Preparation of *Vaikrant Sattva* and its Physico-Chemical Analysis

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**ABSTRACT**

*Rasa Shastra* is the science having the twin aim of attaining *Deha siddhi* and *Loha siddhi*, but in the due course of time, this science has become more oriented towards *deha siddhi* and for the therapeutic purpose. *Vagbhat* in his comprehensive compilation *Rasa Ratna Sammucchhay* has accredited second place to *Vaikrant* amongst the eight *rasas*. Amongst various types of *vaikrant*, *Krishna vaikrant* is used for *deha siddhi*. Even though the *sattva* bears more potency than *bhasma*, the actual usage of *sattva* in clinical practice is rare. This arouses a dire need to study the preparatory methods of *sattva* and its physico chemical analysis along with its merits and demerits.

**KEYWORDS**

*Vaikrant, Sattvapatan, Black Tourmaline, Vaikrantsattva, Krishna Vaikrant*
INTRODUCTION

Rasa Shastra is a multifacetal spiritual science which virtually means the “science of rasa”. Rasa Shastra is the science having the twin aim of attaining Deha siddhi and Loha siddhi, but in the due course of time, this science became more oriented towards deha siddhi and for the therapeutic purpose. Vagbhat in his comprehensive compilation Rasa Ratna Sammuchhay has accredited second place to Vaikrant amongst the eight rasa. Vaikrant gains its name from the fact that it can produce vikruti in loha. Enumerating the virtues of Krishna Vaikrant it is mentioned as dehasiddhikaram krishna. The bhasma, sattva and druti of various rasa-dravyas are utilized for the accomplishment of deha siddhi (medicinal use). In the present era, more focus is laid on the manufacturing process of bhasma and its application. And the other basic siddhantas of sattva, bija and druti remain unexplored. Even though the sattva bears more potency than its counterpart, the actual usage of sattva in clinical practice is rare. So far numerous studies have been done on Vaikrant bhasma but its sattva remains unexplored.

Study of the Rasa texts in chronological order reveals that the earlier rasa texts like Rasendra Mangal, Rasa Hriday Tantra, Rasarnav have given more importance and explained sattvapatan procedure in detail as compared to the marana procedure. While the texts written in 12th century like Rasendra Chudamani, Rasa Prakash Sudhakar, Goraksha Samhita has imparted equal importance to marana samskar and sattvapatan. Compilation works done thereafter in 15th century gradually showed more inclination towards marana procedure and the sattvapatan was not much explained. This arouses a dire need to study the preparatory methods of sattva and its merits and demerits. Also the pharmaceutical applications and the utility of sattva need to be studied. This experimental study is a humble effort to boost use of Vaikrant sattva in practice.

AIM

Preparation of Krishna Vaikrant sattva.

OBJECTIVES

1) Identification of the Krishna Vaikrant.
2) To study Krishna Vaikrant sattvapatan procedure.
3) Physico- chemical analysis of Krishna Vaikrant.
4) Physico- chemical analysis of Krishna Vaikrant sattva.
MATERIALS

a. Literature review of Vaikrant, sattva, sattvapatan procedure from authentic rasashastra texts. Table 1.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name Of Texts</th>
<th>References</th>
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<tbody>
<tr>
<td>1.</td>
<td>RasendraMangal</td>
<td>2/23-25</td>
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<tr>
<td>2.</td>
<td>Rasarnav</td>
<td>6/134-136</td>
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<td>3.</td>
<td>Rasa RataSammuchay</td>
<td>2/69-71</td>
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<td>4.</td>
<td>Rasa Ratakar-RiddhiKhanda</td>
<td>13/63,64-66,67-69,70</td>
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<td>5.</td>
<td>Rasa HridayTantra</td>
<td>10/4-5</td>
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<tr>
<td>7.</td>
<td>Anandakanda</td>
<td>8/182-184,185,186,187</td>
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<td>9.</td>
<td>RasendraChudamani</td>
<td>10/66</td>
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<td>10.</td>
<td>Ayurveda Prakash</td>
<td>5/171,172-173</td>
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<tr>
<td>11.</td>
<td>Rasa PrakashSudhakar</td>
<td>5/66-69</td>
</tr>
<tr>
<td>12.</td>
<td>Bruhat Rasa Raj Sundar</td>
<td>Pg 209</td>
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</tbody>
</table>

b. Shodhita Krishna Vaikrant sample (Black Tourmaline)\(^5\). Figure No.1, Figure No.2.

c. Shuddha Rakta Gunja seeds, Shuddha Guggulu, Shuddha Tankana, Goghrila (cow ghee), Madhu (honey), Guda (jaggery).

d. Koshti for hatagni (tivragni) was built using fire bricks and fire clay; electric blower (was attached to the koshti). The dimensions of koshti used for sattvapatan of Krishna Vaikrant sample:

i. Circumference of koshti = 60 inches

ii. Outer diameter of koshti = 19 inches

iii. Inner diameter of koshti = 10 inches

iv. Depth of koshti (within) = 33 inches

v. Depth upto iron rods (within) = 24 inches

e. Vajra Musha (crucible), pair of tongs.

