

An Easy Way to Prepare *Kupipakwa Rasayana* by Muffle Furnace

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Abstract

Rasaushadhies are more popular due to their low dose, palatability and short acting nature. *Murchana* process increases disease curing ability of Mercury (*Parad*). *Kupipakwa rasayana* is one of the most important *murchana* which is prepared in specially designed glass bottle (*kachkupi*) in sand-bath (*valukayantra*) with a particular heating pattern (*Kramagni*). *Kupipakwa Rasayana* is more potent than all mercurial preparations due to its *ushna*, *tikshna*, and *laghu* guna properties, hence it is popular with Ayurved physicians. But its preparation is complex and require precision. Preparation of *Kupipakwa rasayana* by traditional methods requires more time, manpower, fuel and efforts which make it more laborious. With the help of modern technology *Kupipakwa rasayana* can be prepared easily in limited time with less manpower and efforts by using muffle furnace. In the present paper an easy way to prepare *Kupipakwa rasayana* with greater temperature control has been discussed.

Keywords

Kupipakwa, Rasayana, Muffle, Furnace



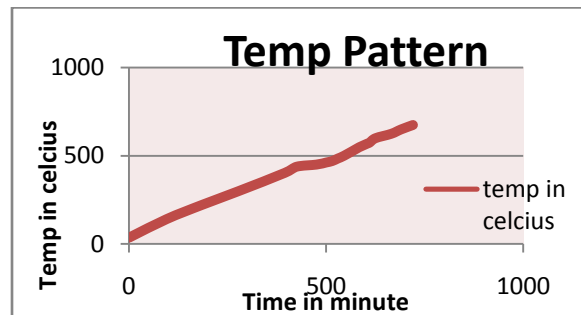
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INTRODUCTION

In today's era of modernization sedentary lifestyle generated *Kapha* prominent diseases are affecting overall health of a population globally. In these diseases no mercurial preparations are as effective as *Kupipakwa rasa*. Preparation of *kupipakwa rasayana* by traditional methods involve heating glass bottle (*kupi*) filled with ingredients in sand-bath using *chulha* and wood as fuel. More time is required for the preparation due to poor temperature control. Amount of heat and combustive fumes emitted from *Chulha* makes preparation laborious. One single person cannot handle all operating procedures. Temperature regulation and pollution due to combustion is another big trouble in traditional methods. With the help of modern electric heating devices, drawbacks in traditional methods of preparation can be overcome. Electric muffle furnace is a front loading box type oven or kiln. It consists of a heating chamber in which materials to be heated are kept. This chamber is constructed by mild steel sheet and channel. Heat is supplied to this chamber from resistance heating element placed around and transmitted by radiation. Fire clay bricks provide thermal

Graph 1 Kramagni (Heating pattern) during preparation.



insulation. A lining with refractory bricks is made, heating elements are embedded on the refractory lining and their terminals are taken out for connecting to electric power supply (**Fig.1**). Temperature is controlled and monitored by using thermostat and thermocouple. In traditional method *Valukayantra* used for uniform controlled temperature, here muffle furnace gives much greater control on temperature uniformity. *Kupipakwa rasayanas* are mainly divided into three types based on the position of final product deposited in glass bottle.

- 1) *Kanthastha/Galastha*- Ex: *Rasasindoor*, *Tamrasindoor*, *Rajatsindoor*, *Makardhwaj*
- 2) *Adhastha/talastha*- Ex: *Rasasindoor*, *Sameerpannag*
- 3) *Ubhayastha*- Ex: *Purnachandrodaya*.

AIMS AND OBJECTIVES

1. To prepare *Rasasindoor* in electric muffle furnace.

2. To prepare *Tamrasindoor* in electric muffle furnace.
3. To develop Standard operating procedure (SOP) of *Kupipakwa rasayan* by modern heating equipment.

