



International Journal of Indian Medicine

www.ijim.co.in

ISSN: 2582-7634

Volume - 7, Issue - 03

March 2026

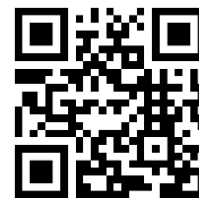


IJIM

INDEXED



International Journal of Indian Medicine



International Category Code (ICC): ICC-1702 International Journal Address (IJA): IJA.ZONE/258276217634

"Pharmaceutical Preparation of Sameerpannaga Rasa (SPR): A Comparative Study of Modified Portable Valuka Yantra (MPV) vs. Electrical Muffle Furnace (EMF)"

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ABSTRACT: Introduction: Sameerpannaga Rasa is a traditional Kupipakva Rasayana used for Shwasa and Kasa. The proper application of Agni Sanskara through the right Yantra is essential for achieving the desired pharmaceutical and therapeutic properties of Rasaushadhis. While classical texts recommend the use of Valuka Yantra, the Electric Muffle Furnace (EMF) is commonly utilized in modern pharmaceutical practices. This study aims to compare the pharmaceutical processes of Sameerpannaga Rasa prepared using these two methods. **Methods & Observation:** To create Sameerpannaga Rasa, we followed classical references with the same raw materials and proportions. Heating was done separately with Valuka Yantra and EMF, ensuring similar heating patterns were maintained. We recorded observations related to Agni duration, State of Kajjali, Fumes, Flames, Organoleptic characteristics, and yield. **Results:** Both methods effectively produced Sameerpannaga Rasa with similar physical traits. Valuka Yantra enabled gradual and uniform heating, while EMF provided superior temperature control and ease of use in the procedure. Discussion and Conclusion This study emphasizes the significance of Agni and Yantra in the field of Ras Shastra pharmaceuticals. While Valuka Yantra adheres closely to classical tenets, EMF can be a viable alternative if the classical heating conditions are closely replicated.

KEYWORDS: Agni Sanskara; Electric Muffle Furnace; Kupipakva Rasayana; Sameerpannaga Rasa; Ras Shastra; Valuka Yantra.

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How to cite this article: Wanjari A., Gandhe Y., Nandurkar V., Belge R. "Pharmaceutical Preparation of Sameerpannaga Rasa (SPR): A Comparative Study of Modified Portable Valuka Yantra (MPV) vs. Electrical Muffle Furnace (EMF)". Int J Ind Med 2026;7(03):64-80 DOI: <http://doi.org/10.55552/IJIM.2026.70310>

INTRODUCTION:

Kupipakva Rasayana, derived from the processing of Parada (mercury) in a *Kachakupi* (glass bottle) through controlled *Agni Paka* (heating), represents a pinnacle of Rasashastra—the advanced Ayurvedic branch transforming toxic metals and minerals into therapeutic herbo-mineral formulations. *Sameerpannaga Rasa* (SPR), a unique *Talastha* (bottom-settled) or *Ubhayastha* (settled at both neck and bottom) preparation, traditionally includes *Parada*, *Gandhaka* (sulfur) as *Kajjali*, arsenic compound *Somal*, *Haritala* & *Manashila*; in this study, *Manashila* was added to align with the enhanced formulation in Ayurvedic Formulary of India(1) and *Ayurveda Aushodhi Guna Dharma Shastra*(2) (though absent in *Rasachandamsu*)(3).

Etymologically, "Sameera" denotes *Vata* and "Pannaga"(4) (*serpent or Vasuki*) implies its prowess in subduing *Vata* disorders like *Sandhivata*, alongside *Kapha Vyadhi*, *Sannipataja Jwara*, and *Kaphaja Unmada*. Mercury's therapeutic superiority hinges on *Samskaras like Murchchhana*, ensuring biocompatibility, low dosage, rapid action, palatability, and extended shelf-life.

Classical texts mandate precise temperature gradients, but traditional Valuka Yantra

preparation faces many challenges: heat control, high fuel/manpower needs, ambiguous details. In this study to limit these issues Modified *Valuka Yantra*(5) (MVK) is used. This study compares the Pharmaceutical Preparation of *Sameerpannaga Rasa* manufacturing by Modified Portable Valuka Yantra (MVK) and Electrical Muffle Furnace (EMF) for digital precision, without altering *Rasashastra* principles.

