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RESEARCH ARTICLE *ISSN 2456-0170*

ANALYTICAL STUDY OF SARVAAPASMARAHARA RASA

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ABSTRACT

Sarvaapasmarahara Rasa is a classical Pottali Rasayana explained in Rasa Tantra Sara va Siddha Prayoga Samgraha-II and is indicated in Apasmara. It contains Rasa Sindhura, Shuddha Srotoanjana, Shuddha Haratala, Shuddha Manashila, Shuddha Gouripashan and Shuddha Vatsanabha and prepared by Pottali Paka method. Very few formulations have been selected for study for anti-epileptic activity for research. Hence this, Sarvaapasmarahara Rasa was prepared as per classical reference for pharmaceutical standardization. Organoleptic parameters, Physico-chemical parameters, particle size analysis, XRD, FTIR and XRF studies were carried out. The yield of Sarvaapasmarahara Rasa was 57%, presenting as a greyish-brown, lusterless fine powder with an agreeable odour. XRD analysis confirmed the presence of fine crystalline structures and organo-metallic complexes with a median particle size of 1.4 µm.

KEYWORDS: Sarvaapasmarahara Rasa, Pottali Rasayana, Pharmaceutical standardization, Physico-chemical Analysis.

INTRODUCTION

Rasashastra, the Alchemical branch of Ayurveda, emphasizes the transformation of metals and minerals into therapeutically potent and safe Rasoushadhi's. Paradeeya Kalpas are noted for their Yogavahi and Rasayana properties. Among these, Pottali Rasayana represents a specialized form of mercurial processing involving compaction of ingredients in molten sulphur to enhance potency and stability.

Sarvaapasmarahara Rasa is one such Pottali kalpa explained in Rasa Tantra Sara va Siddha Prayoga Sangraha-II[1]indicated in Apasmara roga.Apasmara roga, in modern neurological terminology is correlated to epileptic disorders. Epilepsy is a chronic disorder characterized by recurrent seizures due to abnormal neuronal discharges. Globally[2], more than 50 million individuals are affected with developing countries bearing 80% of the burden. Despite of several antiepileptic drugs, adverse effects and drug resistance remain major concern in the treatment of epilepsy. Hence, Sarvaapasmarahara Rasa is being selected for pharmaceutical standardization and its analytical evaluation.

AIMS AND OBJECTIVES

-To prepare *Sarvaapasmarahara rasa*.

-To subject SAR for physico-chemical analysis.

-To subject SAR for instrumental analysis.

MATERIALS AND METHODS

Pharmaceutical Work:

Materials:

Raw materials were procured from M/S Dorle & Son's, Kolhapur and were authenticated by experts.

Shodhana of Parada, Gandhaka, Vatsanabha, Haratala andManashila were carried out in Dept. of RSBK, BVVS Ayurved Medical College & Hospital, Bagalkot.

Rasa Sindhur was prepared at Dept. of RSBK, BVVS Ayurved Medical College & Hospital, Bagalkot.

Analytical Study was carried out at HSK College of Pharmacy, Bagalkot.

Instrumental analysis was carried out at accredited laboratory i.e. Jeevanarekha Laboratories, Sambhaji Nagar (Aurangabad), Maharashtra.

Methods:

Pharmaceutical Study:

Parada Shodhana[3] was carried out by using haridra churna and kumari swarasa with Tiryak Patana Method.

Gandhaka Shodhana[4] was performed in godugdha media.

Srotoanjana[5], Vatsanabha[6], Haratala[7], Manashila[8], and Gouripashan[9] were subjected for shodhana procedures according to Rasa Tarangini.

Rasa Sindhur was prepared according to Rasa Tarangini[10].

Sarvaapasmarahara Rasa was prepared according to Rasa Tantra Sara va Siddha Prayoga Sangraha-IIby ***Pottali Paka*** method.

Observations and results of analytical study:

Analyses were conducted at accredited laboratories;

Test of Perfectness of SAR Kajjali:

Sarvaapasmarahara Rasa kajjali was tested for Nischandratva, Rekhapurnatva, Varitaratva and Unam. All four tests passed for perfectness of kajjali.

