

A COMPARATIVE PHARMACEUTICAL STUDY ON MRIDU AND KHARA SATVAPATANA W.S.R. TO TUTTHA (MRIDU) MAYURA PICCHA AND BHUNAGA (KHARA) SATAVPATANA

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ABSTRACT

Various pharmaceutical procedures i.e. *Shodhana* (Purification), *Marana* (Incineration), *Satvapatana* (Extraction of metal from mineral) etc. converts deadly toxic mineral, metallic substances into safe and potent therapeutic agent. *Satvapatana* is well described pharmaceutical process. The main aim of *Marana* & *Satvapatana* is to enhance the properties of the drug. This study aims to pharmaceutical approach of *Tuttha*, *Mayura Piccha* and *Bhunaga Satvapatana* according to *Rasatarangini*. And to evaluate the temperature and fuel needed in which *Tuttha*, *Mayur picccha* and *Bhunaga* gives the features of *Bijavarta* and *Shuddhavarta*. For *Tuttha Satvapatana* quantity of fuel consumption is comparatively less while in *Mayura Piccha* high and in *Bhunaga Satvapatana* fuel consumption is comparatively higher for one attempt of procedure. For *Bijavarta* and *Shuddhavarta Tuttha* needed 1280⁰C and 1320⁰C respectively and only one attempt needed for *Satvapatana*. While for same *Mayura Piccha* needed 1420⁰C and 1590⁰C respectively and two attempt needed for *Satvapatana* and *Bhunaga* needed 1440⁰C and 1620⁰C respectively for same features and two attempts were needed for *Satvapatana*. *Bhunaga* & *Mayura Piccha Satva* (denoted *Khara Satva*) obtained by 2 repeated attempt of *Satvapatana*. In *Khara Satva* where *Satva* may not obtain in one attempt, the finished product is triturated again with subjected drugs & heated. Comparatively yield percentage of *Satva* is higher (5%) in *Tuttha*, while it is lower and lowest in *Mayura Piccha* (0.5%) and *Bhunaga* (1%) respectively.

Keywords: *Satvapatana*, *Tuttha*, *Mayura Piccha*, *Bhunaga*.

INTRODUCTION

Development of Pharmaceutics in the field of Ayurveda found the use of formulations of metals, Minerals and Animal Origin in *Ayurvedic* therapeutics in the form of *Bhasmas*, *Satva*, *Satva Bhasmas* Different types of Metal, Mineral, Animal Origin and

gems need to undergo a processing called *Marana* & *Satvapatana*. The main aim of *Marana* & *Satvapatana* is to enhance the properties of the drug, to induce new properties, to bring out the *Atyanta Sukshmatva* i.e. finest form of *Bhasma* and pure

form *Satva* and to bring *Guna Vishishtatva*. *Satva* denoted “purity, literally, existence, reality” and brightness. *Satvapatana* is an important process which applies after *Shodhana*. So various trace elements are added and molecular changes have been seen in the particular drug during the procedure of *Shodhana* to *Satvapatana*. To obtain the metallic part from the Minerals/Ores/Compounds with the help of *Dravaka Gana* by strong heating in *Koshthi* (Specially prepared Fired place), here *Satvapatana* is Smelting process¹. According to *Rasaratna samucchya* any mineral compound, animal origin or any ore is mixed and rubbed with the drugs prescribed in *Kshara Varga*, *Amla Varga* and *Dravaka Varga*. Then it is kept in a closed crucible and heated intensively, in a *Koshthi* (furnace). By this, the metallic essence portion of that compound can be obtained, which is nothing but *Satva*². After *Satvapatana* potency of these drugs remains for longer period. *Satva* requires minimal dose & easy for administration. *Abhraka Satva* form is eight time more potent than *Abhraka Patra* form³. In context of *Tamra Rasatarangini* and *Rasaratna samucchya* have been mentioned about *Sasyaka*, *Mayura Piccha* and *Bhunaga Satvapatana*. All main classics of *Rasashastra* have mentioned that copper is obtained as a *Satva* from *Tuttha*, *Mayura Piccha* and *Bhunaga Satvapatana*. Their *Satva* may be used as a source of *Tamra*. *Tuttha*, *Mayura Piccha* & *Bhunaga Satva* denoted as *Tamravatam* or *Tamrarupam* in various *Rasa* classics.