METHODS

This experimental study includes two parts as:-

1. Pharmaceutical study
2. Analytical study

1. Pharmaceutical study:-

a. Collection and authentication of materials.

i. Authentication of Shodhita Krishna Vaikrant, Shodhita Tankana, Shodhita Guggulu, Shodhita Rakta Gunja seeds collected from our L.K.R.A.M. college pharmacy was done by the Rasashastra and
Bhaisjya kalpana dept. and Dravyaguna dept. of L.K.R.A.M.college.

ii. The sample of Krishna Vaikrant i.e., black tourmaline was authenticated again from the dept. of geology.

b. Sattvapatan of Krishna Vaikrant, that includes -

i. Preparation of dravakagana7: Figure 3.

Table 2 “Ingredients of Dravakagana”

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<tr>
<th>Sr.No.</th>
<th>Ingredient</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>1.</td>
<td>ShodhitaRaktagunjha (Botanical name: Abrusprecatorius Linn., Family: Leguminosae- Papilionatae, Part used: Seeds)</td>
<td>40 gms</td>
</tr>
<tr>
<td>2.</td>
<td>ShodhitaGuggulu (Botanical name: Commiphoromukul Engl., Family: Burseraceae, Part used: Gum Resin)</td>
<td>40 gms</td>
</tr>
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<td>3.</td>
<td>ShodhitaTankana (Borax, Latin name: Sodium pyro borate, Chemical formula:Na2B4O7·10H2O)</td>
<td>40 gms</td>
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<tr>
<td>4.</td>
<td>Goghruta (Cow Ghee- Clarified butter)</td>
<td>40 gms</td>
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<td>5.</td>
<td>Guda (Jaggery)</td>
<td>40 gms</td>
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<tr>
<td>6.</td>
<td>Madhu (Honey)</td>
<td>40 gms</td>
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Procedure:

1. Shuddha Gunja and Shuddha Tankana were grounded to a mixture.
2. This mixture was taken in khalwayantra and guda was added to this and triturated until properly mixed.
3. Then Shuddha Guggulu was added and triturated until it was properly mixed.
4. Afterwards Goghrita and Madhu were added to this mixture and triturated to obtain a soft paste like consistency.

ii. Krishna Vaikrant sattvapatan procedure as per R.R.S 2/728: Figure No.4.

Reference: R.R.S. 10/95

Material: Khalwayantra, Steel plates, Spoon, Measuring glass, weighing machine.

Ingredients: Table No.2

Figure 3 “Dravakagana”

Figure 4 “Sattvapatan in koshti with thermocouple”

Reference:

“Sattvapatanayogenmarditaschavatikrutah Mushastoghatikadhatovaiyakrantaksatvautsr ujer” [R.R.S. 2/72]

Material: Khalwayantra, Musha, Stainless steel spoons, Steel plates, Weighing machine.
machine, Coal, Long iron pair of tongs, Electric blower, Thermocouple

Ingredients:
1. Shodhita Krishna Vaikrant (Black tourmaline) = 200gms
2. Dravaka Gana = 200gms

Procedure:
1. The Shodhita Krishna Vaikrant in the above quantity and equal quantity of Dravaka Gana was added in khalwayantra and trititerated to mix them well.
2. Then chakrika were prepared from the mixture and weighed.
3. Afterwards the chakrika were kept in musha.
4. In the koshti 1 kg charcoal was placed over the iron rods and saw dust was sprinkled over it and set on fire.
5. With the help of electric blower the fire was augmented.
6. Then slowly 3 kg of coal was added into the koshti, which begun to burn briskly within 5 minutes.
7. The musha was then kept in burning coal in koshti for 24 mins in such a way that the burning coal does not mix with contents of musha.
8. At the end of 24 minutes the musha was taken out of koshti with the help of long iron tongs and allowed to cool.
9. When the musha attained room temperature, the contents within the musha were scrapped and collected in steel vessel.
10. The collected scrapped material was separated into sattva, kita and ash and stored in separate containers for analysis. The sattva was collected according to the sattva grahya lakshana. Table no.3

Observations:
1. Thermocouple used in the practical had its upper limit of 1400°C.
2. After 2 mins of musha’s placement in koshti, the temperature rose upto 1050°C.
3. Then after within another 1-2 min, musha with its contents appeared red hot in colour and the contents within musha began to melt from the periphery.
4. Within 6-8 min, smelting process begun in musha. Figure 5.

