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PHARMACEUTICO-ANALYTICAL EVALUATION OF RASAMANIKYA PREPARED WITH CLASSICAL & MODIFIED SHARAV METHOD

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ABSTRACT

Rasa Shastra is a field of study that focuses on processing methods for medications with mineral origin. Rasamanikya is one such classical formulation which is widely used in practise. Rasamanikya holds a distinguished position as a single-drug formulation prepared from Shuddha Haratala (Orpiment – Arsenic trisulfide). There are various preparatory methods of Rasamanikya, from them sharav method is considered suitable for large scale preparation. This is an attempt to put forth preparation of Rasmanikya by classical sharav method and modified sharav method and assessment of the Analytical Study of obtained product.

KEY WORDS: *Rasamanikya, Sharav Method, Classical Sharav Method, Modified Sharav Method.*

INTRODUCTION

To treat the disease, there are four pillars of chikitsa known as *chikistapad*, one of them is *Aushadha*.[1] In *Ayurveda* to treat illness variety of *aushadha kalpas* are used which are made under the pharmaceutical branch of *Ayurveda* that is *Rasashastra* and *Bhaishajya Kalpana*. *Rasa Shastra* is a field of study that focuses on processing methods for medications with mineral origin.

A popular ayurvedic arsenic preparation made from *shuddha haratala* is called *Rasamanikya*. *Rasendra Chintamani* first introduced the formulation as *Rasam manikya prabham* in the 13th century A.D. [2]

Rasamanikya is described in *Rasendra Chintamani* by *Acharya Dhundhuknath*. This formulation is a well-known drug in Ayurveda that is judiciously used in practice by physicians. This formulation is included under the essential drug list framed under the Ministry of *Ayush*.[3] The final product color resembles *Manikya* (ruby). It is being used in various *Kushtha Roga* (skin diseases), *Shwasa* (asthama), *Vicharchika* (eczema), *Bhagandara* (fistula-in-ano), *Vatarakta* (gout), and *Phiranga Roga* (syphilis).[4] *Hartala* is the only ingredient in the formulation of *Rasamanikya*[5] which is included in the schedule E1 drug list (poisonous substances in *Ayush*). In *Rasashastra* classics, Hartala is categorized under *Uparasa Varga*.[6] In classics, there are several purification (*Shodhana*) media described for *Hartala*.[7] *Shodhana* is a process of purification and detoxification; by which physical and chemical blemishes, toxic materials are eliminated and substances are made suitable for further processing.[8] Specific media has an important role in rendering a drug therapeutically active without causing side effects/adverse effects.[9] In *Ayurveda* classics, there are three procedures involved in the manufacturing of *Rasamanikya* from *Haratala*, but there have been some modifications with the advancements of scientific tools such as *Kupipakwa* method, fuse bulb method, and blow lamp[10] [Table 1].

From all these methods in the present study, *Sharav* samput method has been used for the preparation of *Rasamanikya* for advantage of bulk preparation.

Table 1: Methods of *Rasa Manikya* preparation

	Method of *Rasa Manikya* Preparation	**Reference**
Classical methods	*Sharava Samputa*	*Rasendra Chintamani* (Ra. Chin.) 9/128-133
	Sharava Samputa	*Rasendra Sara Sangraha* (Ras.Sa.San) 1/182
	Keeping *Abhrakapatra* in *Valukayantra*	*Rasa Tarangini* (Ra.Ta) 11/83 89
	Keeping in between *Abhrakapatra*	*Rasa Tarangini* (Ra.Ta) 11/90 93
	Modified *Sharava* Samputa	*Rasendra Chintamani*

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Adopted methods		(Ra. Chin.) 9/128-133 – *Siddhiprada Hindi* Translation
	Glass Bottle method	*Rasendra Sara Sangraha*
	Kupipakwa method	*Bhartiya Rasa Shastra*
	Electric Bulb Method	IPGT&RA, Jamnagar

AIMS & OBJECTIVES

AIM – Preparation of *Rasamanikya* by classical and modified *Sharav* samputa pharmaceutical preparation.