Materials and Methods

The whole procedure of preparation of *Sameerpannaga Rasa* (SPR) can be divided into three parts:

1. Preparatory Phase
2. Operational Phase
3. Post-heating Phase

1) Preparatory Phase (Purva Karma):

- Appropriate equipment – *Kupi*, *kapad mitti*, Modified Portable Valuka yantra, EMF, LPG Gas Burner, *Sheeta & Ushna shalaka*, Copper sheet, Torch, Thermameter
- Basic Understanding Collection & Purification of ingredients
- Preparation of *kajjali*
- *Bhavana*
- *Kupibharana*

Understanding Basic Properties of ingredients of Sameerpannaga Rasa(6,7,7-9)

Sr No	Dravya	Rasa	Guna	Virya	Vipaka	Doshagnata	Karma	Therapeutic Dose
1	<i>Parada</i>	<i>Shadarasa</i>	<i>Snigdha, Sara, Guru</i>	-	-	<i>Tridoshaghna</i>	<i>Rasayana, Balya, vrishya, yogavahi etc.</i>	<i>Vataroga, Krimi, kustha etc</i>
2	<i>Gandhaka</i>	<i>Katu, tikta</i>	<i>sara Ushna</i>	<i>Ushna</i>	<i>Katu*</i>	<i>Kapha Vata hara</i>	<i>Rasayana, Deepana etc</i>	<i>Urdhwajatrur oga, kasa, kustha, pama, dadru.</i>

								Visharpa, kshaya, amajeerna
3	Haratala	Snigdha, Katu, Kasaya	Guru	Ushna	Katu	Tridoshaghna	Deepan, Rasayana etc.	Shwasa-kasa, kustha, twak vikara etc.
4	Manashila	Katu, Tikta	Sara, Snigdha	Ushna	Katu	Vata Kapha Hara	Lekhana, rasayana, twachya etc	Shoatha, Kasa, Shwasa, agnimandy, Kshaya etc
5	Gauripasha na	Katu, Tikta	Sara, Snigdha	Ushna	Katu	Vata kapha hara	-	Shwasa roga, pratamaka shwasa, yakshma, Amavata, Kapharoga, Sandhigatav ata, Shoatha etc.
6	Tulasi	Katu, Tikta	Laghu, Ruksh, Teekshna	Ushna	Katu	Kapha Vatahara	Krimighna, Ruchi kara, Deepani, Daurgandh ahara etc.	Parswa sula, Kustha, K richhrasrava etc. Effective against Arsenic (10)& Mercury(11) induced toxicity1

Table 1: Properties of ingredients of Sameerpanaga Rasa

Shodhana(12-17): All the ingredients should be in purified form. So we have done the purification of each ingredient in our departmental pharmacy.

Sr No	Ingredient	Shodhana Dravya	Shodhana Procedure	Yantra Name	Initial Quantity	Final Quantity	Final Outcome	Precaution
1	Ashudha Parada	Garlic Paste 150 g	Trituration / Mardana (7 Days)	Khalwayantra	150 g	138 g	92%	Very Flickering hence often loss is common
2	Ashudha Gandhaka	Cow ghee 35 g, Cow milk 3L, Hot Water	Melting and Pouring/ Dhalana (3 times)	Palika,	150 g	148 g	98.66%	Sulphur Fumes are harmful
3	Somal	Bitter Guard	Fomentation/ Swedana (6 Hrs)	Dola-yantra	150 g	142 g	94.66%	Highly Toxic Arsenic Compound
4	Hartala	Churnodaka 2L	Fomentation/ Swedana in Churnodaka (6 Hrs)	Dola-yantra	150 g	148 g	98.66%	Highly Toxic Arsenic Compound
5	Manshila	Adraka Swarasa	Titration/ Bhavana	Khalva Yantra	150 g	157 g	104.6% (Gain In Wt)	Highly Toxic Arsenic Compound