Satva is said to be two types: Metallic and Herbal. *Rasaushashi* (*Jangama* and Mineral drugs) contains metallic *Satva* while *Kashtha Aushadhi* contains herbal *Satva*. The process of *Satvapatana* always needs strong heat but some drugs releases their essence in low temperature. So according to time, temperature and fuel needed for *Satvapatana*, Metallic *Satvapatana* is divided in two types – *Mridu* and *Khara*.

i. Mridu Satva – The drug which releases their *Satva* in low temperature (below 1000°C like *Tuttha*)

ii. Khara Satva – The drug which releases their *Satva* in very High Temperature above 1300°C and need repeated attempt e.g. *Bhunaga* and *Mayura Piccha* etc [4].(R.R.S.5/224)

In present study *Tuttha* is mineral ore for *Satvapatana* while *Bhunaga* and *Mayura Piccha* are animal origin. Procedure of *Satvapatana* including *Satvanam Mridukarnam*, and important of *Satvapatana* is described in *Rasratna Samucchya* but exact time of heating, amount of fuel, temperature and how much quantity of *Satva*/percentage of yield is not mentioned.

Aim and Objectives

1. To pharmaceutical approach of *Tuttha*, *Mayura Piccha* and *Bhunaga Satvapatana* according to *Rasa Tarangini*.
2. To evaluate the temperature in which *Tuttha*, *Mayur piccha* and *Bhunaga* gives the features of *Bijavarta* and *Shuddhavarta*.
3. To evaluate the amount of fuel needed for *Tuttha*, *Mayura Piccha*, *Bhunaga Satvapatana*.
4. To evaluate the percentage yield of *Satva*.
5. To compare pharmaceutical differences between *Mridu* (*Tuttha*) and *Khara* (*Mayura Piccha* and *Bhunaga*) *Satvapatana*.

Material and Method

Apparatus for Satvapatana:- *Rasa* classics have mentioned *Andha musha* [closed crucible] and *Angar Koshthi* for *Satvapatana* but *Rasaratnakar* in *Bhunaga Satvapatana* also a reference of *Chhidra musha* and *Patal Koshthi* was found. Among them *Andha musha* and *Satvapatana Koshthi* [*Angar Koshthi*] can be considered better for the *Satvapatana* where intensively strong heating is needed. Use of *Andha musha*, the coal derived from the wood of *Madhuka* and *Khadira*, *Angar Koshthi* and *Vanknaala* (blower) is appropriate to get intensively strong heat which is need to obtained *Satva*. Materials mostly used for *Satvapatana* are *Kshar Varga*, *Amla Varga* and *Dravak Varga*, *Una* [wool]

and small fishes were collected from local market. All pharmaceutical procedures are as follows:

1. *Tuttha nirmalikaarana* (*Rasataragini*-21:73-75)
2. *Tuttha shodhan* (*Rasataragini* -21:106-107)
3. *Tuttha Satvapatana* (*Rasataragini* -21:137-138)
4. *Mayura Piccha Satvapatana* (*Rasataragini* -17:123-12)
5. *Bhunaga Satvapatana* (*Rasataragini*-17:116-118)

1. *Tuttha Nirmalikaarana*

250 ml of warm water was required for *Nirmalikaarana* of 500 gm of *Tuttha*, this process was completed in 2 days and obtained bright shiny, dark-blue colour of *Nirmalikaarana* *Tuttha* in crystal form, weight was 480gm. *Nirmalikaarana* process was done by using boiling and filtration method [yield 96%].

2. *Tuttha Shodhana*

Impure *Tuttha* [500gm] was weighed and triturated for 1st *Bhavana*, 370 ml of lemon juice was added cautiously, the paste was subjected for continuous trituration and same process was repeated for 5 times and total 10 hour *Bhavana* were given in 5 days. 810 ml lemon juice required for total procedure. Process was done by using *Bhavana* and *Mardana* method and obtained dull blue colour of *Shuddha Tuttha* in smooth and powder form with smell of lemon juice, weight was 640gm (yield 128%).

