



A CRITICAL REVIEW OF SATVAPATANA ACCORDING TO VARIOUS RASASHASTRA TEXTS

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ABSTRACT

INTRODUCTION: *Satvapatana* process is rarely used now a days due to the availability of metals in pure forms. However, it would be highly recommended to prepare *Bhasma* from *Satva* obtained from their respective ores. The difference between modern metallurgy and traditional *Satvapatana* is studied to note the difference between *Satva* and extracted pure metal. In order to achieve this, thorough knowledge about *Satvapatana* and various processes of *Satvapatana* has to be enlightened. Apart from the common *Satvapatana* method, special methods of extraction from various minerals have been mentioned in various *Rasashastra* texts. This information needs to be gathered and studied in order to utilize this very effective process for the extraction of *Satva*. In this present study, *Satvapatana*, various processes of *Satvapatana* of different ores, properties of various *Satvas* as well as modern metal extraction techniques and chemistry of *Satvapatana* will be discussed. **AIM:** To study the concept of *Satvapatana* according to various *Rasashastra* texts. **MATERIALS AND METHODS:** Various *Rasashastra* texts, modern chemistry books, various research articles, and internet content related to the topic have been carefully studied. **CONCLUSIONS:** The traditional *Satvapatana* process is different from the modern

metal extraction technique because the extracted *Satva* is a pharmacologically active substance whereas pure metal extracted from metallurgy is inactive. The *Satvas* extracted from the *Satvapatana* process should be used to prepare *Bhasmas*.

Keywords: *Satvapatana*, *Satva*, Metallurgy, *Bhasma*

INTRODUCTION

Rasashastra, the Indian Alchemy has mentioned various processes like *Shodhana*, *Marana*, *Amruthikarana*, *Lohitakarana*, and *Satvapatana*, etc. for the preparations of metals, minerals, gemstones, etc. In ancient times, metals were extracted by the process of *Satvapatana* i.e., the extraction of *Satva* from ores. The *Satvapatana* process is rarely used now a days due to the availability of metals in pure forms. However, it would be highly recommended to prepare *Bhasma* from *Satva* obtained from their respective ores. In order to achieve this, thorough knowledge about *Satvapatana* and various processes of *Satvapatana* has to be enlightened. The difference between modern metallurgy and traditional *Satvapatana* is studied to note the difference between *Satva* and extracted pure metal. Apart from the common *Satvapatana* method, special methods of extraction from various minerals have been mentioned in various *Rasashastra* texts. This information needs to be gathered and studied in order to utilize this very effective process for the extraction of *satva*. In this present study, *Satvapatana*, various processes of *satvapatana* of different ores, properties of various *Satvas* as well as modern metal extraction techniques and chemistry of *Satvapatana* have been discussed.

History – *Satvapatana* was first described by *Acharya Nagarjuna*. Thereafter many *Rasagrantha* mentioned the *Satvapatana* process as follows –

*Rasendramangal*¹ = 8 procedures of *Satvapatana* for different minerals.

*Anandakanda*² = 36 procedures for 13 minerals

*Rasarnava*³ = procedures for 9 minerals

*Rasaratnakara*⁴ = 19 procedures for 13 minerals

Definition – *Satvapatana* can be defined as the process of extraction of *Satvas* from minerals by heating the crucibles containing the mixture of mineral ores

and *Kshara*, *Amla*, and *Dravaka Dravyas* with the help of *Koshtis*⁵.

Classification –

I. On basis of Origin =

1. Mineral – *Abhraka*, *Vaikranta*
2. Animal – *Bhunagasatva*, *Mayurapiccha*
3. Herbal – *Guduchi satva*

II. On basis of Source = 1. *Dhaturupa* (metallic form) e.g. *Abhraka Satva* 2. *Adhaturupa* (non-metal form) e.g. *Hartala*, *Manashila*

**Essential Components for *Satvapatana* of *Rasadra-
vyas* –**

1. Raw materials:

**a) *Rasadra-
vyas* containing *Satva*:** Metals and minerals containing *Satva* are selected for the *Satvapatana* process. The process to extract *Satva* differs according to the mineral source. Different techniques have been mentioned in various *Rasashastra samhitas*.

