



**A PHARMACEUTICO-ANALYTICAL CHARACTERIZATION OF
ARSENO-MERCURIAL FORMULATION: *SAMEERAPANNAGA RASA***

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ABSTRACT

Background: *Rasa Aushadhi*'s are known to play an important role in therapeutics due to their nanoparticle characteristics. A systematic study of the manufacturing processes for these formulations is essential to ensure their quality, safety, and efficacy, thereby preserving the deep trust patients have in Ayurveda.

Aim & objectives: The present study aimed to prepare SPR as per the methods mentioned in the classical text and to characterize it physio-chemically using available analytical techniques.

Materials & Methods: All the raw drugs were subjected to *shodhana* as per classical SOP and the final product was prepared by classical *kupipakwa* method by giving bhavana with Tulasi swarasa for three days. The qualitative and quantitative estimations were done for raw drugs, intermediate and final product. The characterization was done through XRD, SEM, FTIR, and ICP-AES Analysis.

Results and Discussion: During the Sameera Pannaga Rasa preparation it was found that the time duration of Madhyama agni was longest i.e. 14 hrs which might be due the chemical reaction between organic and inorganic materials and obtaining the stable form. The maximum temperature

obtained after corking was 617⁰C. Final product was obtained in shiny black colour. XRD Analysis reveals the final composition corresponding to HgS and As₂O₃ only. Particle size was found to be ranged between 1-50 micrometre owing to its good absorption. FTIR Analysis revealed the presence of various functional groups such as alcohol, alkenes, aliphatic and secondary amines which might correspond to the functionality of final product. ICP-MS Analysis confirms the predominance of arsenic in the final product.

Conclusion- The results of this study certainly can be utilized as baseline data for quality assurance of this herbo-mineral formulation. The preliminary profiles of *Sameerapannaga rasa* evaluated in this attempt could be used to lay down a new set of pharmacopeial standards for further research studies.

Keywords: Sameerapannaga Rasa, rasa aushadhi, Kupipakwa, Pharmaceutico-analytical, Characterization

INTRODUCTION:

Kupipakwa rasayana is one of the chaturvidha rasayanas known for their high efficacy due to extensive application of heat and minimal dose. *Sameera Pannaga Rasa* belongs to this preparation category known for its indication in *kapha-amaya vikara* like *kasa*, *shwasa*, *rajyakshma*, *jwara* etc. i.e., mainly in diseases of respiratory system.

Sameera Pannaga Rasa is a *kupipakwa rasayana* firstly mentioned in *Rasa Chandamshu* [1]. Another variety of SPR (*Sameera Pannaga Rasa*) with *Manahshila* is mentioned by *Aushodhi Gunadharm Shastra* [2] also quoted by Ayurvedic formulary of India [3]. It is prepared by triturating *Parada* (Mercury-Hg), *Gandhaka* (Sulphur-S), *Haratala* (Orpiment-As₂S₃), *Manahshila* (Realgar-As₂S₂), and *Gouripashana* (White

Arsenic-As₂O₃) in equal amounts and giving *kramagni paka* with the help of *Baluka yantra*.

Sameera Pannaga Rasa is indicated in *kapha-vataja vikara* especially in *sannipataja jwara*, *kaphajunmada*, *sandhibandha* (*sandhivata*) and *kaphamaya* (*kasa*, *swasa*, *jwara* etc.) [2]. It is been widely practiced by clinicians for the above-mentioned conditions.

This article is set out to give an idea regarding the pharmaceutical and the analytical parameters required for qualitative & quantitative assessment, as well as characterization of the intermediate and final product of the *Sameera Pannaga Rasa*.

MATERIAL & METHOD:

All ingredients were procured from GMP-certified KLE Ayurveda pharmacy and

analysis was carried out at Ayush-approved drug testing laboratory, Belagavi, SAIF-IIT, Bombay, SAIF-IIT, Cocchi and KLE college of Pharmacy, Belagavi.

1. Pharmaceutical Study:

Procurement & Authentication of Raw

Material: All the raw ingredients were procured and authenticated by experts in drug testing laboratory.

Preparation of Sameera Pannaga Rasa:

The Pharmaceutical study was carried out in

the Dept. of Rasashastra & Bhaishajya kalpana, in following steps i.e., *shodhana* of *Parada*, *Gandhaka*, *Haratal*, *Manahshila* & *Gauripashana*. It is followed by *Kajjali* preparation and the addition of remaining ingredients, triturating with *bhavana* of *Tulasi swarasa* to obtain the *Sameera Pannaga Rasa kajjali* and subjected to *kramagni kupipaka*.

