.

Cite this article as:
Sheenam Rani, Usha Sharma, Shuchi Mitra, Khem Chand Sharma. Review on Satvapatana: A Process of Essence Extraction. AYUSHDHARA, 2023;10(Suppl 1):105-112.
https://doi.org/10.47070/ayushdhara.v10iSuppl1.1151
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Sheenam Rani
P.G Scholar,
P.G. Department of Rasa Shastra & Bhaishajya Kalpana,
Uttarakhand Ayurved University, Rishikul Campus, Haridwar,
Email: josansheenam416@gmail.com
Contact no: 7888561430