OBJECTVES –

1. Physicochemical analysis of Raw *hartal*.
2. Physicochemical analysis of Shodhit *hartal*.
3. Physicochemical analysis of *Rasamanikya* prepared by classical and modified *Sharav* samput.
4. Preparation of *Rasamanikya* by classical *Sharav* samput.
5. Preparation of *Rasamanikya* by modified *Sharav* samput.
6. Analytical study of obtained *Rasamanikya*.

MATERIAL & METHODS

This consist of

1. Shodhan of *Hartala*
   (a) Preparation of *Kushmanda swaras*
   (b) *Shodhan* of *Hartala* in *Kushmanda swaras*
   (c) Preparation of *dadhi*
   (d) *Shodhan* of *Hartala* in *dadhi*

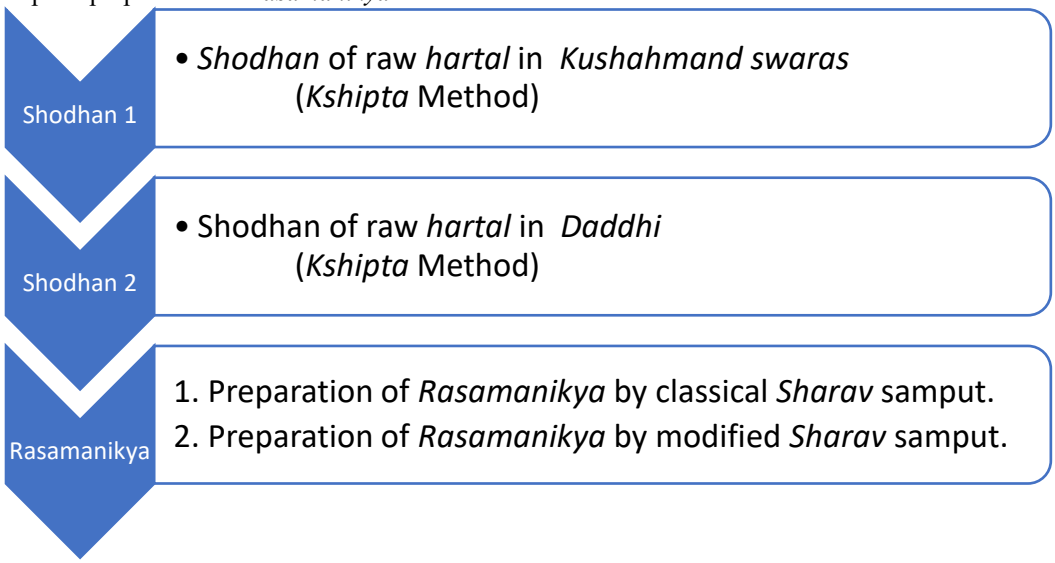
Preparation of *Rasamanikya*

Rasamanikya as described in *Rasendrachintamani* is as follows,

तालकं वंशपत्राख्यं कूष्माण्डसलिले क्षिपेत् ।
सप्तधा वा त्रिधा वाऽपि दध्नाऽम्लेन तथैव च।।
शोधयित्वा पुनः शुष्कं चूर्णयेत्तण्डुलाकृति ।
ततः शरावके पात्रे स्थापयेत्कुशलो भिषक् ।।
बदरीपत्रकल्केन सन्धिलेपञ्च कारयेत् ।
अरुणाभं ह्यधः पात्रं तावज्ज्वाला प्रदीयते ।।
स्वाङ्गशीतं समुद्धृत्य माणिक्याभं हरेद्रसम् ।

रसेन्द्रचिन्तामणी 9/128-131

Steps in preparation of *Rasamanikya*



1. *Shodhan* of *Hartal*

For preparation of *rasmanikya*, *shodhan* of *hartal* is first step. *Shodhan* of *hartal* will be done in two subsequent steps i.e.

- *Shodhan* in *Kushmand swaras (kshipta* method)
- *Shodhan* in *Dadhi* (*kshipta* method)

I. *Kushmanda Swarasa* Extraction

Essential Ingredients: *Kushmand* fruits

Apparatus & Utensils: Juicer, glass, containers, measuring glass, Knife, cotton cloth etc.

Method: Small pieces of *Kushmand* fruit are made and which is collected in a glass container. Approximately 1 kg of Kushmand is used for the extraction of its juice, is strained with a cloth to separate the pulp from the juice. It is stored in a container and is kept for further experimentation at the safe place.