Method of Preparation: (Figure 1)

Table 1: *Shodhan* of the ingredients of *SPR*

<i>Shodhana of Parada:</i>	<i>Shodhana of Gandhaka:</i>	<i>Shodhana of Haratala:</i>	<i>Shodhana of Manahshila:</i>	<i>Shodhana of Gauripashana:</i>
<i>Shodhana of Parada</i> was done according to <i>Rasa Tarangini</i> where <i>Sudha choorna</i> , <i>lahsuna kalka</i> and <i>saindhava lavana</i> were used for trituration followed by washing of <i>Shodhita parada</i> with lukewarm water [4]	<i>Shodhana of Gandhaka</i> was done as per <i>Rasa Tarangini</i> by melting in <i>goghrita</i> and <i>dhalana</i> in <i>go-dugdha</i> [5]	<i>Shodhana of Haratala</i> was done according to <i>Rasa Tarangini</i> by <i>Pachana</i> in <i>kushmanda swarasa</i> and <i>churnodaka</i> for 1 <i>yama</i> in each media [6]	<i>Shodhana of Manahshila</i> was done according to <i>Rasa Tarangini</i> by <i>bhavana</i> with <i>nimbu swarasa</i> for 7 times [7]	<i>Shodhana of Gauripashana</i> was done according to <i>Rasa Tarangini</i> by <i>Pachana</i> in <i>karavellaka swarasa</i> for 2 <i>yama</i> [8]





Figures 1: Shodhana of ingredients of SPR

Preparation of Kajjali: *Shodhita Parada* and *Shodhita Gandhaka* were taken in the ratio of 01:01 in *khalwayantra* and triturated until the *kajjali siddhi lakshana* were obtained [9].

Preparation of Sameerapannaga Rasa:

First *kajjali* was prepared then *suddha haratala*, *manahshila* and *gouripashana* were added to the *kajjali* and triturated with *Tulasi swarasa* for 3 days. After drying the *SPR-*

kajjali mixture was placed in a long neck glass bottle and heated gradually on a sand bath for a specified duration. On cooling, *Sameera Pannaga Rasa* was found deposited at the bottom of bottle which was then collected by breaking the bottle. Final product *Sameera Pannaga Rasa* was subjected to trituration to convert it into fine powder and stored in air tight container [2] (Figure 2).





Figure 2: Sameera Pannaga Rasa Preparation

2. ANALYTICAL STUDY:

All the ingredients from raw materials to final product were studied for their organoleptic characters.

Shodhana dravya and *bhavana dravya* were subjected to Preliminary Phytochemical, inorganic elements, Ph etc., whereas *Tulasi swarasa* was specifically subjected for Specific gravity & TLC along with the above-mentioned parameters.

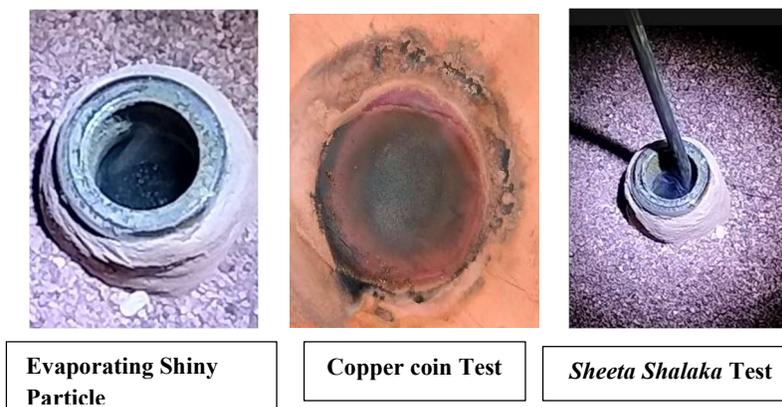
For *kajjali*, *siddhi pariksha* (ayurvedic test) as *varitar*, *rekhapurnatwa*, *vishista varnotpatti*, *nischandratwa*, *slakshanatwa* were observed along with modern parameter ICP-AES was done. ICP-AES Analysis of *Ashodhita* and *Shodhita* raw ingredients and *Kajjali* was done at SAIF- IIT Bombay using SPECTRO

Analytical Instrument GmbH, Germany, AROCS, Simultaneous ICP Spectrometer.