Table 2: Shodhana/Purification of Ingredients

- **Kajjali Nirmana**(13,18): Initially 100 g each of *Sudha Parada*, *Gandhaka* taken, powdered and mixed together using *Khalwayantra* to prepare *Kajjali*. *Kajjali* is further mixed well with 100 g *Sudha Sankhiya*, *Harital* & *Manahila* each. The ingredients were triturated until the *Nishchandratva* (loss of metallic luster) and *Rekhapurnatva* (fineness) tests were positive.
- **Bhavana**(13): The *Kajjali* was levigated with *Tulasi Patra Swarasa* (Holy Basil juice) for three days to induce organic potency into the mineral mix.
- **Kupi Preparation**(19): This mixture was filled in *Mritbhavita kachakupi* (A 750 ml glass bottle was coated with seven

successive layers of mud-smearred muslin cloth to withstand high temperatures.

- **Kupibharana (Filling of glass bottle)(14):** The Kupa (glass bottle) was filled up to the 1/3 part by *Kajjali* so that there should be enough space inside *Kupa* for melting and boiling of *Kajjali* and also for the sublimation of compound which is going to be condensed and deposited in the neck and specially at base of *Kupa*. *Kupa* is shaken, rolled between both hands so the *kajjali* is uniformly distributed at base.

(Until *Kupibharana* Stage the Procedure for Both the methods were almost common.)

2) Operational Phase (Pradhana Karma)

Method 1: Modified Valuka Yantra made *Sameerpannaga Rasa*

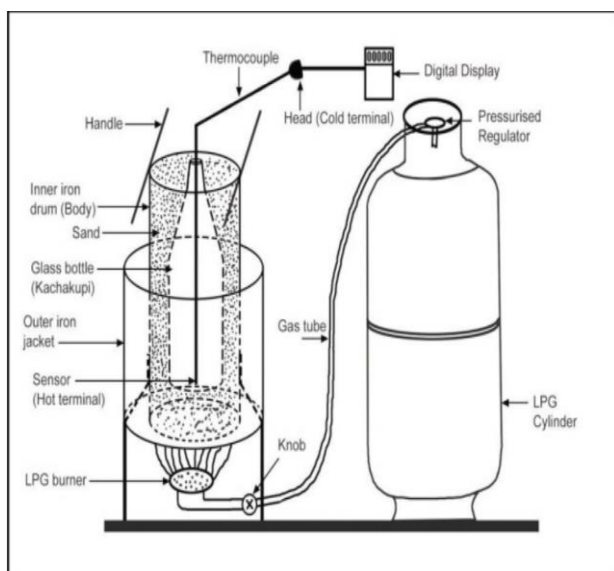


Diagram 1: Modified Valuka Yantra (5) Procedure

1. A Modified *Valuka Yantra* iron cast vessel was taken and placed over LPG Gas Burner.
2. A Mica Sheet is placed in the middle of an iron vessel and *Four Angulas* of *Valuka* were filled above it.
3. The *Kupa* was then placed on it at the center of the iron vessel along with cork.

4. Later more *Valuka* was filled around the *Kupa* till the mouth portion of the *Kupa*.
5. After proper placing of the *Kupa* the cork was removed from the mouth of *Kupa*.
6. Heating was started from room temperature and observations noted as below



Image 1,2: Sameerpannaga Rasa Preparation

Time			Temp (°C)	Observations		
12 Hour Cycle	Hour	From 0 Hr Onward		State of <i>Kajjali</i>	Smell/Fumes/Flames	Other
8 am		0	36			
21/04/2025						
9 am		1	90	Black powdered	Tulsi like herbal smell	
11 am		3	130	Swelled but powdered form	Light yellow fumes started	
1 pm		5	173	Puffiness		
3 pm		7	210	Started to rise the level	Yellow Fumes	
5 pm		9	247		Dark Yellow Fumes with Sulphur Smell	Kajjali pushed back with sheet shalaka at regular interval
7 pm		11	275		Whitish Yellow fumes	
9 pm		13	290			
11 pm		15	307	Started to melt		
1 am		17	323	Semisolid	Dark yellow fumes	
22/04/2025						
3 am		19	355	More liquified		
4 am		20	367	Melted completely	Orange yellow fumes	
5 am		21	379			Yellowish deposit at neck
7 am		23	389	Blackish liquified	Blue flame test positive	
9 am		25	412	reddish black colour		
11 am		27	432			Self corking avoided by Tapta shalaka use
1 pm		29	453			Copper plate test negative[Black circle visible on copper plate]
3 pm		31	498		Yellowish fumes	Yellowish colour base was visible
5 pm		33	500		Almost no fumes	Golden yellow base with