MATERIALS AND METHODS

In present study *Rasasindoor* and *Tamrasindoor* examples of *Kanthastha kupipakwa rasayana* with same heating pattern were prepared as per textual references using single electric muffle furnace. **Tables**

Table1 Showing ingredients of *Rasasindoor* and *Tamrasindoor*

Name	Ingredients
Rasasindoor	Sh.Parad-75gms, Sh.Gandhak-75gms Vatankur swaras
Tamrasindoor	Sh.Parad-75gms, Sh.Gandhak-75gms Sh. Tamra coils-37gms

Table 2 Temperature and duration

Type of Agni	Temperature range	Duration
Mrudu	Up to 250°C	3 hours
Madhyam	250 to 500°C	6 hours
Tivra	500 to 675°C	3hours

Ingredients^{1,2}: Table 1

Preparation of *Kupipakwa rasayana* divided in three phases-

- 1] *Purvakarma*/Preheating phase
- 2] *Pradhankarma*/Heating phase
- 3] *Paschatkarma*/Post heating phase

1] Preheating Phase- It includes

a)Collection of equipments

Khalvayantra, Glass bottles (*Kachkupi*), Funnel, Iron rod (*shalaka*), Electric muffle furnace, Brick and Multani mitti

b) Wrapping of Glass bottle (kachkupi)

Glass bottle was wrapped with 7 layers of cotton cloth strips smeared in *multani mitti*. Two *kupi* were prepared.

c) Shodhan of ingredients³⁻⁵

Parad, *gandhak*, *Tamra* coils were subjected to purification (*Shodhan*) as per textual reference.

d)Preparation of kajjali⁶

For Rasasindoor:

Shuddha parad and *shuddha gandhaka* were triturated together for several hours till the mixture turns smooth black colored, lusterless powder called kajjali. Kajjali was levigated by adding sufficient amount of *vatankur swaras* (Leaf bud juice of *Ficus bengalensis* Linn.). Two more *bhavna* of *vatankur swaras* was given and allowed to dry completely.

For Tamrasindoor:

Shuddha parad and *shuddha gandhak* was taken in *khalvayantra* and triturated till it turns into smooth black coloured powder. *Shuddha tamra* (Purified copper) coils were mixed with *kajjali*.

e) Kupibharan (Filling ingredients in glass bottle)

Kajjali prepared for *Rasasindoor* and *Tamrasindoor* were filled in separate *kupi* with the help of funnel.

2]Pradhankarma/Heating phase:

a)Kupi sthapan(Fig. 2)

Both bottles filled with ingredients were kept in heating chamber of muffle furnace and electric power supply was turned on.

b)Kramagni(Temperature regulation)and observation

Gradual increase in temperature was maintained during process of preparation. (Table.2)

Temperature displayed on screen of furnace and observations were recorded with respect to time.

c)Shalakachalan

Iron rod (*Loha shalaka*) was preheated till red hot by inserting it in the separate space provided in furnace. Red hot iron rod was introduced in the bottle to clean blockages in the neck.

d)Siddhi lakshan (Fig.3,4,5)

i) Blue flame coming from *kupi* was completely disappeared.

ii) Red coloured bottom-Torch light thrown inside glass bottle, tiny glittering particles were seen coming up and bottom of *kupi* appeared red.

iii) Cold iron rod (*shalaka*) inserted in bottle and removed. It was appeared clean.

e) Kupi mudran

Immediately after *siddhi lakshan* brick cork was inserted in mouth of each glass bottle tightly and sealed with *multani mitti*. Heating was continued for 675^oc for 30 min and electricity was turned off.

3] Paschatkarma / Postheating phase

a) Removal of glass bottle (Fig.6)

Next day after self cooling both glass bottles were removed from heating chamber. Layers of *kapad mitti* were removed with the help of knife.

Table 3 Observations recorded with reference to *agni* and precautions taken

Agni	Observations	Precaution
Mrudu	Melted kajjali	Controlled heat
Madhyam	Kajjali boiling, dense sulphur fumes, blue flame from glass bottle,	Shalaka chalan during intervals
Tivra	Red bottom of kupi	Cork application without delay

b) Breaking of glass bottle (Kupibhedan) (Fig.7)

Cleaned bottles were kept in a tray, thick thread soaked in kerosene was tied below lower boarder of the final product deposited in neck of each bottle and burned. After complete burning, heated portion of glass bottle was covered with wet cloth. Glass bottle broke immediately in sharp manner and final product was removed from each bottle.