Table 3 “Grahya sattva lakshana”

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name Of Text</th>
<th>Reference</th>
<th>SattvaLakshana</th>
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<tbody>
<tr>
<td>1.</td>
<td>Rasa HridayTantra</td>
<td>10/5</td>
<td>Sphulingaakara, Muktikarptraaya, LohaNibhama</td>
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<td>2.</td>
<td>Rasarnav</td>
<td>6/136</td>
<td>Indragopasama</td>
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Figure 5 “Koshti with sattva smelting from Krishna Vaikrant chakrikas”
2. **Analytical study:** This includes Physico-chemical analysis of *Krishna Vaikrant* and *Krishna Vaikrantsattva*.

A. **Physical analysis:**

- Megascopic Examination of Crude Krishna Vaikrant sample:
  - Colour = Black
  - Streak = Colourless
  - Luster = Vitreous
  - Diaphanity = Opaque
  - Cleavage = Rhombohedral; Difficult
  - Fracture = Uneven to subconchoidal
  - Hardness = 7 to 7.5
  - Form = prismatic crystals three-sided in cross section, with Hexagonal prism and trigonal prism, terminated by trigonal pyramid; hemimorphic; needle like radiating groups of crystals.
  - Crystal system = Hexagonal, trigonal (rhombohedral) division
  - Class = Ditrigonal – pyramidal, hemimorphic
  - Type Mineral = Tourmaline
  - Occurrence = In pegmatite, in association with quartz, feldspar, mica etc., collected from Kadaval.

- **Organoleptic tests:** Table No.4

B. **Chemical analysis:** Table No.5

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<th>Table 4 “Organoleptic tests results”</th>
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<th>Table 5 “Chemical analysis results”</th>
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Sample 1: Crude Vaikrant Sample
Sample 2: Shodhit Vaikrant Sample
Sample 3: Vaikrant Sattva Sample-I (small shining balls of metals)
RESULTS

a) Physical Analysis:
As per the grahya lakshana of Vaikrant sattva mentioned in classical texts, we have found the following observations in our practical:

- **Grahya lakshanas** observed in obtained Krishna Vaikrant sattva were: Muktanikarpraay, rajatvadbhavet. Figure no.6.
- The obtained sattva was shining silvery white ball-like structures and the raw tourmaline was blackish smooth hexagonal structure.

b) Chemical Analysis:

1. **Moisture Content:** The moisture content of raw Krishna Vaikrant sample was 0.34%, after shodhan it increased to 0.62% and after sattvapatan the moisture content reduced considerably. In **sattva** (small shining metal balls) it was 0.29%, in **kitta** it was 0.27% and in the **sattvapatan** ash it was least 0.23%.

2. **Ash content:** The ash content of raw Krishna Vaikrant was 95.12%, shodhita Krishna Vaikrant showed 94.78% ash, sattva, kitta and sattvapatan ash had 96.31%, 95.88% and 95.89% ash content, respectively.

3. **SiO₂ content:** The SiO₂ content in raw Krishna Vaikrant was 58.79%, after shodhan it was 58.24% and sattva, kitta and sattvapatan ash had 57.38%, 56.81% and 57.46% SiO₂ content, respectively.

4. **Al₂O₃ content:** Al₂O₃ in raw Krishna Vaikrant sample had 0.34% Fe₂O₃, shodhita Krishna Vaikrant had 0.37%, sattva had 0.89%, kitta had 0.42%, sattvapatan ash had 1.34%.

5. **MnO content:** All the samples contained less than 0.1% MnO.

6. **MgO content:** MgO in raw Krishna Vaikrant was 0.18%, after shodhan it was
0.21%, in sattva it was 0.20%, initta it was 0.26% and ash contained 0.28% MgO.

8. CaO content: Raw Krishna Vaikrant sample had 0.16%, shodhita Krishna Vaikrant had 0.165%, sattva had 0.18%, kitta had 0.17%, sattvapatan ash had 0.21%.

9. Na₂O content: Raw Krishna Vaikrant sample had 4.68% Na₂O, shodhita Krishna Vaikrant had 4.72%, sattva had 4.89%, kitta had 5.02%, sattvapatan ash had 5.12%.

10. K₂O content: K₂O content was minimum in raw Krishna Vaikrant sample with only 5.67%, after shodhan it increased upto 5.94, sattva had 5.98%, kitta had 6.04% and sattvapatan ash had 6.88% K₂O.