The final product *Sameera Pannaga Rasa* was analyzed for XRD analysis using Bruker D8 Advance XRD, SEM by SEM: Jeol6390LA and ICP-MS Analysis using Thermo Fisher iCAP RQ ICP-MS by Helium Kinetic Energy Discrimination mode at SAIF- IIT Cocchi. FTIR Analysis was done at KLE College of Pharmacy, Belagavi using Shimadzu IR Affinity-1, Japan.

3.OBSERVATION & RESULTS:

It was observed that after 21 hours of *paka*, all the *pariksha* mainly *Sheeta shalaka test*, Copper coin test and evaporating shiny particle were observed (Figure 3).



Evaporating Shiny Particle

Copper coin Test

Sheeta Shalaka Test

Figure 3: Paka Siddhi Lakshana

Observations and results of the preparation are depicted in the following tables (Table 2 to 16).

Table 2: Observations of weight change throughout procedures

S.N.	Ingredients	Initial weight	Shodhana Dravya	Wt. after procedure	Gain/loss
1	Parada	220 gm	Sudha- 220 gm Rasona-185 gm Saindhava-92.5 gm	184 gm	16.37 % loss
2	Gandhaka	200 gm	Ghrita-600 gm Godugdha-1500 ml	188 gm	06% loss
3	Haratal	200 gm	Kushmanda-700 ml Churnodaka-720 ml	196 gm	02% loss
4	Manahshila	200 gm	Nimbu-700 ml	205 gm	2.5 % gain
5	Gauripashana	200 gm	Karavellaka- 1300 ml	194 gm	08 % loss
6	Tulasi	1000 gm	-	520 ml	-
7	Kajjali	180+180 gm	-	355 gm	1.4% loss
8	SPR kajjali	160 gm 400 gm	-	412 gm	03% gain
9	SPR	412 gm kajjali	-	352 gm	15% loss

Observation of Kupipaka:

Table 3: Observations during the preparation of Sameera Pannaga Rasa

S.N.	Date	Time	Temp in °C	Observations
1.	24/02/24	01:40 PM	25C	Greenish black powdery kajjali
2.		01:43 PM	61C	Smell of Tulasi was observed
3.		02:10 PM	143C	Smell of Tulasi was observed
4.		04:00 PM	185C	-
5.		04:30 PM	220C	Mild white fumes were observed
6.		06:00 PM	250C	Shalaka sanchalana was done
7.		07:30 PM	274C	White fumes become denser
8.		10:00 PM	380C	Sheet shalaka was inserted; Kajjali started melting
9.		11:30 PM	395C	-
10.	AM	12:00AM	403C	-
11.	25/02/24	02:00AM	433C	Neck of the bottle becomes yellow, but the fumes were white
12.		02:30AM	445C	Shalaka sanchalana was done
13.		03:40AM	480C	Fumes colour changes to yellow
14.		05:30AM	500C	-
15.		09:00AM	550C	Kajjali starts swelling up so shalaka sanchalana were needed repeatedly
16.		10:30AM	585C	Dense yellow fumes with an intense smell
17.		11:00 AM	600C	While shalaka sanchalana blue flame appear
18.		11:45 AM	615C	Fumes disappear and shiny particles start coming out
19.	PM	12:00 PM	617C	Copper coin test positive, Corking was done at this stage
20.		12:30 PM	622C	Teevragni was continuously given
21.		02:00 PM	639C	Stopped the flame and allowed to swangasheetata