Process: *Kshipta* procedure.

Precaution: Every day new *kushmand* was used (with wt approx 2 kg) *Swaras* was filter properly from washed white cloth to avoid contamination.

Observation: The colour of *Kushmand Swaras* was cream colour and watery consistence.

Result: The yield of *Kushmand Swaras* was approximately 1 litre.

II. *Hartala Shodhana* (*kshipta* procedure) - In *Kushmand Swaras*:

Ref. - *Rasendra Chintamani*

Equipment - Vessel, Trey, Measuring glass, etc.

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Ingredients - *Ashudha Hartal, Kushmand Swarasa*
Process – *Kshipta* method
Procedure - At first, *Ashudha Haritala* made in to small pieces with help of mortar and pestle, that *Ashudha Haritala* taken in a vessel and poured the fresh *kushmanda swarasa* in it. In addition, every day changed with new juice for 7 days.

Precautions-

- Glass beaker was used for *Kshipta* procedure to avoid chemical reaction of hartal with any other metal.
- *Swaras* was changed with precaurtion to avoid loss of Hartal.
- Before pouring new *Kushmand Swaras hartal* was washed with lukewarm water.
- During washing, used water should remove very cautiously from Glass beaker.

III. Preparation Of Dadhi
1. Milk Selection - fresh, good quality cow milk is selected.
2. Heating – Milk is boiled and stirred occasionally to prevent it from sticking to the bottom.
3. Cooling – Then boiled milk is allowed to cool to a lukewarm temperature
4. Inoculation – 1 to 2 teaspoons of curd added to the warm milk.
5. Fermenting the Milk – Milk is Covered by the container with a lid and allowed to ferment.

Precautions -
- Take Clean utensils to ensure no contamination that might hinder fermentation.
- Consistency of temperature during fermentation is crucial for a good result.

IV. *Hartala Shodhana* (*kshipta* procedure) - In *Dadhi*
Ref. - *Rasendra Chintamani*
Equipment - Vessel, Trey, Measuring glass, etc.
Ingredients – *Hartal shodhit* in *Kushmand Swaras*
Process – *Kshipta* method
Procedure – *Hartal shodhit* in *Kushmand Swarasa* was taken in vessel and fresh *dadhi* is poured on it. *Dadhi* which is used for *shodhana* was prepared one day before from *Godugdha*. In addition, every day changed with new *Dadhi* for 7 days.
Precautions-

- Glass beaker was used for Kshipta procedure to avoid chemical reaction of hartal with any other metal.
- Dadhi was changed with precaution to avoid loss of Hartal.
- Before pouring new Dadhi hartal was washed with lukewarm water.
- During washing, used water should remove very cautiously from glass beaker with help of muslin cloth.

V. Preparation of *Rasamanikya* – Classical *Sharava Samput* Method

Preparation of *Rasamanikya* was done after the *shodhana* procedure i.e. both in *kushmand* and *Dadhi*.
Ref. - *Rasendra Chintamani*
Equipment – 1. Earthen *Sharavas* – 2 of equal sizes
2. *Badri patra* – for making *kalka*
3. Knife
4. Heating device – LPG Gas
Ingredients – *Shodhit Hartal*
Procedure –
1. 100 gm of *Shodhit Haratal* was taken in a Sharav and spread uniformly.
2. Another *Sharav* of same size was kept above the lower *Sharav*.
3. Then *Sandhibandhan* was done with *Badri kalka* to fix the 2 *Sharavas*.
4. On drying of the *Sandhibandhan*, the *Samput* was subjected to *Agni*.
5. This *sharav samputa* is kept on fire and heated till the lower *sharava* turned *Arun Varna* i.e. red hot.
6. After it *Samputa* was allowed for self-cooling.

Paschatkarma
1. On self-cooling, the *Samput* was opened and *Rasamanikya* was collected from the lower *Sharav*.
2. The flakes of *Rasamanikya* gets separated from the *Sharav* on scratching.
3. The flakes of *Rasamanikya* were collected carefully and stored in an air tight container.