**DISCUSSION**

Sattvapatan is an important process that beholds a solid niche in rasa karma for dehasiddhi and lohasiddhi as Vaikrant, kanta, sasyak, makshik, vimal etc., even after being shuddha do not participate in dwanda formation nor does parad do their grasa unless they are in sattva form. The minerals that occur in crude natural form are explained in rasa shastra with context to grahya lakshana, and to extract the essence of these minerals sattvapatan procedure is explained. And the sattva thus gained is used in various further processes like bija nirman, jaran samskar, and different parad banda and for rasayan purpose. Also the sattva is subjected to maran and used for medicinal purpose.

**Vaikrant sattvapatan:**

The Vaikrant sattvapatan was conducted according to the R.R.S. 2/72. Here it is necessary to understand the meaning of the above verse to explore the sattvapatan procedure from practical point of view.

- **Sattvapatanyog:** In this context rasa Vagbhat in R.R.S 8/34 has explained that kshara varga, amla varga and dravaka gana are used for the sattvapatan of rasa, maharasa etc. Further in R.R.S 10/95 he has defined dravaka gana by guda, guggulu, gunja, goghruta, madhu and tankana. Rasarnavam in 5th patala, 43rd verse explains the importance of amla dravya being prabodhak, kshadvravya being malahar, visha dravya being tamohagnani and sneha dravya being mardavkara. The contents of the dravaka gana possess all the above merits, so this dravaka gana has been used in the Krishna Vaikrant sattvapatan practical.

- **Marditashcvatikrut:** Trituration of Krishna Vaikrant and dravaka gana was carried out to mix them properly, so that vati
or chakrika can be formed properly from them.

➢ Mushasthoghatikadhmato: As already mentioned black tourmaline is taken as Krishna Vaikrant for sattvapatan procedure. Tourmaline is a type of “Igneous rock” and is formed through the cooling and solidification of magma\(^{12}\). So very high temperature is required for melting tourmaline and hence the musha used in the practical was such that it can sustain more than 1500°C temperature. According to Manparibhasha Ghatika means 24 mins\(^{13}\). So the musha was subjected to tivragni in koshti for 24 mins. The time limit 24 min may have been told to avoid the reaction between the musha and the melted Vaikrant chakrikas. The word “dhmaato” here is used specifically to point out the fact that continuous tivragni is required throughout the sattvapatan process for the extraction of sattva. To fulfil this requirement the koshti was built such that it can produce and sustain more than 1500°C and the electric blower was affixed to the koshti to attain continuous high degree temperature. The coal was used as fuel to generate such high amount of heat.

➢ Vaikrant sattvamutsrujet: When the chakrikas are subjected to high degree temperature (more than 1500\(^{0}\)c) for 24 min they start melting. During this melting process the sattva smelts from the chakrikas.

➢ Agni Samskar on Vaikrant: In the process of sattvapatan we triturate the Krishna Vaikrant with dravakagana and then do agnisamskar in koshti. Charakacharya in context of samskar has explained\(^{14}\):

“Samskarohigunanantaradhanaamuchyate|” (Ch.Sa.Vi. 1st chp)

Here because of the mardana with dravaka gana and agni samskar the properties like sukshamatva, laghutva, ashukaritva, vyavayi guna, vikashi guna are developed in the Vaikrant sattva. Because of the virtue of these developed gunas Vaikrant sattva becomes assimilable by the jatharagni.

CONCLUSION

The physical analysis of Raw Krishna Vaikrant, shodita Krishna Vaikrant, Krishna Vaikrant sattva was done. There was insignificant change in raw Krishna Vaikrant and shodhita Krishna Vaikrant. There were significant changes seen in Krishna Vaikrant after sattvapatan. The changes seen were as:

➢ Colour: Black colour of shodita Krishna Vaikrant changes to shiny silver sattva.
Appearance: hexagonal elongated structure of *shodita Krishna Vaikrant* changed to oblong – spherical structure of *sattva*.

The obtained *sattva* was examined for the *grahya lakshana of sattva* as per the classical references and found to possess those *lakshanas*.

The chemical analysis of raw *Krishna Vaikrant, shodita Krishna Vaikrant, Krishna Vaikrant sattva, kita* and *sattvapatan ash* was done. All the samples show presence of SiO$_2$, Al$_2$O$_3$, Fe$_2$O$_3$, MnO, MgO, CaO, Na$_2$O, K$_2$O in variable percentage. The obtained *Krishna Vaikrant sattva* contains more amount of SiO$_2$ i.e. 57.38% and Al$_2$O$_3$ i.e., 21.63%. It also contains Fe$_2$O$_3$, MnO, MgO, CaO, Na$_2$O, K$_2$O in lesser quantity.
REFERENCES