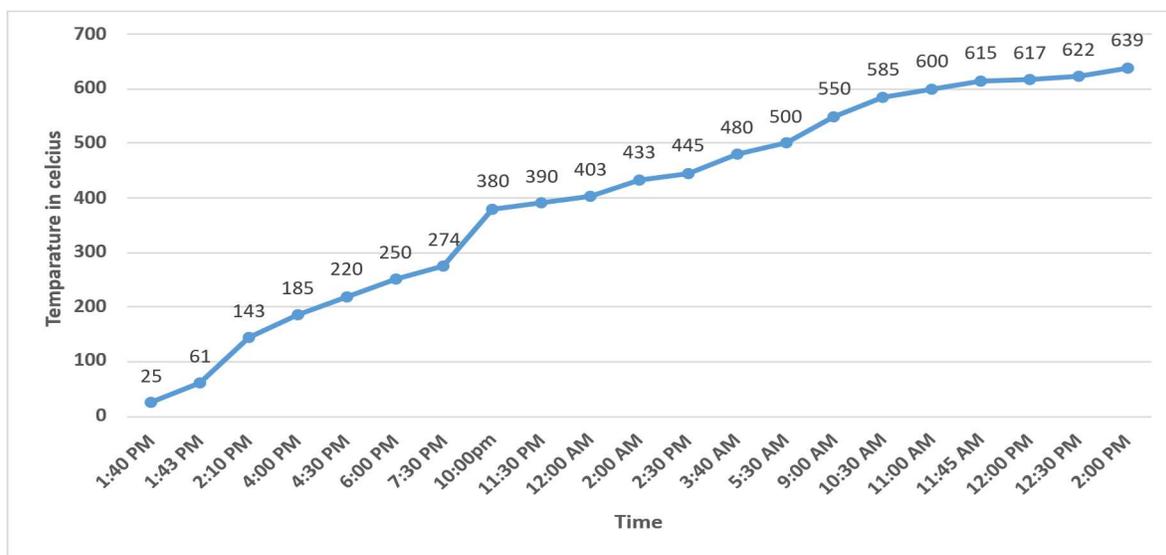


Figure 4: Temperature graph during the preparation of Sameera Pannaga Rasa

Table 4: Organoleptic observations of Ingredients

S.N.	DRUG		FORM	COLOUR	TOUCH	ODOUR
1.	Parada	BS	Liquid	Silvery white	Smooth and cold	Odourless
		AS	Liquid	Shiny silvery white	Smooth & cold	Odourless
2.	Gandhaka	BS	Solid	Lemon yellow	Rough	Characteristic
		AS	Solid	Pale yellow	Slightly smooth	Characteristic
3.	Haratal	BS	Solid	Yellow	Rough	Characteristic
		AS	Solid	yellow	Rough	Characteristic
4.	Manahshila	BS	Solid	Brownish orange	Soft	Characteristic
		AS	Solid	Dark orange	Soft & fine	Characteristic
5.	Gauripashana	BS	Solid	White	Smooth	Odourless
		AS	Solid	White	Soft	Odourless
6.	Tulasi		Liquid	Dark green	Watery	Characteristic
7.	Kajjali		Powder	Black	Smooth	Characteristic
8.	SPR Kajjali		Powder	Greenish black	smooth	Tulasi-sama (Dravyabhoota)
9.	Sameera Pannaga Rasa		Solid	Shiny black	Smooth	Odourless

Analytical study:

Physico-chemical analysis:

Table 5: Physico-chemical analysis of *Sudha churna*

Sample	LOD	Ash value	Acid insoluble ash	Water soluble ash	Water soluble extractive	Alcohol soluble extractive	P ^H Value 5% sol
<i>Sudha churna</i>	1.791%	95.685%	29.895%	2.125%	9.137%	0.634%	12.86

Table 6: Inorganic Element Analysis of *Sudha churna* and *Churnodaka*

Sample	Ca ⁺²	Mg ⁺²	Na ⁺	K ⁺	Fe ⁺²	SO ₄ ²⁻	PO ₄ ²⁻	Cl ⁻	CO ₃ ²⁻	NO ₃ ⁻
<i>Sudha churna</i>	D*	D	D	ND**	D	ND	ND	ND	ND	ND
<i>churnodaka</i>	BS [±]	D	D	D	ND	ND	ND	ND	D	ND
	AS [×]	D	D	D	D	ND	ND	ND	D	ND

± BS- Before shodhana ×AS -After shodhana *D- Detected

**ND- Not detected

Table 7: Physico-chemical Analysis of *Tulasi swarasa, Ghrita & Dugdha*

	<i>Ghrit</i>	<i>Dugdha</i>	<i>Tulasi swarasa</i>
pH	05	07	6.9
Sp. gravity	0.919	1.028	1.005
Total solid	-	-	4.075%
Lactometer value	-	30	-

Table 8: TLC Analysis of *Tulasi*

Test	Result
TLC- (Alcohol Extract) Mobile Phase- Toluene: Ethyl acetate Ratio- 9:1	Rf Value
	Short Wave: 0.29, 0.64, 0.69 & 0.95
	Long Wave: 0.21, 0.24, 0.53, 0.66, 0.69 & 0.95