VI. Preparation of *Rasamanikya* – Modified *Sharava* Samput Method

Preparation of *Rasamanikya* was done after the *shodhana* procedure i.e. both in *kushmand* and *Dadhi*.
Ref. - *Rasendra Chintamani*
Equipment – 1. Earthen *Sharavas* – 2 of equal sizes
2. Cloth
3. Knife
4. *Multani Mitti*
5. Iron wire
6. Heating device – LPG Gas
Ingredients – *Shodhit Hartal*
Procedure –
1. 100 gm of *Shodhit Haratal* was taken in a *Sharav* and spread uniformly.
2. Another *Sharav* of same size was kept above the lower *Sharav*.
3. A small hole of 1 cm diameter was made to upper *Sharav* to assess the *Paklakshan*.
4. Then *Sandhibandhan* was done with mud smeared cloth to fix the 2 *Sharavas*.
5. On drying of the *Sandhibandhan*, the *Samput* was subjected to Agni.
6. On attaining *Paklakshan*, the *Agni* was stopped and the *Samput* was allowed for self-cooling.

Paschatkarma
1. On self-cooling, the *Samput* was opened and *Rasamanikya* was collected from the lower *Sharav*.
2. The flakes of *Rasamanikya* gets separated from the *Sharav* on scratching.
3. The flakes of *Rasamanikya* were collected carefully and stored in an air tight container.

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OBSERVATIONS & RESULTS

Observation of	*Hartal shodhan* in *Kushmand swaras*	*Shodhit Hartal* in *Kushmand swaras* After drying in sun	*Hartal shodhan* in *Dadhi*	*Shodhit Hartal* in *Dadhi* After drying in sun
Initial amount	400 gm	450 gm	400 gm	390 gm
Final amount	450 gm	400 gm	390 gm	380 gm
Colour	Yellow	Yellow	Yellow	Yellow
Texture	Smooth	Smooth	Smooth	Smooth
Odour	Odourless	Odourless	Dadhi like	Odourless

Table 2: Comparison of Classical and Modified *Sharava Samputa* Methods

Observation of	*Rasamanikya* prepared by classical *Sharav samput*	*Rasamanikya* prepared by modified *Sharav samput*
Quantity Of *Hartala* taken	100 gm	100 gm
Quantity Of *Rasamanikya* obtained	80 gm	85 gm
Temprature	250 ·C	250 ·C
***Agni* given till**	Lower *sharav* become red hot	given till proper *paka lakshana* observed to obtained *rasamanikya*
Time required	**2 hours**	**1 hour**

Table 3: Comparison of Observation of Organoleptic parameters

Observation of Organoleptic parameters	*Raw Hartala*	*Hartala Shodhit* in *kushmand swaras*	*Hartala Shodhit* in *Dadhi*	*Rasamanikya* prepared by classical *Sharav samput*	*Rasamanikya* prepared by modified *Sharav samput*
Appearance	Hard Powdered Crystals	Hard Powdered	Hard Powdered	Fine Powder	Very Fine Powder
Colour	Dark Orange	Dark Brown	Light Brown	Light Yellowish	Yellow
Odour	Sulphurus	Faint Sulphurus	Faint Sulphurus	Odorless	Odorless
Taste	Acrid	Slight Acrid	Slightly Acrid	Tasteless	Tasteless
Touch	Rough	Slight Soft	Slightly Soft	powder	Fine powder

Table 4: Comparison of Observation of Physico-chemical parameters

Observation of Physico-chemical parameters	*Raw Hartala*	*Hartala Shodhit* in *kushmand swaras*	*Hartala Shodhit* in *Dadhi*	*Rasamanikya* prepared by classical *Sharav samput*	*Rasamanikya* prepared by modified *Sharav samput*
Moisture Content	1.9 %	1.1 %	0.90 %	0.16 %	0.11 %
Total Ash (%w/w)	4.11 %	3.95 %	3.54 %	3.16 %	2.95 %
Acid Insoluble Ash (%w/w)	1.24 %	1.68 %	1.59 %	2.68 %	2.04 %
Water soluble extractive(%w/w)				1.46 %	1.64 %
Alcohol soluble extractive(%w/w)				1.55 %	1.96 %
pH	8.9	8.3	8.1	5.6	5.8
Specific gravity	1.65 gm/ml	1.69 gm/ml	1.46 gm/ml	0.998 gm/ml	0.997 gm/ml
Volatile matter				96.67 %	97.04 %
Particle size distribution				686.2nm	355.2nm