					honeycomb structure was visible & Corking Done
7 pm	35	520	Corked		
9 pm	37	563			
11 pm	39	598			Level of fire is up to the height of kupi
1 am	41	620	Heating Stopped	-	-

Table 3: Showing temperature recorded along with observation of Modified Valuka Yantra made SPR



Image 3,4: Base just before corking

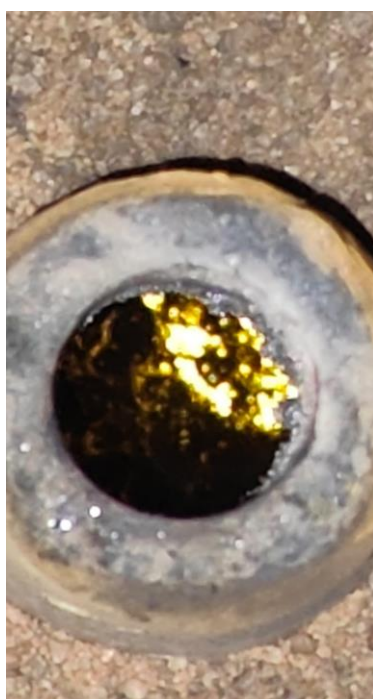


Image 5: Sameerpannaga Rasa Tivragni Stage





Image 6: Ushna Shalaka

Image 7: Blue Flame Test

Method 2: EMF made Sameerpanaga Ras

Procedure

- 1) The *kupi* was placed in EMF machine
- 2) Electric Supply switched on and temp is raised from room temp and Observations were mentioned as below
- 3) During whole procedure acceleration was kept constant i.e.10



Image 8: Operating Electric Muffle Furnace Machine

Time		Temp (°C)	Observations		
12 Hour Cycle	From 0 Hr Onward		State of <i>Kajjali</i>	Smell/Fumes/Flames	Other
8 am	0 (started)	38°C (Room Temp)	-	-	-
31/05/24					

9:00 am	1 Hr	100	-	-	-
9:20 am	1 Hr 20 Min	120	Puffiness started	Very mild fumes started	-
11:00 am	3 Hr	170	Puffiness increase in height	Mild Whitish fumes	-
1:00 pm	5 Hr	230	-	Yellow Fumes Started	-
3:00 pm	7 Hr	270	Soft Thick layered, Swelled up to the half height of the kupi	-	Started Pushing Kajjali Back with sheeta shalaka
5:00 pm	9 Hr	310	Colour blackish grey (semisolid)	Dark Yellow Fumes	Till now 8 times Pushed back
6:00 pm	10 Hr	337	-	After puncturing the raised layer with sheeta shalaka, Yellowish orange fumes escapes	Need repeated attempts to push raised kajjali back
7:30 pm	11 Hr 30 Min	342	Started to self cork but cleared with Ushna Shalaka	Dark Yellow Fumes, Blue flames visible	Crystallise deposit at neck
9:00 pm	13 Hr	365	Kajjali melted	Dark Yellow Fumes	-
11:00 pm	15 Hr	376	-	Dark Orange Fumes	White crystal deposit at neck
1:00 am 1/06/24	17 Hr	384	Completely melted	Whitish yellow fumes	-
3:00 am	19 Hr	398	Blackish shiny	Yellow fumes	Brownish base visible
5:00 am	21 Hr	417	-	Mild Yellowish Orange fumes	Deposit at neck, Coin test negative
5:40 am	21 Hr 40 Min	412	-	V mild white fumes	Red colour base seen, Coin Test Negative
6:00 am	23 Hr	427	-	Almost no fumes	Brick red colored product(Aruna bhaskar

				sannibha) appeared, Corking Done
9:00 am	25 Hr	480	Corked	
11:00 am	27 Hr	520		
1:40 pm	28Hr 40 Min	580	EMF Stopped	