Table No. 1: Showing the result of Test of perfectness of kajjali

Test	Observation and Results
Nischandratva	The Kajjali was observed in bright sunlight. It was not having any luster – **Positive**
Rekhapurnatva	The Kajjali was rubbed in between index finger and thumb. It penetrates the furrows of the fingers – **Positive**
Varitaratva	A small amount of Kajjali was carefully sprinkled over the surface of a beaker contained a stagnant water. It was found that total portion of kajjali was floating on the water surface –**Positive**
Unam	A small amount of Kajjali was carefully sprinkled in beaker full of water and a grain is placed on the floating matter. It was found that the grain was floating on the water surface – **Positive**

Table No. 2: Showing preparation of *Sarvaapasmarahara Rasa*

Ingredient		Quantity
Sarvaapasmarahara Rasa	Before *Shodhana*	200gms
	After *Shodhana*	114gms
	Loss	86gms
Percentage of *SAR* obtained		57%

Organoleptic study: Colour, odour, taste, and texture.

Table No.3: Organoleptic features of Sarvaapasmarahara Rasa.

S.N.	Features	Before	After
1	Colour	Grey	Greyish brown
2	Form	Powder	Powder
3	Odor	Agreeable	Agreeable
4	Weight	200	114

Physico-chemical study[11]: Moisture, pH, total ash, and acid-insoluble ash.

Table No.4: Qualitative Analysis of Prepared Sarvaapasmarahara Rasa.

S.N.	Test	Sarvaapasmarahara Rasa
1	Loss on drying	0.6%w/w
2	Total ash	74.5 w/w
3	Acid insoluble ash	2.5 w/w
4	Water soluble ash	1.5 w/w
5	pH	5.65

Table No. 5: Sarvaapasmarahara Rasa Vati analysis.

S.N.	Parameters	Results
1	Disintegration	34min
2	Hardness	5.75kg/cm²
3	Friability	0.41%

Instrumental Analysis: XRD, XRF, FTIR and Particle size.

Table No. 6: Showing the result of XRD

Compound	Composition	Crystal	2 thetas	D spacing	Intensity
Lead Sulfide	PbS	Cubic	30.245 35.086 50.466	3.4287 2.9676 2.0983	78.2 84.2 50.3
Mercury Sulfide	HgS	Hexagonal axis	96432.817 36.386	09 3.1665 2.8650	37.3 43.5
Arsenic Sulfide	AsS	Monoclinic	32.26434.615 35.224	3.2193 3.0066 2.9563	68.1 53.5 79.6
Arsenic Trisulfide	As_2S_3	Monoclinic	21.61426.013 32.651	4.7705 3.9745 3.1821	50.7 59.6 73.2

RESULTS

Pharmaceutical Findings.

Sarvaapasmarahara Rasa Yield: 57%

Analytical results:

Organoleptic Properties:

- Greyish-brown powder;
- Agreeable odour;
- Tasteless.

Tablet Testing parameters:

- Disintegration time-34 min;
- Tablet Hardness-5.75 kg/cm²;
- Friability-0.41%.

Particle size suggests suitability for applications requiring high surface area, enhanced reactivity and uniform dispersion.

Physico-chemical parameters confirmed stability and purity.

XRD and FTIR spectra revealed crystalline and organometallic structures.

The XRF analysis showed herbo-mineral formulation enriched in arsenic, mercury sulfides with significant sulfur content.

DISCUSSION

Sarvaapasmarahara rasa kajjali was tested for nischandrata, rekhapurnata, varitaratvaand unam. It passed all four tests for perfectness of kajjali. Sarvaapasmarahara Rasa was prepared as per Rasa Tantra Sara va Siddha Prayoga Sangraha-II. Analytical studies confirmed transformation of raw minerals into bio-compatible, stable forms through classical samskara. The use of gandhaka paka and bhavana with devadali swarasa likely facilitated formation of organometallic complexes enhancing pharmacodynamic activity. The presence of traced bio-elements detected by XRF, such as Hg, S and As in stable bound forms, suggests complexation rather than toxicity, aligning with classical detoxification principles of Rasashastra.

CONCLUSION

Present analytical study established classical preparation method of Sarvapasmarahara *Rasa by gandhaka paka method.* Systematic shodhana of raw drugs and devadali swarasa bhāvana resulted in a stable, lusterless, fine kajjali fulfilling all classical tests of Nischandrata, Rekhapurṇata, Varitaratva and Unam. Pharmaceutical procedures ensured complete transformation of raw materials into bio-compatible, stable and therapeutically active forms. Analytical findings validate the structural integrity, safety and standardized quality of *Sarvapasmarahara Rasa*. Instrumental analysis confirmed the transformation of raw minerals into therapeutically safer, complexed and stable crystalline compound. These results provide a scientific basis for its classical preparatory method by gandhaka paka method.