3. Ball [*Pinda/Vataka*] formation for *Tuttha Satvapatana*

Shuddha Tuttha and *Ashuddha tankana* weighed equally (each 300gm). 600gm of mixture triturated with lemon juice, for 1st *Bhavana* 400ml of lemon juice was added cautiously, the paste was subjected for continuous trituration and same process was repeated for 3 times and total 06 hour *Bhavana* was given in 03 days, 700 ml lemon juice required for total procedure. Process was done by using *Bhavana* and *Mardana* method and obtained whitish blue colour of smooth paste with smell of lemon weight was 710gm (yield 118.33%), ball (*Pinda /Vataka*) was made by above mixture and completely dried in next one day.

4. *Tuttha Satvapatana*

Pinda of *Tuttha* [400gm] was kept in closed crucible, crucible and lid dish sealed by mud and clay, after drying this was kept in mid part of *Koshthi* between fuels for strong heating, after total liquefying of ball, (time taken 7.30hour product was taken out, the product was found deposited mostly at the bottom and very little in surrounding of crucible, had crystalline like appearance which contain shiny particle, weight was 120gm [24%], grinding of finished product in stone motor and pestle was done and weight of shiny particle which had metallic property weight was 10gm. Graphical presentation of Temperature pattern of *Tuttha Satvapatana* is shown in Fig.1.

5. *Mayura Piccha Jarana*

120gm of *Mayura Piccha Varti* made by using of 60gm of *Mayura Piccha* & 60gm of *Ghrita*, this was fired in an iron pot, black colour of oily-sticky powder obtained with having foul smell, weight was 45gm (yield 37.5%), the procedure was completed in 30 min. Process was done by using *Jarana* method.

6. Ball [*Pinda/Vataka*] formation for *Mayura Piccha Satvapatana*

200gm of *Mayura Piccha Masi* triturated with 200gm of subjected drugs (jaggery, *Guggul*, *Tankana*, sesame oil cake, wool and dried small fish) cautiously mixture was subjected for continuous trituration for two days (6hour), obtained dark blue colour of smooth paste of mixture, weight was 390gm. (yield 97.5%) Process was done by using *Bhavana* and *Mardana* method. Ball made by paste & completely dried in next 2 days.

7. *Mayura Piccha Satvapatana*

390gm of *Mayura Piccha Masi Pinda* [mixture along with *Satvapatana* drugs] kept in closed crucible, crucible and lid dish sealed by mud and clay, after drying this was kept in mid part of *Koshthi* between fuels for strong heating, after stoppage of liquefying of mixture (time taken 7.30hour tem. 1590°C) crucible left for self-cooling (21hour). Graphical presentation of Temperature pattern of *Mayura Piccha Satvapatana* is shown in Fig.2.

Result: For *Satvapatana* total 150 gm of mixture/compound was taken. Total 10 mg of *Satva* (essence) was obtained. It means percentage yield was 20.5%. After that finished product was taken out, finished product was found deposited mostly at the bottom and very little in surrounding. looked like ash and no any *Satva* like particle present, so procedure was again repeated with above ash, and finally the finish product had crystalline like appearance which contained shiny particle, grinding of finished product in stone mortar and pestle was done and weight of shiny particle which had metallic appearance was 1gm. *Satvapatana* was done by using extraction method with applying strong heating.

8. *Bhunaga Masi* formation /*Jarana*:-

3.6 kg of *Bhunaga* burnt in an iron pot and obtained black colour of smooth powder *Masi*, weighed was 600 gm this process is completed in 30 minutes process was done by using *Jarana* method [yield 16.7%] cause of weight loss of *Bhunaga* is due to animal origin and has very higher percent of water.

9. Ball [*Pinda/Vataka*] formation for *Bhunaga Satvapatana*:-

400gm of *Bhunaga Masi* triturated with subjected *Satvapatana* drugs [jaggery, *Guggul*, *Tankan*,

sesamum oil cake, Wool, dried small fishes] cautiously the mixture was subjected for continuous trituration for 2 days [6 hour] obtained darken black colour of smooth paste of mixture weight was 390gm [yeild 97.5%], process was done by using *Bhavana* and *Mardana* method ball made by the paste and complete dried for next 2 days.