Table 4: Showing temperature recorded along with observation of EMF made SPR

Fumes Change in Kupi Across Different Temperature



Image 9: Raised level of Kajjali is visible

Image 10-13: Fumes Changes during the process

Image 14: Reddish base is visible

States Of Kajjali Change

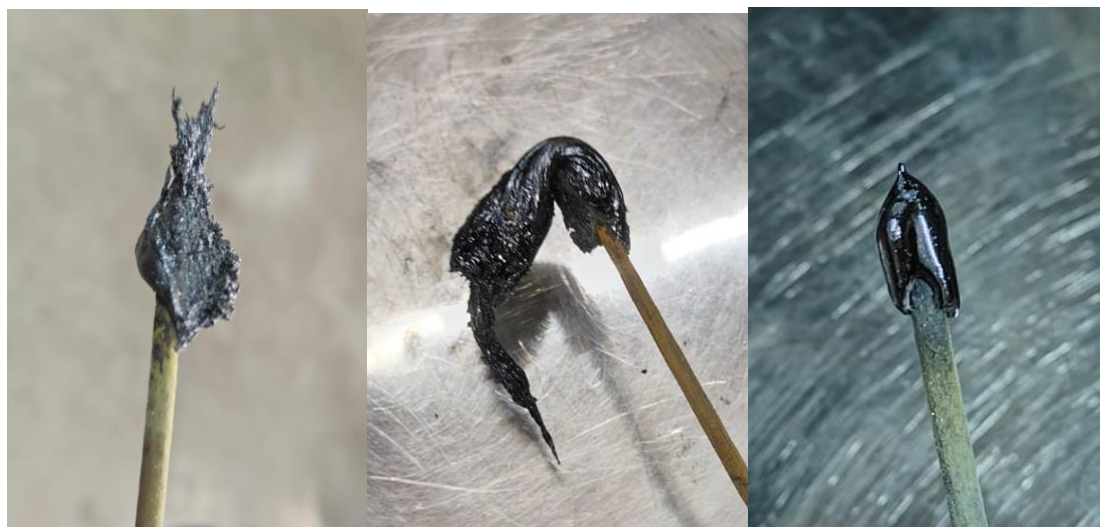


Image 15: Swelled up Kajjali **Image 16: Partially Melted Kajjali**

Image 17: Melted Kajjali

Operational Definitions

- **Kramagni** indicates the time limit for maintenance of heating patterns. *Mrudu* (mild), *Madhyama* (moderate) and *Tivra* (intense) *Agni* (Heat) were maintained and the temperature patterns were recorded.
- **Shalaka Sanchalana** Insertion of hot and cold iron rod and Observation of Fumes and Flames
- **Hot Shalaka (Iron rod)** To burn extra sulphur or arsenic deposited at the neck region of Kupi.
- **Sheet Shalaka (Cold iron rod)** To know the state of Kajjali i.e. whether it is in powder form, in melted form, in boiling state or in sublimation stage of product.
- **Fumes** All the characters of fumes like colour, odour, intensity etc. were noted. They turn from whitish to yellowish as the time progresses.
- **Flame** Timing of appearance of flame, its colour, duration and height were observed. E.g. Blue colour flame is because of formation of SO₂
- **Mukhabandhan (Corking)** A piece of brick wrapped with muslin cloth being smeared with mixture of Multan Clay and water is used for corking

Confirmatory tests for Corking⁽²⁰⁾

- 1) **Ushna Shalaka Test (Hot Iron Test):** After Ushna Shalaka introduction at neck, no noticeable fumes escapes or any ignition of any flames suggesting no free sulfur or arsenic deposition
- 2) **Sheet Shalaka Test (Cold iron test):** Absence of sulphur like smell when the iron rod is inserted into bottle and smelled immediately; is suggestive of proper preparation of medicine.
- 3) **Red Hot Pictures:** Bottom of the bottle was like a red colour of the dawn when examined in darkness.
- 4) **Copper Plate Test:** In order to check and prevent loss of mercury this test is applied. If Mercury is started evaporating then it condenses on the cool copper plate leaving white spot on the plate



Image 18: Copper Plate Test

3) Post Heating Phase (*Pachata Karma*)

1) *Swangasheetikarana* (Self cooling):

After completion of *Tivra Agni* (Intense Heat) the MVY and EMF were allowed to cool on their own.