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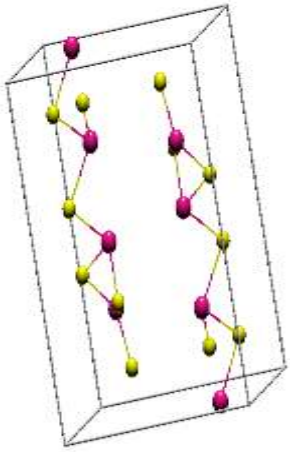
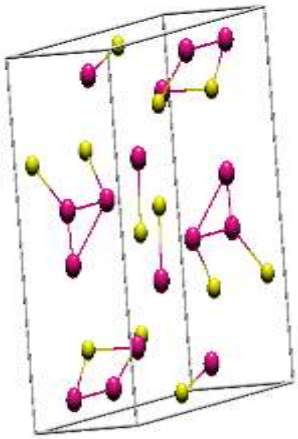
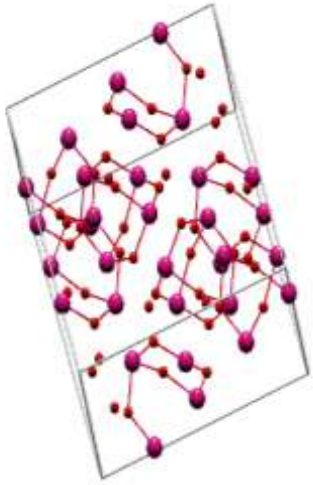
Table 5: Comparison of Observation of XRF

Observation of XRF	*Raw Hartala*	*Hartala Shodhit* in *kushmand swaras*	*Hartala Shodhit* in *Dadhi*	*Rasamanikya* prepared by classical *Sharav samput*	*Rasamanikya* prepared by modified *Sharav samput*
As	63.9	62.6	64.7	64.4	67.1
S	33.9	35.2	34.1	28.3	30.6
Si	1.64	0.409	0.352	3.78	0.534
Sb	0.487	0.856	0.614	1.02	1.00
Fe	0.0378	0.0426	0.0533	0.0816	0.0783
Zn	0.0263	0.0530	0.156	0.155	0.162
Cu	0.0126	0.0145			
Al				2.18	
Ni				0.0239	
K		0.807			
Ca					0.532

Table 6: Comparison of Observation of XRD

Raw *Hartala*	*Rasamanikya* prepared by classical *Sharav samput*	*Rasamanikya* prepared by modified *Sharav samput*
Orpiment	Dimorphite	Arsenolite
As2 S3	As4 S3	As4O6
		

DISCUSSION

Rasamanikya is one of the most frequently used *Rasoushadhis* in clinical practice because of its minimal ingredients and relatively simple preparation method. Several procedures are described in the classics; however, for large-scale production, the *Sharava Samputa* method has traditionally been considered more suitable due to its feasibility.

I. Discussion on Classical *Sharava Samput* Method

- In the classical procedure, the exact quantity of *Haratala Churna* is not specified. The advantage here is that a larger quantity of *Haratala* can be taken, depending on the size of the *Sharava*, and spread evenly to ensure uniform heating and proper melting. The use of earthen *Sharava*, as mentioned in the classics, may be due to their inert nature, which does not interfere with the quality of the final product.
- *Sandhi bandhana* is performed after placing the powdered *Haratala* in the Sharava, ensuring that the drug is processed in a closed chamber with limited oxygen supply. This facilitates gradual oxidation while minimizing sulphur loss as oxides. Classical texts describe the red-hot appearance (*Aruna varna*) of the lower Sharava as a criterion for completion of Paka, which was also observed during the procedure.
- However, practical challenges were noted. *Badari patra kalka* used for sealing was not adhesive enough, resulting in the escape of fumes and incomplete *Paka*, with residual *Haratala* sticking to the *Sharava* walls. This led to reduced yield and absence of the characteristic *Manikya varna*.

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Advantages

1. Larger quantity of *Rasamanikya* can be prepared in a single batch.

Disadvantages

1. Longer duration required for completion.
2. *Badari patra kalka* insufficient for proper sealing.
3. Incomplete transformation of *Haratala* due to leakage.
4. Low yield and absence of typical *Manikya varna*.