Table 9: Preliminary Phytochemicals of shodhana dravya & Bhavana dravya Tulasi

S.N.	Tests	Rsaona	Kushmanda		Nimbu	Karvellaka		Tulasi
			BS	AS		BS	AS	
1	Carbohydrates	+	+	+	+	+	+	+
2	Reducing sugar	+	-	-	+	+	+	+
3	Monosaccharides	-	+	-	-	-	-	+
4	Pentose sugar	-	-	-	+	-	-	+
5	Non reducing sugar	-	-	-	-	-	-	-
6	Hexose sugar	+	+	-	-	+	+	-
7	Proteins	+	+	-	-	+	+	+
8	Amino acids	+	+	-	-	+	+	+
9	Steroids	+	-	-	-	+	+	-
10	Flavonoids	+	-	-	+	+	+	+
11	Alkaloids	+	-	-	+	+	+	+
12	Tannins	+	-	-	-	-	-	+
Tests for Glycosides								
13	Cardiac Glycosides	+	+	+	-	+	+	+
14	Anthraquinone Glycosides	-	-	-	-	-	-	-
15	Saponin Glycosides	-	+	+	+	+	+	+

BS- Before shodhana AS- After shodhana +=Detected -= Not detected

Table 10: Analysis of *Parada Gandhaka Kajjali*

S.N.	Kajjali Siddhi Lakshana	Observation	S.N.	Modern Analysis	Observation
01.	<i>Varitar</i>	Attained	01.	NPST	Pattern of colour changes is correspond to Parada Bhasma NPST
02.	<i>Rekhapurnatwa</i>	Attained			
03.	<i>Vishistha varnotpatti</i>	Attained	02.	ICP-AES	Hg %: 50.616 S%: 47.632
04.	<i>Nischandratwa</i>	Attained			
05.	<i>Mridatwa and Slakshanatwa</i>	Attained			

Table 11: ICP-AES Analysis of Ashodhita and Shodhita Samples Raw materials

Samples	Parad Hg%	Gandhaka S ppm	Haratal		Manahshila		Gauripashana As ppm
			As ppm	S ppm	As ppm	S ppm	
Ashodhita Samples	99.98	272.727	133.584	57.217	210.378	49.337	295.105
Shodhita Samples	99.96	267.895	194.273	79.339	144.031	38.631	305.562

Analysis of *Sameerapannaga Rasa*:

XRD:

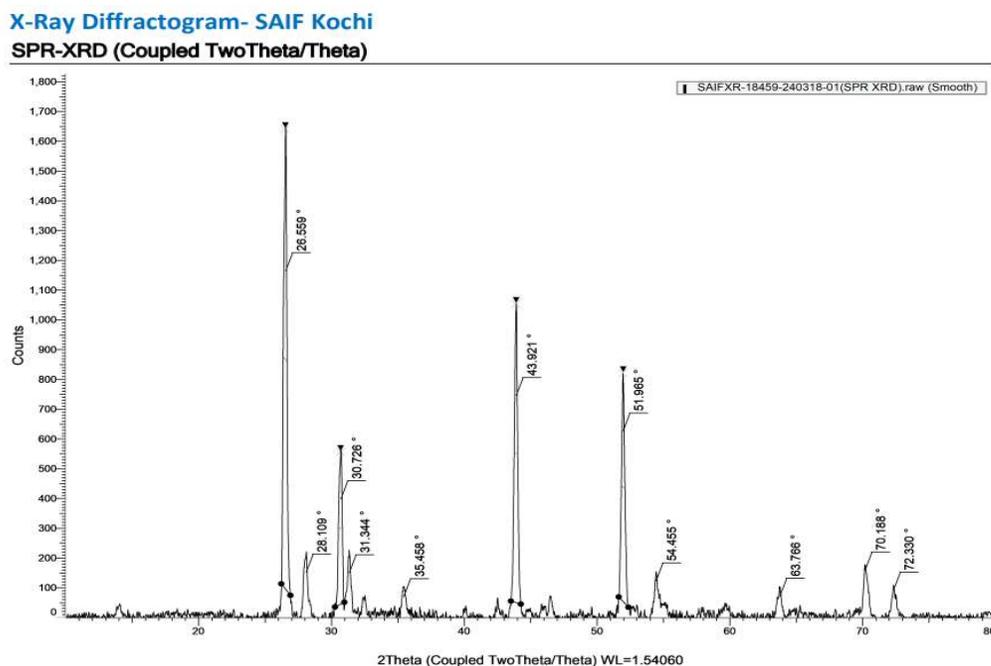
Figure 5: XRD of *Sameerapannaga Rasa*

Table 12: XRD Analysis peak list data

Angle	d Value	Net Intensity	Gross Intensity	Rel. Intensity
26.559 °	3.35350 Å	1164.51 Counts	1451.83 Counts	100.0%
28.110 °	3.17193 Å	152.449 Counts	461.472 Counts	13.1%
30.726 °	2.90757 Å	398.951 Counts	737.484 Counts	34.3%
31.344 °	2.85158 Å	151.131 Counts	496.327 Counts	13.0%
35.458 °	2.52958 Å	70.1955 Counts	420.014 Counts	6.0%
43.921 °	2.05981 Å	746.060 Counts	1021.27 Counts	64.1%
51.965 °	1.75830 Å	626.538 Counts	903.860 Counts	53.8%
54.455 °	1.68362 Å	123.486 Counts	402.422 Counts	10.6%
63.766 °	1.45839 Å	71.5377 Counts	254.166 Counts	6.1%
70.188 °	1.33984 Å	159.785 Counts	296.340 Counts	13.7%
72.330 °	1.30534 Å	92.4324 Counts	221.024 Counts	7.9%

Table 13: XRD Analysis of *Sameerapannaga Rasa*

S. No.	2θ values (angles)	Composition
01.	26.559, 31.344, 43.821, 51.965	HgS
02.	28.110, 35.45	As ₂ O ₃

SEM:

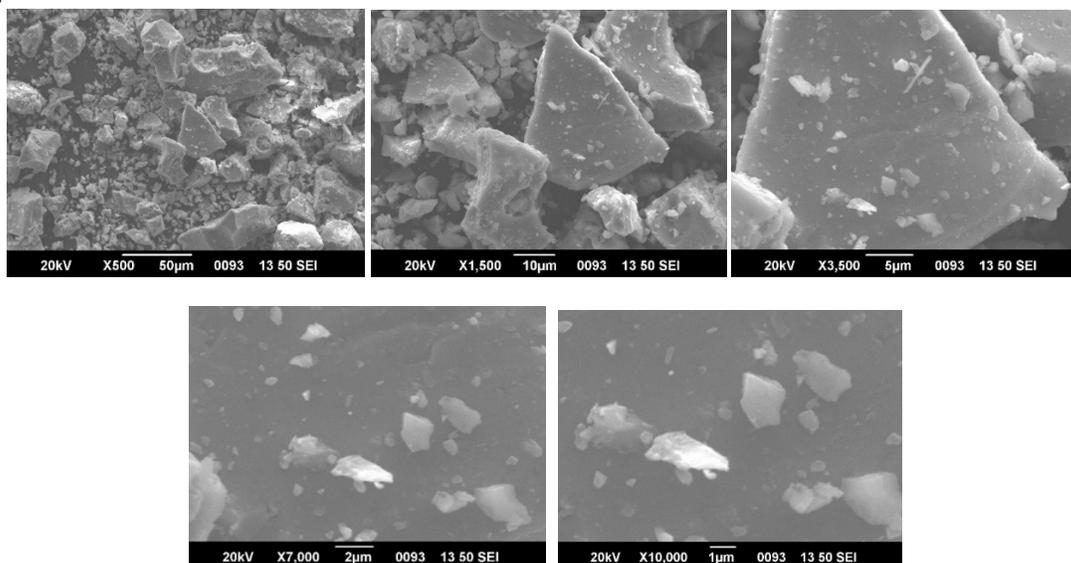


Figure 6: SEM Analysis of Sameerapannaga Rasa

Table 14: Particle size of Sameerapannaga Rasa

S. No.	Resolution	Particle Size	Shape
	500×	50 μm	Irregular with flat and smooth surfaces
	1500×	10 μm	
	3500×	05 μm	
	7000×	02 μm	
	10000×	01 μm	

FTIR:

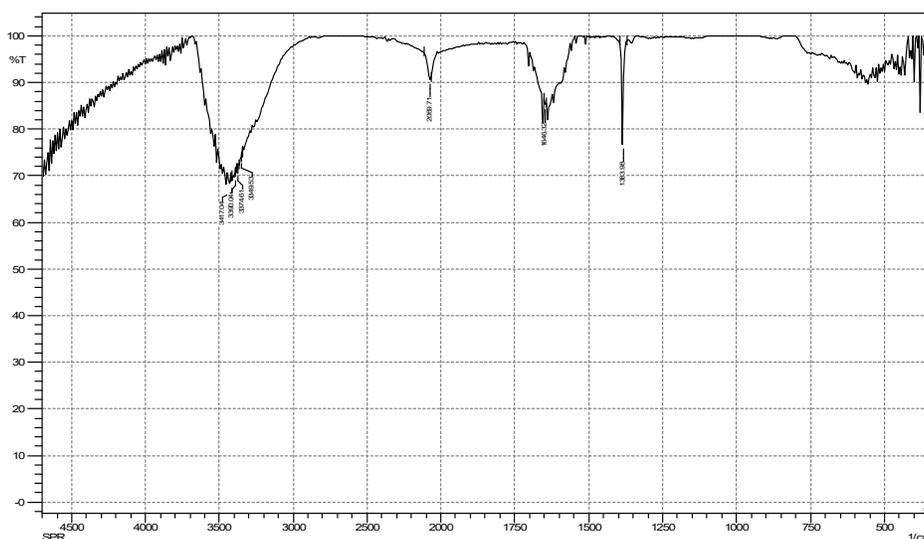


Figure 7: FTIR analysis of Sameerapannaga Rasa

Table 15: Functional groups in FTIR Analysis

Frequency value	Functional groups	Stretching/bending	Intensity
1383.98	O-H (Phenol)	Bending	Medium
1646.71	C=C (Alkene)	Stretching	Strong
3349.53	N-H (Secondary amine)	Stretching	Medium
3374.61, 3390.04 & 3417.04	N-H (Aliphatic amine)	Stretching	Medium

ICP-MS:

Table 16: ICPMS analysis of *Sameerapannaga Rasa*

Sample	As	Hg	S
Sameer Pannaga Rasa	52.0	4.70	24.0
Unit	%	%	%
Detection Limit in ppm	0.10	0.10	0.10

DISCUSSION:

Kupipakwa Rasayana holds a significant position in *Rasashastra*, known for their potent therapeutic effects even at minimal doses [10]. The precise control of heat (Agni) during the preparation process is crucial, as it directly influences the quality and efficacy of the final product. Using high-quality and authentic ingredients is essential to ensure optimal therapeutic outcomes. Therefore, rigorous quality assessments are necessary at every stage of the preparation process. The following discussion provides a detailed overview of each step in preparing *Kupipakwa Rasayana*, along with the analytical parameters used to evaluate the final product.

1. **Shodhana of Parada:** After the *shodhana* process, the percentage of *Parada* was found to be decreased by 0.020 % observed in ICP-AES Analysis which might be due to the addition of some trace elements from the *shodhana* media into *Parada* [11].
2. **Shodhana of Gandhaka:** Similarly, after the *shodhana* process, the concentration of Sulphur decreased from 272.727 ppm to 267.895 ppm.

This might be because of the infusion of organic functional groups in *Shodhita Gandhaka* from *ghrita* and *Dugdha* [12].

3. **Shodhana of Haratal:** After the *shodhana* process, the weight loss of *Haratal* is likely due to the leaching of arsenic in *kushmanda swarasa* and the release of arsine gas during heating [13]. However, the increased concentration of arsenic from 133.584 ppm to 194.273 ppm was observed in the ICP-AES analysis. It could be the result of undesired trace elemental substances that were present in an *ashodhita haratal* but later decreased in *shodhita haratala*, which in turn increased the percentage of *Haratal* after *shodhana* [14]. In the phytochemical estimation of *kusmanda swarasa*, it was seen that monosaccharides, hexose sugars, proteins, and amino acids were absent after *shodhana* which might have also helped in the purification of *Hartal*. They might help in adsorbing the trace

elements (impurities) and hence aid in purification.

4. **Shodhana of Gauripashana:** The ICP-AES analysis of *ashodhita* and *shodhita gauripashana* shows the concentration of arsenic increases from 295.105 ppm to 305.562 ppm. This increase in concentration may be due to the loss of physical and chemical impurities (trace elements) from *ashodhita gauripashana* within the *shodhana* medium, thereby enriching the arsenic concentration in *shodhita gauripashana*.