b) *Dravaka varga*⁶ (Drugs inducing *Satvapatana*): The drugs from *Dravakagana* and *Mitrapanchaka* are used in the process of *Satvapatana*, these include *Gunja*, *Guda*, *Guggulu*, *Ghrita*, *Madhu*, *Tankana*. They are useful in the extraction of *Satva* from its mineral.

c) Heat: Heating is done in closed *Musha* by application of intense heat. However, the intensity of heat depends upon the nature of the *Dravya* whose *Satvapatana* is to be done.

d) *Musha* (Crucibles): *Musha* is a container in which the *Satvapatana* process is carried out. Different types of *Mushas* according to the intensity of heat required are mentioned in *Ayurvedic Samhitas* e.g. *Vajra Musha* for intense heat and *Samanya Musha* for relatively less heat. *Musha* is prepared from organic and inorganic materials which are temperature resistant. In short, *Mushas* are inert in nature i.e., they do not interfere in the process.

e) **Koshti (Furnace):** As seen above, the amount of heat is an important factor in the process of *Satvapataana* hence, the *Koshti* used becomes an essential factor too as it provides the required amount of heat

e.g. *Angara koshti*= for *Kathina dravyas* and *Patalakoshti*= for *Mridu dravyas*.

Shuddhavarta Lakshanas⁷: *Rasarnava* has mentioned the characteristics of flames that are seen during the extraction of *Satvas*.

Name of <i>Satva</i>	Nature of Flames
<i>Swarna satva</i>	Yellow
<i>Rajata satva</i>	White
<i>Tamrasatva</i>	Bluish
<i>TeekshnaLohasatva</i>	Black
<i>Naga satva</i>	Black
<i>Shilajatusatva</i>	Grey
<i>Lohasatva</i>	Kapila
<i>Sasyakasatva</i>	Red

Various methods of Satvapataana :

Sr.No.	Name of <i>Rasadravya</i>	<i>Satvapataana</i> process	<i>Satva</i> Obtained	Characteristic of <i>Satva</i>
1.	<i>Abhraka</i>	(Method 1) ⁸ - (a) <i>Dhanyaabhraka</i> 1 part + <i>Tankan</i> ¼ parts (b) <i>Musali swaras bhavana</i> (c) Dough is made (d) It is dried and heated in a crucible. (Method 2) ⁹ - (a) <i>Abhraka</i> + <i>Kasmarda</i> + <i>Musta</i> + <i>Dhanyaka</i> + <i>Vasa</i> + <i>Punarnava</i> + <i>Matsyakshi</i> + <i>Hansapadi Swaras Bhavana</i> (b) dough is made and dried (c) each 1/8-part <i>Godhumchurna</i> + <i>Kshudramatsya</i> + <i>Tankan Mardana</i> and dried (d) <i>Panchaaja</i> + <i>Panchagavya</i> + <i>Panchamahish Bhavna</i> (e) <i>Tindukaakara Golak</i> is made &dried. (f) Heated in the crucible	<i>Loha</i> (Iron)	<i>Pandur</i>
2.	<i>Vaikranta</i> ¹⁰	(a) <i>Sh.Vaikranta</i> powdered + <i>Dravakagana</i> (b) <i>Chakrikas</i> are made and dried (c) Heated in the crucible for 1 <i>Ghatika</i> (48minutes)	Aluminium	<i>Shweta</i>
3.	<i>Makshika</i>	(Method 1) ¹ (a) <i>Shu. Naag</i> 1 part is liquefied and <i>Shu. Makshika</i> 30 parts are added as <i>prakshepa</i> (b) To this powder <i>Kshaartraya</i> is added + <i>Amlvarga Dravya Bhavana</i> . (c) Dough is made and dried (d) heated in a crucible. (e) <i>Tamra varna satva</i> obtained (f) <i>Dhavana</i> with <i>Nirgundi Swarasa</i> to remove excess <i>Naga dhatu</i> . (Method 2) ¹² (a) <i>Madhu</i> , <i>Eranda taila</i> , <i>Gomutra</i> , <i>Goghrita</i> , <i>Kadali Kanda Swaras 7 Bhavanas</i> each to <i>Shu. Makshik</i> (b) Dough is made and dried (c) heated in a crucible	Copper	<i>Tamra varna</i> <i>Shulbanibha</i>