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Source of support: Nil
Conflict of interest: None Declared

Cite this article as
Dr Prakash R. Deshpande: Analytical Study of Sarvaapasmarahara Rasa; X (5): 2696-2704

Fig1: XRD Report

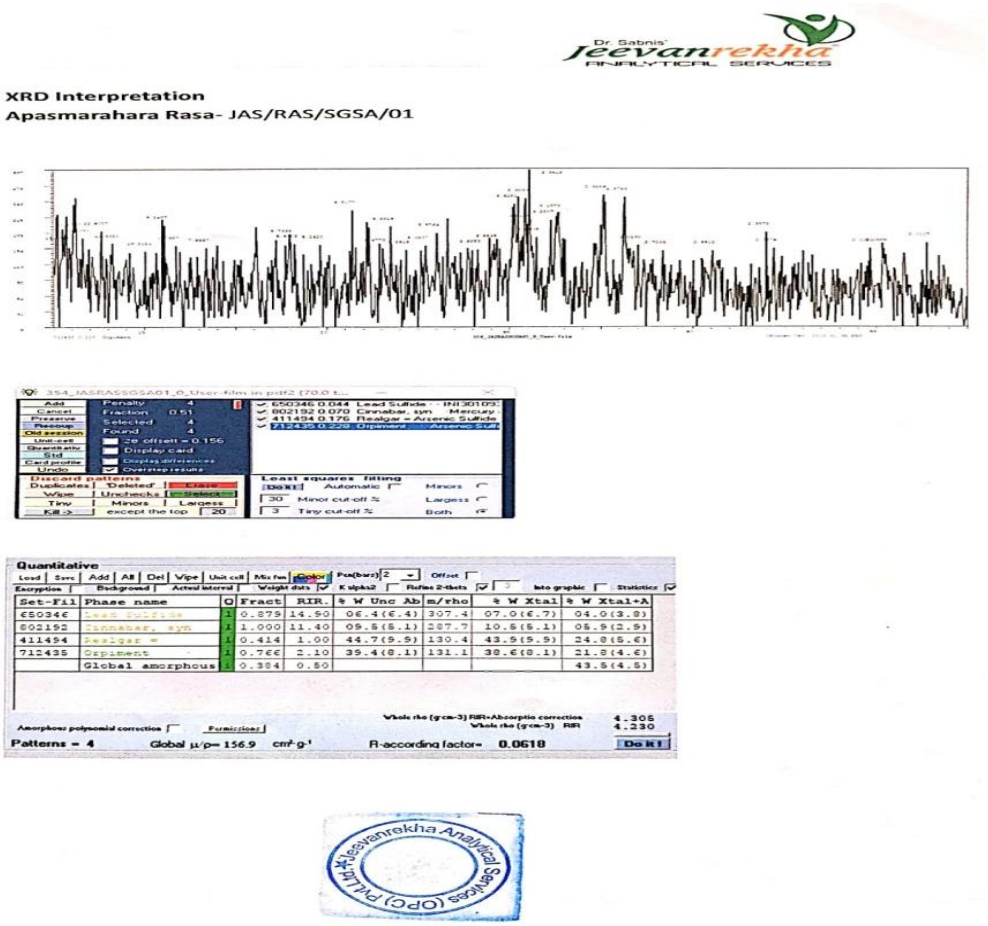

Fig 2: XRD Report

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Compound	Composition	Crystal	2 theta	D spacing	Intensity
Lead Sulfide	Pb S	Cubic	30.245	3.4287	78.2
			35.086	2.9676	84.2
			50.466	2.0983	50.3
Mercury Sulfide	Hg S	Hexagonal axis	30.964	3.3509	65.5
			32.817	3.1665	37.3
			36.386	2.8650	43.5
Arsenic Sulfide ·	As S	Monoclinic	32.264	3.2193	68.1
			34.615	3.0066	53.5
			35.224	2.9563	79.6
Arsenic Trisulfide ·	As2 S3	Monoclinic	21.614	4.7705	50.7
			26.013	3.9745	59.6
			32.651	3.1821	73.2

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Test result relate only to the sampling tested. This report shall not be reproduced expect in full, without the written approval of the laboratory.