2) *Kupi Uddharana* (Removal of bottle)(21):

- In MVY After self-cooling the sand around the *kupi* was carefully removed and the bottle was pulled out
- In EMF the *Kupi* was removed after self-cooling.

3) *Kupibhedana* (Breaking of bottle) and storage of final product:

By scrapping, the layers of *Kapadmitti* were removed and *Kupi* was cleaned with wet cloth, and the level of product was marked. A thread soaked in spirit was tied around the middle of *Kupi* just below the marking and set on fire. It was kept horizontal and rotated so that the whole thread burned up completely. Then cold water is sprinkled, which facilitates the breaking of *Kupi* from the middle. Primarily *Talastha* (at base) *Sameerpanaga Rasa* was observed.



Image 19: Scrapping of Kupi



Image 20: Kupi Bhedana

- #### 4) Final Product:
- After *Kupibhedana* total weight is measured separately for *Talastha* & *Galastha* for both methods and mentioned below in the table

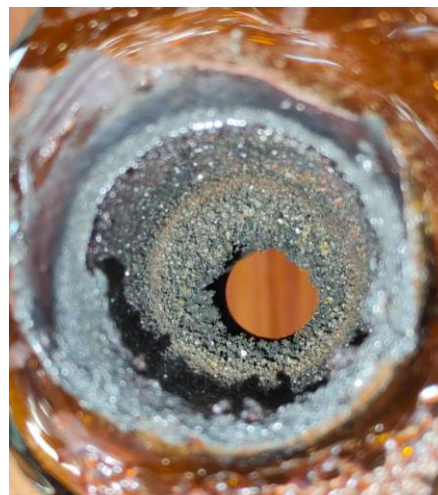


Image 21: Galastha Product



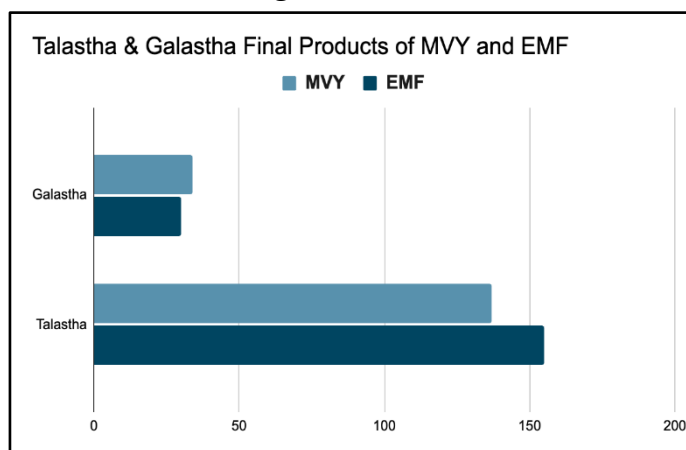
Image 22: Talastha Product



Image 23: After Grounding

	Modified Valuka Yantra	Electric Muffle Furnace
Initial Wt (g)	250	250
Galastha (g)	34	30
Talastha (g)	137	155
Total Wt (g)	171	185

Table 5: Comparison of Talastha & Galastha Final Product Weight



Graph 1: Comparison of Talastha & Galastha Final Product Weight

Observations and Results

The study utilized two separate batches:

- **Batch A (Modified Valuka Yantra):** The *Kupi* was placed in the center of the *Yantra*, surrounded by sand.
- **Batch B (EMF):** Heating was provided by Gas and burner.