5. **Increase in weight after Bhavana:** After *manahshila shodhana*, the weight of Manahshila increased by 2.5% also in *Sameera Pannaga Rasa kajjali* after *tulasi swarasa bhavana* weight increased by 3% due to total solid present in the *bhavana dravya*. which is directly transferred to the main drug. In *shodhita manahshila*, ICP-AES analysis showed that the arsenic concentration decreased from 210.378 ppm to 144.031 ppm which might be due to the influence of the total solid content from *nimbu swarasa*.

6. **Kajjali preparation:** To get the *siddhi lakshana of Kajjali* mainly

nischandratwa, it took 104 hours. This extended time may be due to the *ghrita* used in *gandhaka shodhana* (equal quantity of *gandhaka*) Despite of repeated washings, the *snigdha* (oily) *guna* was not completely removed from *gandhaka* which hindered to attain the *siddhilakshana* easily.

7. **Sameera Pannaga Rasa:** The preparation took 24.5 hours to complete. The duration specified in the classic is 8 *prahara* (24 hours). The temperature attained at the time of corking of the preparation was 617⁰ C. The copper coin test was found to be positive at that temperature. After *teevragni* was given for five hours, the maximum temperature attained was 639⁰ C. Compared to *mrudu* and *teevra agnipaka*, the period of *madhyam -agni paka* was considerably longer (*Kramagni paka*) i.e., 14 hours (**Figure 4**). This longer period may have been required for enhancing the Parada digestion as well as the chemical reaction between organic and inorganic compound helps in forming stable product and transforming them into biocompatible form.

8. Sameera Pannaga Rasa

Instrumental Analysis:

a) **X-Ray Diffraction (XRD):** The graph of *Sameerapannaga Rasa* has shown many peaks which indicate the crystallinity of the substance (**Figure 5**). The different peaks of X-ray diffraction frequency peak corresponding confirm the presence of HgS, and As₂O₃ in final product *Sameera Pannaga Rasa* [15].

b) **Scanning electron microscopy (SEM):** *Sameerapannaga Rasa* crystalline structure at different resolutions showed different particle sizes which range from 01 micrometers to 50 micrometers. The shapes of particles were irregular with smooth and flat surfaces (**Figure 6**). The reduction in particle size might be due to the trituration given to the individual drug along with *Sameerapannaga kajjali*. The preparation of *Sameerapannaga Rasa* involves several meticulous steps. First, the *Kajjali* is trituated for 104 hours. For the purification (*shodhana*) of *manahshila*, a 7-day bhavana (8 hours daily) is conducted, followed by 6 hours of trituration to powder the *shodhita haratala*. After this, the

compound drug (*Sameerapannaga Kajjali*) undergoes 3 days of *bhavana* (8 hours daily) with *tulasi swarasa*, before being subjected to the *Kupi-Paka* process. An additional 2 hours of trituration is applied to the final product, *Sameera Pannaga Rasa*. The reduction in particle size during these processes enhances the product's absorption and assimilation, thereby increasing its therapeutic value.

c) **Fourier transmission infra-red (FTIR):** Fourier transmission infra-red analysis spectra of *Sameera Pannaga Rasa* have shown -OH (Alcohol group), C=C (Alkene group), and N-H (Aliphatic and secondary amine) functional groups. (Figure 07) That might be incorporated from the organic substance used in *shodhana* and *bhavana*. It can enhance the bioactivity of the drug by enhancing absorption and distribution within the body.

d) **Inductive coupled plasma-Mass spectrometry (ICP-MS):** Inductive coupled plasma-Mass spectrometry of the *Sameerapannaga Rasa* confirmed the predominance of arsenic in comparison to other elements.

CONCLUSION:

The findings of this study are certain to serve as baseline information for ensuring the quality of this herbo-mineral formulation. They can also assist scientists and researchers in developing thorough screening criteria to identify the compounds exhibiting various bioactivities and in clarifying the molecular mechanism of action. Moreover, it is important to examine the significance of each procedural step in the preparation process. The insights gained will serve as a vital resource for quality assurance and standardization of this herbo-mineral-metallic formulation. The initial evaluations of *Sameerapannaga* Rasa profiles made in this endeavor may serve to establish new pharmacopeial guidelines for subsequent investigations. This study also gives an insight of modern analytical techniques that can be incorporated during the *rasa aushadhi* preparation.

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