10. *Bhunaga Satvapatana*-

390gm of *Pinda* of *Bhunaga Masi* mixture kept in closed crucible, crucible and lid dish sealed by mud and clay after drying this was kept in mid part of *Koshthi* between fuels for strong heating after liquefying of most part of ball (time taken 7.30hour tem.1620°C) where it stopped to melt crucible left for self-cooling (21hour) after this finished product was taken out, finished product was found deposited mostly at the bottom and very little in surrounding of crucible looked like ash and no any *Satva* like particle present so procedure was again repeated with above ash and finally found the finish product had crystalline like appearance which contain shiny particle weight of 110gm [yield 29%], grinding of finished product in stone mortar and pestle was done and shiny particle which had metallic appearance, weight was 2gm.

Observation

A comparative graphical presentation of temperature pattern of *Mridu* and *Khara Satvapatana* are shown in Fig.1, 2 & 3.

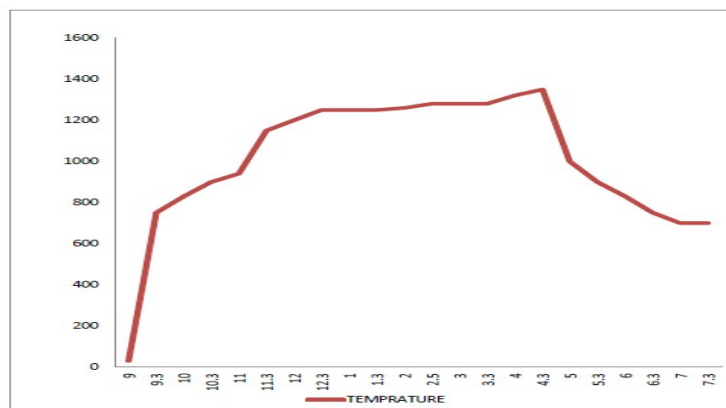


Fig.1: Graphical presentation of Temperature pattern of *Mridu (Tuttha) Satvapatana*

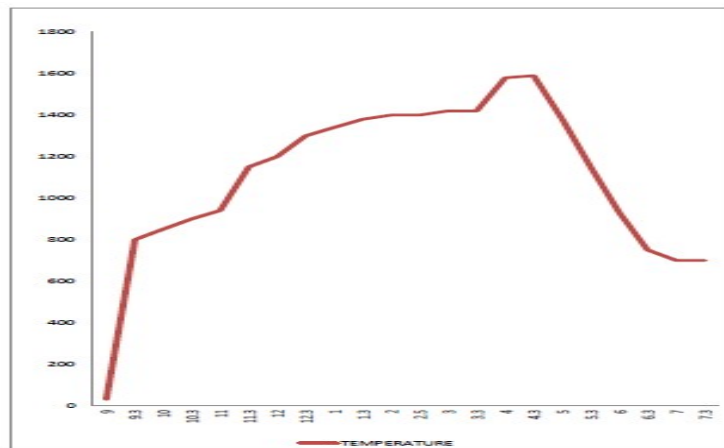


Fig.2: Graphical presentation of temperature pattern in *Mayura Piccha Satvapatana*