The temperature ranges, duration for maintenance of *Mrudu*, *Madhyam* and *Tivra* agni (heating pattern) were recorded as follows:

		Modified Valuka Yantra SPR		EMF SPR	
Type Of Agni	Observation	Expected Temperature Range	Duration	Expected Temperature Range	Duration
Mrudu	Melting of <i>Kajjali</i>	36-365	20	37-365	13
Madhyam	Boiling of <i>Kajjali</i>	367-455	9	365-415	8
Tivra	Sublimation of <i>Kajjali</i>	455-620	12	415-580	7.66

Table 6: Comparison between Modified Valuka Yantra & EMF Agni Pattern

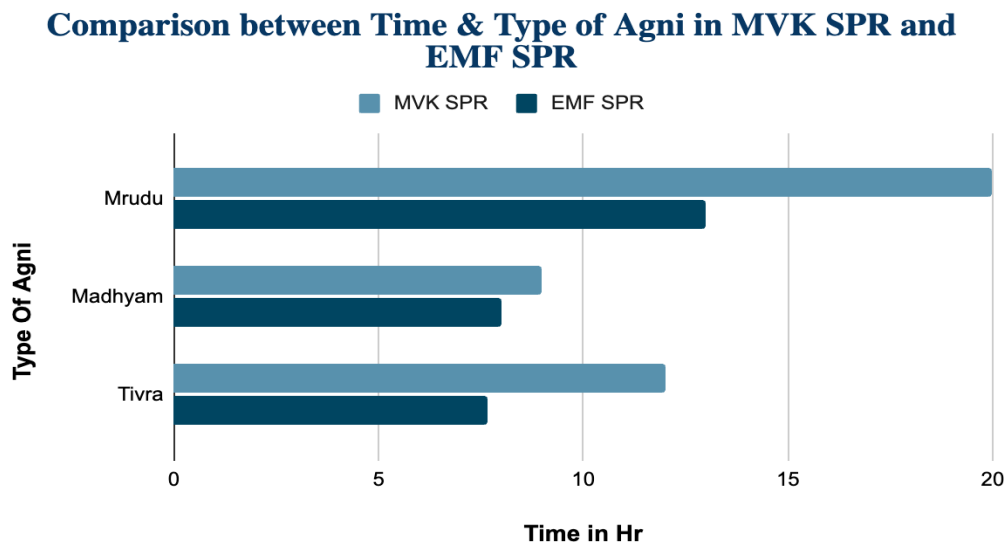


Diagram 1: This Graph Shows Relation of Type of Agni & Time in Hours

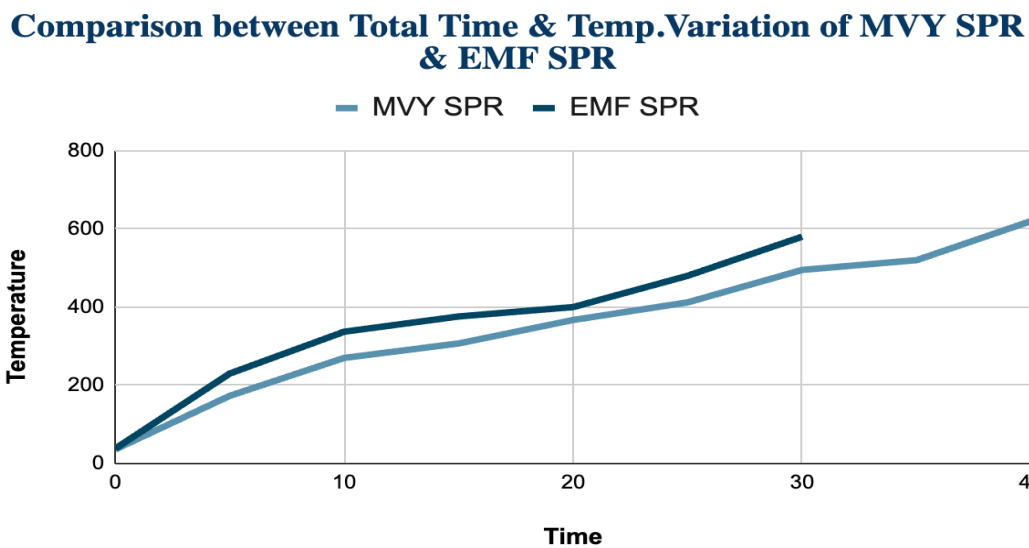


Diagram 2: Comparison between Temp Variation of Two Methods with time

Both the samples i.e. Sameerpanaga Ras prepared by Modified Valuka Yantra method and EMF were subjected to the same Ayurvedic Parameters. The results recorded are noted below.