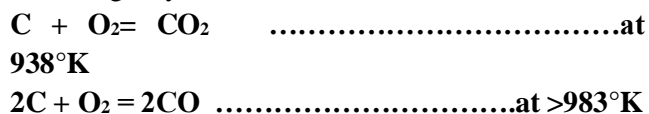
4.	Vimala	(Method 1) ¹³ (a) <i>Shu. Vimala churna + Tankan</i> equal parts + <i>Meshshrungi Lakucha Swaras Bhavana</i> (b) The above mixture is applied on the inner surface of the crucible (c) On drying mouth of the crucible is closed and heated in 6 <i>prastha</i> (768 gms) coal. (Method 2) ¹⁴ (a) <i>Shu. Vimala + Shu. Kankshi + Shu. Kasisa + Shu. Tankana + Vajrakanda Shigru Kwatha Bhavana, Kadali Swaras + Mokshak Kshar</i> (b) <i>Chakrikas</i> are made and heated in a crucible.	Iron	<i>Chandrarkasankasham</i>
5.	<i>Shilajatu</i> ¹⁵	(a) <i>Shu. Shilajatu + Dravaka Gana + Amla varga Dravya Bhavana</i> (b) <i>Chakrikas</i> are made and dried (c) The above mixture is heated in the crucible (coal).	Iron	<i>Lohavarnasaman</i>
6.	<i>Sasyak</i>	(Method 1) ¹⁶ (a) <i>Shu. Sasyak</i> 1 part + <i>Tankan</i> ¼ th part (b) Soaked in <i>Karanja taila</i> for one day (c) Heated in crucible (Method 2) ¹⁷ (a) <i>Shu. Sasyak</i> 1 part + ¼ part <i>Tankan</i> (b) <i>Nimbu Swaras Bhavana</i> (c) Dough is made and dried (d) Heated in the crucible. 3. <i>Bhunagsatwapatan</i> ^{18,19} - I) Method I (a) <i>Bhunag</i> 1 part + <i>Bhrungraja Swaras + Nimbu swaras + Nirgundi Swaras</i> each 3 days <i>Bhavana</i> . (b) <i>Dravaka Varga Bhavana</i> . (c) <i>Chakrikas</i> are made and dried. (d) Heated in the crucible for two <i>yama</i> (48 min). Addition of 1/12 part of <i>Tamra</i> . (e) Self Cooling and <i>Kanji Prakshalan</i> . II) Method II (a) <i>Bhunag Bharjan + Haridra Churna</i> Equal part + <i>Guda + Guggulu + Laksha + Urna + Matsya + Pinyak + Tankan</i> (b) Dough is made & dried (c) Heated in crucible 4. <i>Mayurpiccha satwa</i> (a) <i>Mayurpiccha + Goghruta</i> equal part (b) Heated Ash of <i>Mayurpiccha + Guda + Guggulu + Urnaanshu + Tankan + Sajjikshar + Madhu + Gunja + Matsya + Pippali + Laksha + Goghruta</i> equal part (c) Dough is made & dried. (d) Heated in the crucible.	Copper Copper Copper Copper Copper	<i>Indragopsaman</i> <i>Tamravarna</i> Tamravat Tamravat Tamravat
7.	<i>Kharpara</i>	(Method 1) ²⁰ (a) <i>Shu. Kharapara, Lak-</i>	Zinc	<i>Vangakruti</i>