OBSERVATIONS AND RESULT

Every Phase during preparation of *Kupipakwa rasa* was carefully observed and precautions were taken accordingly. (Table 3) Particular heating pattern called *Kramagni* (Gradual increase in temperature) was maintained accurately. (Graph.1) Quality and quantity of final products was accessed with respect to weight, colour, residue in bottom and *organoleptic test* (Table 4. Fig 8, 9)

Table 4 Assessment of final product

Name of drug	Wt. of final product	Wt. of Residue in bottom	Colour	Pariksha	Duration
Rasasindoor	78gms	Negligible	Red	Rekhapurna, varitar	12 hours
Tamrasindoor	75gms	35gms	Bluish red	Rekhapurna, varitar	12 hours

DISCUSSION

Rasasindoor and *Tamrasindoor* both are examples of *kanthastha kupipakwa rasayana* which require unique heating pattern (*Kramagni*). *Kramagi* literally means gradual increase in temperature during various stages of preparation. In first stage melting of *kajjali* was expected. Temperature up to 250°C, measured by the sensors located outside the glass bottle in

heating chamber of the furnace, was considered as *mrudu agni*. Temperature between 250-500°C was measured as *madhyam agni*. Duration of *madhyam agni* was more as compared to *mrudu* and *tivra agni* as it gives enough time for proper *gandhaka jarana* or formation of initial compound in the bottom. Third stage of preparation involves deposition of *Rasasindoor* and *Tamrasindoor* at the neck of bottle. Temperature between 500-700°C was considered as *tivragni*.

All principles of traditional methods were followed by heating chamber. It was designed in a way that the bottle below neck was surrounded by heating elements and by insulator coating above. In third stage *sindoor kalpa* was easily deposited at the relatively cooler surface of bottle.

Furnace was heated to desired temperature by conduction, convection and blackbody radiation from electrical resistance heating element therefore, there is no combustion involved. This gives much greater control of temperature uniformity. Time duration required for the preparation is limited due to control on desired temperature. Equal amount of ingredients were taken in both glass bottles which gave similar amount of standard quality yield.

CONCLUSION

In the present pharmaceutical study it can be concluded that concept of *kramagni* (controlled gradual increase in temperature) was maintained accurately by muffle furnace without any major fluctuation which

results in minimization of time duration of pharmaceutical procedure.

Furnace provides combustion and heat remittance free environment this ultimately decreases manpower and efforts for production. Standard quality final product was obtained.

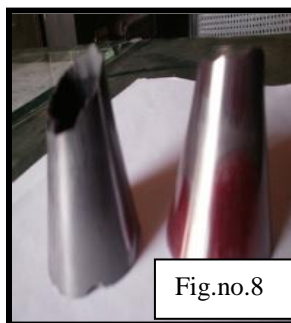
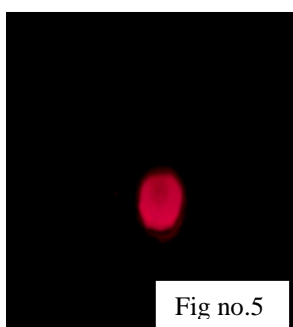
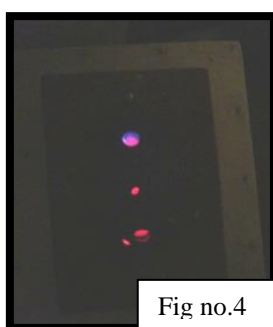
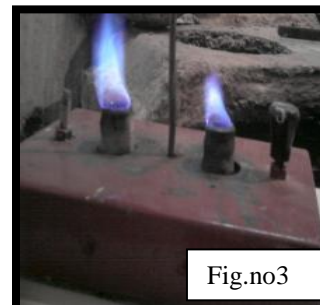
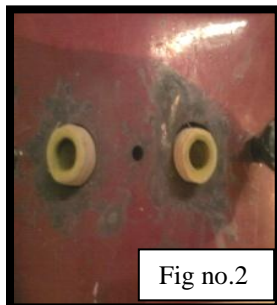
Muffle furnace can be used as better replacement for *Chulha* and *valukayantra* without disturbing principles of traditional methods.

Preparation of *Kupipakwa rasayan* is very complex and requires precision but by following this operative procedures(SOP) any *kanthastha kupipakwa rasayana* can be prepared.

Two different *kupipakwa rasayana* with same heating pattern can be prepared using single furnace provided weight of ingredients should be identical.

Considering all facts it is clear that this is an easy way to prepare *Kupipakwa rasayana*.

Figures of complete Procedure



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