Parameter	Modified Valuka Yantra SPR	Electric Muffle Furnace SPR
Shabda	Create sound on breaking	Create sound on breaking
Sparsha	Coarse but Heavy	Smooth & Heavy
Rupa	Brownish Black	Shiny solid black
Rasa	Niswada/ tasteless	Niswada/ tasteless
Gandha	Gandhahina/ Odourless	Gandhahina/ Odourless
Rekhapurnatva (Fineness)	Present	Present
Nishchandrata (Lustureless)	Present	Present

Table 7: Comparison of Final Product according to Ayurvedic Parameters

Comparative Yield

Parameter	Modified <i>Valuka Yantra</i> (MVY)	Electric Muffle Furnace (EMF)
Total Duration	41 Hours	28.66 Hours
Max Temperature	620°C	580°C
Product Color	Brownish black	Shiny solid black
Total Yield (Recovery)	~68.4%	~74%
Nature of Product	Slightly more brittle mass	Dense hard mass at bottom

Table 9: Comparative Yield of Modified *Valuka Yantra* & Electric Muffle Furnace**DISCUSSION:****a) Comparing Yields**

Modified *Valuka Yantra* gives approx 68.4% yield while EMF gives up to 74% output suggestive of almost 5.6% extra product while the total durations are 41 hours and 28.66 hours respectively, showing extra Time, Fuel and Efforts needed.

b) Control

Though Due to Changes, Modified *Valuka Yantra* give more precise control over Traditional *Valuka Yantra* but Electric Muffle Furnaces digital Precision and constant Acceleration in heating is more effective.

c) Stability of the process

LPG Gas Burner produces erratic fumes due to air draft whereas in Furnace there is steady, localized emission in the EMF.

d) Significance of temperature gradients

- *Mrudu*, *Madhyam* & *Tivrangni* mentioned in the article are primarily decided on the basis of State of *Kajjali* and other Supporting Symptoms (Observational Reading) rather than dividing and distributing total time in three equal parts (Theoretical Reading).
- In Both Methods *Mrudu Agni* temp is almost equal i.e. 365oC, But the duration in *Valuka Yantra* Method is

significantly more (20 Hrs) than Muffle Furnace Method (13 Hrs).

- *Madhyamagni* is almost for the same duration but shows higher temperature for *Valuka Yantra* than Muffle Furnace.
- In *Tivragni* Phase *Valuka Yantra* shows higher temperature for longer duration than Muffle Furnace.

e) Physical characteristics of the final product

EMF made product shows better organoleptic properties (colour, consistency etc) than MVY method but after grounding it in fine powder form, shows reddish brown colour.

f) Base Colour before Corking

In *Valuka Yantra* Method just before corking the base Golden Colour base was seen whereas in EMF machine Reddish colour was prominent. This concept required further comprehension and needed better understanding upon detailed analysis. The researcher has attempted to document and express the actual observations as perceived during the procedure.

g) Energy Source

LPG Gas is a readily available energy source whereas the Muffle Furnace runs on electricity. The only limitation is electricity loss in between the process resulting in defective yield.

CONCLUSION:

Both the Modified *Valuka Yantra* and Electrical Muffle Furnace (EMF) methods successfully produced *Sameerpannaga Rasa* (SPR) meeting classical Ayurvedic standards for *Ubhayastha* characteristics, color, and therapeutic compatibility as per Text.

EMF demonstrated clear practical superiority, achieving higher recovery yields, significantly reduced processing time and enhanced reproducibility through precise controls eliminating manual fuel variability.

Importantly, the use of EMF does not compromise the foundational principles of *Ayurveda*; rather, it supports them by ensuring precision, safety, and standardization in the preparation of *Kupipākva Rasāyana*.

Acknowledgements

The authors are deeply grateful to their teachers and mentors for their constant guidance, encouragement, and support throughout this work. They also sincerely appreciate the institutional facilities and the academic environment that made the completion of this study possible.

Conflict Of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that may be construed as a potential conflict of interest.

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Source of Support: None declared

Conflict of interest: Nil

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