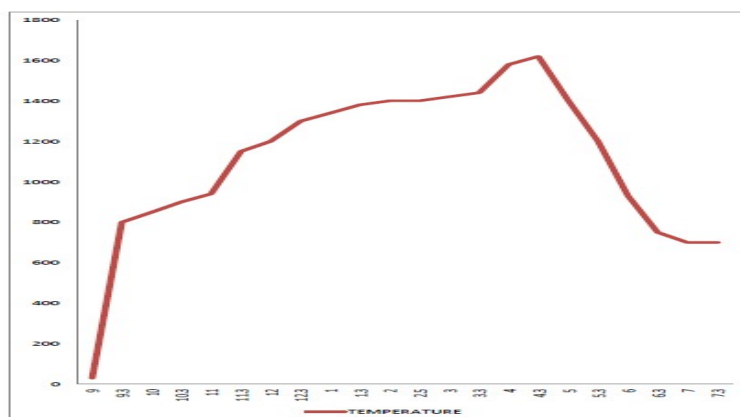


Fig.3: Graphical presentation of temperature pattern in *Bhunaga Satvapatana*

Table 1: Comparison of fuel quantity used for one attempt of procedure

Types of fuel	Quantity used in <i>Tuttha Satvapatana</i>	Quantity used in <i>Mayura Piccha Satvapatana</i>	Quantity used in <i>Bhunaga Satvapatana</i>
Mine Coal	20 Kg	30 Kg	38 Kg
Cow dung	6 Kg	8 Kg	8 Kg
Wood Coal	4 Kg	6 Kg	8 Kg
Wood	4 Kg	4 Kg	4 Kg
Total quantity	34 Kg	48 Kg	58 Kg

Table 2: Comparative observation of pharmaceutical process

S.No.	<i>Tuttha Satvapatana</i>	<i>Mayura Piccha Satvapatana</i>	<i>Bhunaga Satvapatana</i>
1.	Yellowish fumes started coming out at 830° c after 1 hour of procedure, which stop to come out in next 1 hour.	Blackish fumes started coming out after 1 hour of procedure at the temperature of 850°c, which stop to come out in next 1.30 hour.	Blackish fumes started coming out after 1 hour of procedure at the temperature of 850°c, which stop to come out in next 1 hour.

2.	After 2.30 hour of procedure mixture became semi solid at the temperature of 1130°C -1250°C	After 3.30 hour of procedure mixture became semi solid at the temperature of 1300°C -1380°C.	After 3.30 hour of procedure mixture became semi solid at the temperature of 1300°C - 1380°C
3.	After 5 hour crucible seen red hot at the temperature of 1260°C	After 5 hour crucible seen red hot at the temperature of 1400°C	After 5 hour crucible seen red hot at the temperature of 1400°C
4.	After 5.30 hour smelling started and blue flame appeared [<i>Bijavarta</i>] at 1280°C	After 6.30 hour of procedure smelting started and blue flame appeared at 1420°C [<i>Bijavarta</i>]	After 6.30 hour of procedure smelting started and blue flame appeared at 1440°C [<i>Bijavarta</i>]
5.	After 7 hour white flames appeared at the temperature of 1320°C	After 7 hour white flames appeared at the temperature of 1580°C	After 7 hour white flames appeared at the temperature of 1580°C
6.	After 7.30 hour of procedure mixture completely melt and white flame increased (<i>Shuddhavarta</i>) at the temperature of 1350°C	After 7.30 hour of procedure white flame increased (<i>Suddhavarta</i>) and the mixture mostly melt and now stop to melt at the temperature of 1590°C	After 7.30 hour of procedure white flame increased (<i>Suddhavarta</i>) and the mixture mostly melt and now stop to melt at the temperature of 1620°C
7.	Time for self-cooling of crucible, 18 hour	Time for self-cooling of crucible, 21 hour	Time for self-cooling of crucible, 21 hour
8.	<i>Satva</i> obtained in one attempt	<i>Satva</i> obtained in two attempt	<i>Satva</i> obtained in one attempt

Table 3: Comparison of yield percentage of *Satvas*

Raw drug	<i>Shuddha Tuttha</i>	<i>Mayura Piccha Masi</i>	<i>Bhunaga Masi</i>
Quantity	200gm	200gm	200gm
<i>Satva</i> obtained	10gm	1gm	2gm
%	5%	0.5%	1%

Table 4: Appearance and Color of *Tuttha*, *Mayura Piccha* and *Bhunaga Satva* in classics