NOTE: Any queries with sample result or interpretation contact within 7 working days after report issuance date.

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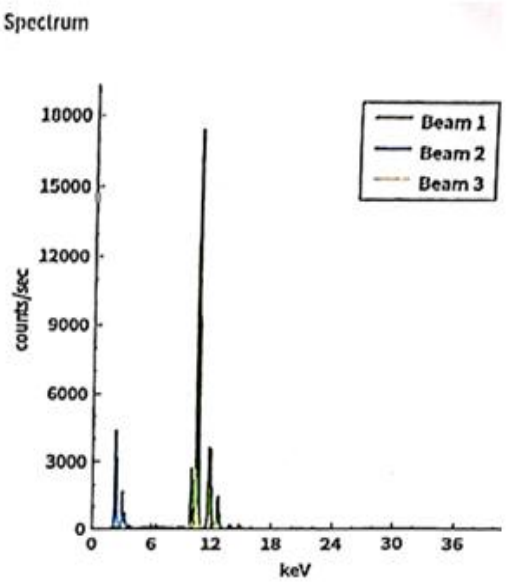
Fig 3: XRF Report of Sarvaapasmarahara Rasa

Elapsed time: 60.0s

El	PPM	+/- 3σ
Mg	4.98%	0.76
Si	8500	640
P	2570	190
S	19.56%	0.34
Ca	2560	190
Ti	630	550
Cr	150	100
Fe	2780	150
Co	64	52
Ni	27	26
Cu	993	57
As	22.86%	0.38
Se	84	52
Rb	853	44
Nb	912	32
Mo	1903	61
Ag	109	58
Sn	320	110
Sb	770	150
Ba	360	240
Hg	20.72%	0.36
Pb	8.28%	0.16
LE	21.19%	0.73
El	PPM	+/- 3σ
Al	ND	<3800
Cl	ND	<1400
V	ND	<61
Mn	ND	<1300
Zn	ND	<29
Sr	ND	<5
Y	ND	<6
Zr	ND	<2
Cd	ND	<7
La	ND	<9000
Ce	ND	<12000
Pr	ND	<15000
Nd	ND	<21000
W	ND	<110
Bi	ND	<52



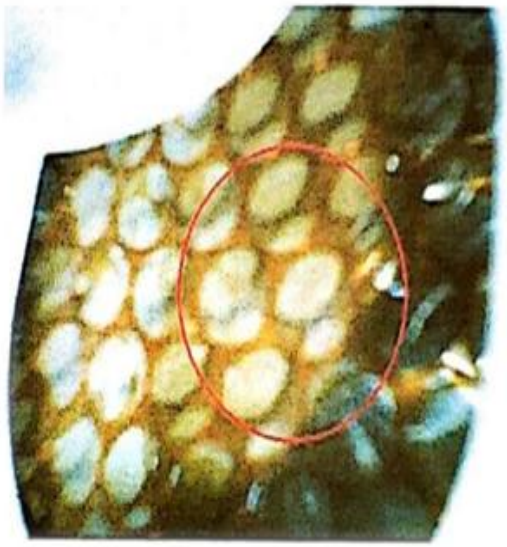


Fig 4: FTIR Report of Sarvaapasmarahara Rasa

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FTIR Analysis Interpretation **Date: 05/04/2025**