II. Discussion on Modified Sharava Samput Method

- To overcome the drawbacks of the classical approach, modifications have been adopted. As suggested in *Siddhiprada* commentary on *Rasendra Chintamani* by *Prof. S.N. Mishra*, the sealing material was replaced with cloth smeared in *Multani mitti*, which provided better adhesion and prevented leakage. Additionally, the upper *Sharava* was perforated with a small hole to allow insertion of a *Shalaka*, enabling assessment of *Tantu Paka* as a reliable criterion for completion.
- This method also maintains a closed chamber with limited oxygen, thereby minimizing sulphur loss. Due to proper sealing, internal pressure is maintained, ensuring uniform heating and more efficient transformation of *Haratala*. Compared to the classical method, the modified procedure resulted in reduced duration and higher yield.

Advantages

1. Assessment of *Tantu Paka* through the perforation ensures accurate determination of completion.
2. Improved sealing with *Multani mitti* reduces leakage.
3. Higher yield and shorter processing time compared to the classical method.

Disadvantages: -

1. A portion of the product remains adhered to the *Sharava* surface.

III. Discussion on Analytical parameters

Analytical observations revealed significant differences in the final product obtained from the two methods:

Rasamanikya prepared by Classical *Sharav Sampuṭa*

- The product was identified as *Dimorphite* (As_4S_3), a stable sulphide form of arsenic. This crystalline rearrangement reduces toxicity by limiting solubility in water, thereby ensuring slower absorption and enhanced pharmaceutical safety.
- Partial exposure to oxygen and gradual sulphur loss favored sulphide rearrangement rather than oxidation.

Rasamanikya prepared by Modified *Sharav Sampuṭa*

- The product was identified as Arsenolite (As_4O_6), an oxide form of arsenic.
- Arsenolite is more soluble and highly toxic compared to sulphides, raising concerns about its internal administration.
- Although the modified method improved yield and reduced time, the trapped atmosphere and higher thermal efficiency promoted oxidation, resulting in the formation of this less desirable oxide form.

Table 7: Comparison of Classical and Modified *Sharava Samputa* Methods for *Rasamanikya*

Parameter	Classical *Sharava Samputa*	Modified *Sharava Samputa*
Sealing material	*Badari patra kalka* (less adhesive, chances of leakage)	Cloth smeared with *Multani mitti* (better sealing, intact)
Paka assessment	By observing *Aruna varna* (reddish glow) of Sharava	By inserting *Shalaka* through hole to check *Tantu paka*
Oxygen exposure	Limited oxygen, partial escape of sulphur vapours	Closed system, but higher internal pressure and oxidation tendency
Processing time	Longer duration	Shorter duration
Yield	Low, incomplete transformation	Higher yield, better conversion
Advantages	Larger batch possible, classical authenticity	Better sealing, quicker process, higher yield
Disadvantages	Incomplete paka, low yield, poor sealing	Product partly adheres to Sharava, oxide form raises toxicity concerns
End product (XRD analysis)	*Dimorphite* (As_4S_3) – sulphide, stable, pharmaceutically safer	*Arsenolite* (As_4O_6) – oxide, more soluble, toxic
Solubility	Poorly soluble in water	High bioavailability.
Bioavailability	Low. Poor absorption from the gastrointestinal tract due to low solubility	High. More readily absorbed into the bloodstream from the digestive tract.
Relative Toxicity	Significantly less acutely toxic.	Highly toxic.

CONCLUSION

Rasamanikya is a classical preparation containing only one ingredient, *Haratala*. Various methods are described in the classics for its preparation. In the present study, the classical *Sharava Samputa* method was compared with a modified version. The modification allows easier assessment of *Paka lakshanas* and offers operational convenience; however, analytical findings suggest that the classical method is

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acceptable. The mode of heating determines whether arsenic stabilizes as a sulphide or transforms into an oxide. *Rasamanikya* prepared by the classical *Sharava Samputa* method (*Dimorphite – As_4S_3*) is safer, aligns with *Ayurvedic* principles, and minimizes toxicity. In contrast, the modified *Sharava Samputa* method produces *Arsenolite* (As_4O_6), an oxide form that is more toxic and therefore therapeutically not suitable. Altough, further studies can be done for more research.

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