		<p>shaChurna, Guda, Rajiaka Churna, Haritaki Churna, Haldi Churna, Sarjaras Churna & Tankan equal part + 1-part Goghruta + Godugdha 8 part (b) heated in a crucible. (Method 2)²¹</p> <p>(a) Shu. Kharpara 1 part + Haldi, Triphala, Saindhav, raal, Gruhadhoom, Bhallataka, Tankan each ¼ parts (b) Mardana with Kanji/Nimbu swaras (c) paste is applied on the inner surface of Vrunataka Musha (d) mouth of Musha is closed (e) Heat is given and the process is repeated 3-4 times (f) Blue flame disappears. (Method 3)²² (a) Shu. Kharpara 1 part + Haritaki, Shilajatu/Laksha, Bhunaag, Haridra, Gruhadhoom, Tankan each ¼ parts mardana is done (b) Heated in Andhamoosha.</p>		
8.	Gairika ²³	Shu. Gairik + Kshara / Amla dravya Swedana in Dolayantra.	Iron	
9.	Kasisa ²⁴	Process done as per Kankshi Satvapataana. (a) Shu. Kasisa + ¼ (Tankana + Yavakshara + Sajjikshara) (b) Mardana with Nimbu Swarasa. (c) The dough is made and dried. (d) Heated in Crucible.	Iron	
10.	Kankshi	(Method 1) ²⁵ Shu. Kankshi + Kshara and Amlavarga Dravya Mardana. (Method 2) ²⁶ (a) Shu. Kankshi + Gopitta 100 Bhavanas (b) Heated in the crucible to obtain Satva	Aluminium	Satva is useful in the Parada Kramana process.
11.	Hartala	(Method 1) ²⁷ (a) 1 pala Shu. Hartala + Arka dugdha Bhavana for 1 day and dried (b) 1 tola Tila oil is added and mardana is done. (c) Filled in Kachakupi and heated in Valukayantra for 7 prahara. (d) Satva obtained at bottom of Kupi.	Arsenic	Shweta varna satva
12.	Manashila	(Method 1) ²⁸ (a) 1-part Manashila + 1/8 parts Mandura, Guda, Guggulu, and Ghrita are grounded together (b) Mass is kept in Koshti and heated. (Method 2) ²⁹ (a) Equal quantities of Manashila + Bhunaag satwa + Tankana and Madanphala are ground together. (b) Karvellakapatra Swaras Bhavana is given and dried. (c) Heated in the crucible. (Method 3) ³⁰ (a) Shu. Manashila + Kshara /Amla Mardana (b) Dried and kept in the	Arsenic	

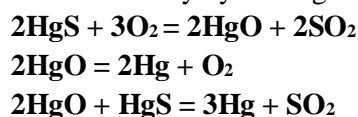
		crucible (c) Heated in the crucible for 2 Ghatika.		
13.	Anjana ^{31,32}	Satvapatana process done according to Satvapatana process of Manashila. (a) 1 part Anjana + 1/8 parts Mandura, Guda, Guggulu, and Ghrita are grounded together (b) Mass is kept in Koshti and heated. Strotonjana Satvapatana is done according to Rajavarta. (a) Strotonjana and Manashila are taken in equal quantity and mardana is done with Ghrita (b) Cooked with buffalo milk (c) Cooked along with Tankana and Panchagavya and made into a ball and heated in a fire made of Khadira wood.	Antimony	
14.	Gauripashana	Satvapatana is done according to Satvapatana process of Hartala. (a) 1 pala Shu. Gauripashana + Arkadugdha bhavana for 1 day and dried (b) 1 tola Tila oil is added and mardana is done (c) Filled in Kachakupi and heated in Valukayantra for 7 prahara (d) Satva obtained at bottom of Kupi.	Arsenic	Shubhra Satva is obtained.
15.	Navsadar ³³	(a) Shu. Khatika 3 Parts + Navasadar 4 parts (b) Heated in Damaruyantra		
16.	Hingula ³⁴	(a) Shu. Hingula is heated in Adhapatana yantra (b) Satva is collected in water and kept in a lower vessel.	Mercury	Sutasankasham

Chemistry of Satvapatana³⁵ :