Sample Code: JAS/RAS/SGSA/01
Sample Name: Sarva Apasmarahara

Group Frequency (cm^{-1})	Wave Number (cm^{-1})	Intensity	Functional Group and Type of Vibration	Interpretation / Remarks	Active Constituents	Source (Origin)
200–400	669–797	Medium	As–S, Pb–S, Hg–S lattice vibrations	Indicative of metal sulfides like realgar, orpiment, mansil, haratala	Arsenic trisulfide (As_2S_3), Mercuric sulfide (HgS), Lead sulfide	Manahshila, Haratala, Parada, Gandhaka, Srotoanjana
1000–1200	1000	Medium	S=O / As–O stretching	Oxidized arsenic or sulfur compounds	Arsenates/sulfates	Somala, Haratala, Manahshila
1000–1200	1144	Medium	Sb–O / S–O bending	Lead or sulfur-oxygen bonding	Lead-oxides or S-based compounds	Srotoanjana / Gandhaka
1300–1500	1374–1458	Medium	NO_3^-, CH_3 deformation, N–H wag	Organic/nitrogenous components from vatsanabha	Alkaloids, nitrogen groups	Gomutra used for shodhan of Vatsanabha (Aconite alkaloids)
1600–1700	1507–1540	Medium	Amide II bending	Proteinaceous or herbal bhavana residue	Plant alkaloids / peptides	Milk and ghee used for shodhan of Vatsanabha
1600–1700	1617–1654	Medium	Amide I, C=C stretching	Bhavana dravya residues, plant matter	Organic acids, esters	Herbal extracts
1650–1750	1684–1772	Weak	C=O stretch / organometallic overtone	arsenic complexation	Metal-organic conjugates	Haratala, Manahshila
1800–2300	1829–1991	Weak	Metal–ligand overtones	Hg–S, Pb–S interactions	Metal sulfide networks	Parada, Somala, Srotoanjana
2000–2500	2112–2369	Weak	Metal–halide or sulfide interactions	Complexation regions	HgCl, AsCl traces	Processed metallic salts
2800–3000	2849–2918	Weak	C–H stretching	Residual hydrocarbons	Organic residues	Vatsanabha / herbal materials
3300–3500	3235–3903	Weak	O–H / N–H stretching	Moisture or hydroxyls from bhavana dravyas	Hydroxyl, Amine groups	Plant-based media / detox agents

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Conclusion:

The FTIR analysis of **Sarva Apasmarahara** (Sample ID: JAS/RAS/SGSA/01) confirms the presence of complex mineral and organometallic components that align with its classical Rasashastra formulation. Peaks in the **669–797 cm^{-1}** range confirm **metal-sulfide bonds**, indicating the presence of **Manahshila (As_2S_2), Haratala (As_2S_3), Somala (As_2O_3), and Srotoanjana (PbS)**.

Mid-IR peaks from **1374 to 1654 cm^{-1}** suggest the presence of **organic moieties**, likely from **Vatsanabha (aconite alkaloids)** and herbal shodhan dravyas used for purification. The weak **C=O and metal-ligand overtone signals (1684–2342 cm^{-1})** further support the formation of **organometallic complexes**, while the **broad O–H and N–H stretches (3235–3903 cm^{-1})** indicate the role of **moisture and proteinaceous purifying agents**.

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Fig 5: Sarvaapasmarahara Rasa Particle size analysis:

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Particle size analysis interpretation Date: 05/04/25

Sample name : - Sarva Apasmarahara Rasa		Sample code: : JAS/RAS/SGSA/01
1.	Field Scanned	05
2.	Total particle count	29947
3.	Number of single particles	29130
4.	Number of agglomerates	816
Single particle	d 10	10% particles are below 0.87 microns.
	d 50	50% particles are below 1.42 microns.
	d90	90% particles are below 2.30 microns.
Agglomerate	d 10	10% agglomerates are below 1.42 microns.
	d 50	50% agglomerates are below 2.65 microns.
	d90	90% agglomerates are below 4.37 microns.

Phali

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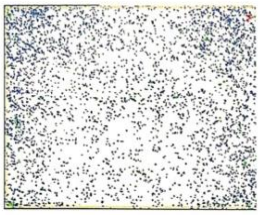
Sample Name	JAS/RAS/SGSA/01	Batch#	201903201
Trial#	201903201	Microscope-Parms	40x
		Date	09/04/2025
A.R.Number	12345678-1	Analysed by	SHRIRAM

09-Apr-25, 14:36:12, Calib: CALIB 100X, Unit: microns, X: 2.25, Y: 2.25 [pixels/microns]



Particle Sizing:Results Summary

Fields measured 5
Particles count 29947

Type	Count	d10 microns	d50 microns	d90 microns	D(3,2) microns	D(4,3) microns	D(1,0) microns
Single	29130	0.8686267	1.4185	2.2982	2.0313	2.3337	1.5269
Agglomerates	816	1.4185	2.6537	4.372	3.9406	4.6237	2.8184
Unclassified	0	1.6633	0	0	0	0	0
All(combined)	29947	0.8686267	1.4185	2.3523	2.2027	2.7015	1.5562

Phali

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