<i>Tuttha Satva</i>	<i>Mayura Piccha Satva</i>	<i>Bhunaga Satva</i>
<i>Indragopasamkasham</i> (R.A. 7/42, R.R. 13/74, R.R.S. 2/133, A.K. 2/255)	" <i>Nagatamra</i> " (R.P. 13/51-52, B.R.R.S. 114)	<i>AbharvataSatva</i> (<i>vyomvat</i>) (R.R. 16/2, 4,5,7,10)
<i>Tamrarupam</i> (R.P.S. 5/77, R.R.S. 2/134)	" <i>Tamravata Satvam</i> " (A.P. 4/51-52, Y.R. page 164)	<i>Sushobhanama</i> (R.R. 16/8, 12)
<i>Kinshukprabhama</i> (R.R. 13/52)	" <i>Tamraabham</i> " (R.T.17/117-118)	<i>KharSatvama</i> (R.R.S. 5/224)
<i>Kirtundasaprabhama</i> (R.R. 13/55, A.T. 4/55, B.R.S.)		<i>Ravakana sukshmana</i> (R.R.S. 5/230)
<i>Shobhanam</i> (R.R. 13/74, B.R.S.)		<i>Nagatamra</i> (B.R.R.S.)
<i>Tamrakam</i> (A.P. 4/44)		<i>Shonditabindu</i> (A.P. 4/56)
<i>Tamramayam</i> (B.R.R.S.)		<i>Tamravata</i> (A.P. 4/52, B.R.S.)
<i>Tapayajsamam</i> (Rakta & mridu)		<i>AbharvataSatva</i> (A.K. 2/228-229)

(R.H.T. 10/9&11)		
Shoditabindu(A.P. 4/56)		
ShukaPicchanta(A.K. 2/251-252)		
Kanchanbindhubhi (A.K. 2/251-252)		

DISCUSSION

For *Tuttha Satvapatana* quantity of fuel consumption is comparatively less while in *Mayura Piccha* high and in *Bhunaga Satvapatana* fuel consumption is comparatively higher for one attempt of procedure. As described in Table No.1. For *Bijavarta* and *Shuddhavarta Tuttha* needed 1280⁰C and 1320⁰C respectively and only one attempt needed for *Satvapatana*. While for same *Mayura Piccha* needed 1420⁰C and 1590⁰C respectively and two attempt needed for *Satvapatana* and *Bhunaga* needed 1440⁰C and 1620⁰C respectively for same features and two attempts were needed for *Satvapatana* which is shown in Table No.2. Comparatively yield percentage of *Satva* is higher in *Tuttha*, while it is lower and lowest in *Mayura Piccha* and *Bhunaga* respectively. As observed in Table No.3. Appearance and color of these three *Satav's* are like to *Tamrarupam*, *Tamramayam*, *Raktabham* and *Indragopasamkasham* same as denoted in discussed classical references.(Table No.4)

CONCLUSION

Satvapatana is such procedure which is performed by strong heating temperature because of All *Rasa Aushadhi* gives their metallic essence after their melting points. The additional drugs (*Satvapatana* drugs) having *Ushna*, *Snigdha*, and *Khara Guna* with Insulating and the Binding properties which help in *Satvapatana*. Homogenous trituration is allowed by *Khara* and *Snigdha Guna*. *Pinda* formation is allowed by *Snigdha* and the binding properties. Strong heating is allowed by Insulating property and *Ushna Guna*. In *Satvapatana*, time of heating ,number of heating amount of fuel and temperature is not mentioned by *Rasacharya* may be due to variations in drugs but to observe of *Satvapatna* some features are clearly mentioned which indicates

sign of obtaining *Satva* i.e. *Bijavarta*, *Suddhavarta* and *Ekkoliska*. *Mridu Satva (Tuttha Satva)* is obtained easily by one process. *Bhunaga & Mayura Piccha Satva* (denoted *Khara Satva*) obtained by 2 repeated attempt of *Satvapatana*. In *Khara Satva* where *Satva* may not obtain in one attempt, the finished product is triturated again with subjected drugs & heated by using blue lamp or with Gas welding apparatus facilitate to obtain *Satva* easily with better yield. In present study we obtained *Satva* as a bright shiny particle immersed in Glass/plastic like crystal structure. We may facilitate the *Satvapatana* process by using closed crucible with a small hole in center; it allows coming out of fumes and for observing of *Bijavarta & Suddhavarta*.

REFERENCE

1. Sastry Kashinath. Rasatarangini. 11th ed. Delhi: Motilal Banarsidas; 1979. pp.17.
2. Sastry Ambikadatta. Rasaratna Samuchchaya. 10th ed. Varanasi: Chaukhambha Amarabharati Prakashan; 2015, pp.151.
3. Mishra Chaturbhuj. Rasahridaya tantra. 1st ed. Ajmer: Krishna Gopal Ayurved Bhavan; 1958, pp.148.

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