1. Role of Dravakavarga – Tankana acts as "flux" which helps in the reduction of the melting point of the metal and also in the formation of slag. The flux combines with the impurities to form an easily fusible product known as "Slag". Guggulu is a plant material that can be used as a "Poling" agent. Due to poling agents metal oxides that are formed are reduced by reacting with hydrocarbon gases that are liberated. Certain organic compounds like Guda and organic acids like Gunja are turned to carbon which acts as reducing agents. Carbon reacts with oxygen in the following ways –



Below 983°K carbon monoxide is a better-reducing agent than carbon. However, above this temperature, the reduction of carbon becomes more favorable. The organic acids like Gunja act as a catalyst as the extracts of Gunja are thermo stable. Some metal reduction reactions don't require reducing agents because the cations of the least electropositive metals may be reduced without the use of any reducing agents. This is called Auto reduction or Air reduction e.g., extraction of Mercury by heating Cinnabar.



In modern metallurgy, reducing agents are selected depending on the method of metal extraction by calculating the free energy change of reactants and reducing agents.

2. Role of Heat – Mostly intense heat is given for the extraction of metals. However, the nature of heat depends upon the *Dravyas* used in *Satvapatana*. Specially prepared containers called *Musha* are used for the heating process which resists high temperatures. They are prepared from different temperature-resistant organic and inorganic materials. The fireplace or *Koshti* is equally important in the *Satvapatana* process as it is necessary for providing adequate temperature.

Modern metal extraction techniques –

1. Concentration of Ore – Hand picking, gravity separation technique, magnetic concentration, electrostatic concentration, and Froth floatation process are various methods used in the concentration of ore.

2. Calcinations – The process to expel moisture, organic matter, volatile matter, etc.

3. Roasting – Process to oxidize the ores.

4. Reduction to free metal – Smelting, Air heating, Reduction by Aluminium, Amalgamation method, Electrometallurgy, Hydrometallurgy.

5. Refining or Purification – Liquefaction, Distillation, Electro refining, and oxidation process.

Difference between Satvapatana and Metallurgy:

1. *Satvapatana* aims at extracting the therapeutically active material whereas metallurgy aims at extracting the purest form of metal i.e., elemental purity is the criteria.

2. The properties of live metal (*Jivayukta*) i.e., therapeutic properties are obtained from the ores in the *Satvapatana* process whereas in metallurgy the metal obtained is therapeutically dead.

The general purification method of Satvas: The *Samanyashodhana* of all *satvas* is done by triturating with *Nimbuswaras* and *Ardrakaswaras* for 3 days each.

DISCUSSION

Satvapatana is a unique but very important process in *Rasashastra*. However, it is a neglected topic by Ayurved students as many *Rasashastra* scholars think that it is an outdated process as pure metals are easily obtained in the market nowadays. However, the process of *Satvapatana* differs from modern metallurgy

i.e., *satva* is a completely different concept as compared to free metals. *Satva* obtained is a therapeutically active material whereas metal is a therapeutically inactive material. Also, the process of obtaining *Satva*, its characteristics, and purification methods are required to be studied in detail. A literature study was carried out to put light on the *Satvapatana* process of various minerals and also the characteristics of obtained *Satvas*. The study of Modern metallurgy indicates clear differentiation between *Satva* and free metal. However, there is further scope for the study of the concept of *Satvapatana*. The Pharmaceutico-analytical properties of the same product *satva* obtained from different *Satvapatana dravyas* can be studied. Also, the comparative therapeutic study of *Bhasmas* prepared from pure metals and extracted *Satvas* can be done to look at the probable differences in the properties.

CONCLUSION

1. The *Satvapatana* process aims at the extraction of the pharmacologically active substance from the ore rather than the pure metal.
2. The *Satvapatana* process has been neglected for years by *Rasashastra* scholars. It is necessary that the topic should be unveiled and brought into light in years to come.
3. The different *Satvas* are extracted from their respective ores by the typical *Satvapatana* process.
4. *Satvapatana dravyas*, *Dravakagana Dravyas*, *Musha*, and *Koshti* are the essential components of the *Satvapatana* process.

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