



PUTA: A CLASSICAL METHOD OF BHASMA PREPARATION

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ABSTRACT

Bhasma is a herbo-mineral preparation manufactured from metal / mineral after following complex Ayurvedic pharmaceutical processes, *Shodana* (purification) and *Marana* (incineration). The measurement of heat required for *Marana* process in converting metal / mineral into *Bhasma* form is known as *Putra* and this heat amount is substance specific and measured in terms of fuel used while in Muffle furnace the subject material is isolated from the fuel. It is usually a front-loading box-type oven or kiln for high-temperature applications. The furnace is usually heated to desired temperatures by conduction, convection or blackbody radiation from electrical resistance heating elements. Objectives of this study is to see comparison between *Bhasma* prepared by *Putra* or by muffle furnace.

INTRODUCTION

Rasashastra is the branch of *Ayurveda* which was developed in the medieval period which deals with the drugs of mineral origin. Various impurities and toxins are present in these minerals. Elimination of this toxin is essential to make them therapeutically suitable for internal administration. This is done with the help of process like *Shodhana* & *Marana*. *Marana* involves conversion of metals & minerals into *Bhasma*. *Putra* plays vital role in *Bhasmikaran* of metals & minerals. It can also be utilized as a device to judge whether *Samyak Paka* of drug has been achieved or not. Fire generated with cow dung cakes helps to achieve this *Paka*.^[1] Different methods of *Putra* are advised according to physical & chemical nature of metals & minerals. It is mentioned in *Rasendra Chudamani* that more number of *Putas* makes metal highly effective.^[2]

Definition of *Putra*: It is a process in which the degree of heat, which is necessary for the incineration of *Rasa*, *Maharasa*, *Uprasa* or metals, is understood. It is seen that the degree of heat is neither less nor more than necessary in this process.^[3]

Advantages of *Putra*: It helps in converting the minerals into *Bhasma* & such *Bhasma* become *Apunarbhava*. In the state of *Bhasma*, mineral gain more beneficial qualities & become excellent. These *Bhasma* become *Varitara* & *Rekhapurna*. Due to such a process of *Putra*, minerals become very light & can readily assimilate. The digestive power is enhanced by intake of the *Bhasmas*,

which is due to the process of *Putra*. The *Bhasmas* of the metal like iron etc. attain more superior qualities than the *Parada*, which has undergone the process of *Jarana*. These minerals by the impact of the process of *Putra*, turn into *Bhasma* & obtain excellent qualities when confined into *Samputa* & become *Rekhapurna* powder, by the heat of the external fire & attain beneficial qualities.^[4] According to *Rasendra Sara Sangraha Putas* numbering 10-100 enhances *Vyadhihara* property, 100-500 *Putas* produces *Vajeekarana* property & the *Putas* numbering 10-1000 are claimed to have the *Rasyana* property.

Types of *Putra*: On the basis of the nature of heat given it is classified into 3 types i.e.; *Surya Putra*, *Chandra Putra* and *Agni putra*. On the basis of intensity of heat given, *Agni Putra* is again divided into three parts *Mridu Agni*, *Madhyama Agni* and *Tivra Agni*. *Lavaka putra* and *Kapota Putra* can be included under *Mridu agni*, *Kukkuta Putra* and *Varaha Putra* included under *Madhyama Agni*, *Gaja Putra* and *Maha Putra* under *Teevra Agni*.

***Anukta Putra Mana Nirdesha*:** *Dhatu* & *Rasa Paka* in which *Putra* is not mentioned, then according to *Putra Dravya* hardness or softness *Mridu* or *Mahaputra* should be used.

Dimension and temperature attained by different *Putas*.

SL.NO	Name of the <i>Putas</i>	Classical dimension	Metric system	Max. Temp
1	<i>Mahaputa</i>	2 <i>Hasta</i>	91x91x91	1000°C for 1 hr
2	<i>Gaja puta</i>	<i>Rajahasta</i>	57x57x57	1000°C for 1 hr
3	<i>Kukkuta puta</i>	2 <i>vitasti</i>	46x46x46	1000°C for 1/2 hr
4	<i>Varaha puta</i>	1 <i>Aratni</i>	42x42x42	1000°C for 1/2 hr
5	<i>Laghu puta</i>	8 <i>Upala</i>	23x23x23	800°C for ½ hr
6	<i>Bhudhara puta</i>	-	20x20x20	140°C for ½ hr
7	<i>Gorbara puta</i>	1 <i>Vitasti (Ht)</i>	23x23x23	400°C for 4 hr
8	<i>Bhanda puta</i>	<i>Brihat Bhanda</i>	-	400°C for 8 hr
9	<i>Valuka puta</i>	<i>Brihat Bhanda</i>	-	400°C for 6 hr

Parts of *Putas*: The procedure of *Putas* involves usage of material which includes *Samputa*, *Upala* and *Chakrika*. The place used to keep *Chakrikas* during incineration process is called *Samputa*. The use of different *Samputa* is made according to procedure involved which includes *Sharava Samputa*, *Kamsya Samputa*, *Lavana Samputa*, *Suranakanda Samputa*, *Patra Samputa* etc. An ideal *Samputa* is characterized by its inertness, stability to heat & it should neither be thick nor to thin. It should not conduct heat as well. *Upala* is made used to generate heat in *Putas*. *Gorvara* (the dried cow dung powder and husk of paddy) can be used in place of *Upala* & small *Putas*. Material after levigation, is made into uniform round shape called *Chakrikas* or pellets. To avoid fast loss of moisture & cracking, pellets are dried in shades.

***Putas Vidhi*:** The drug is first collected followed by *Shodhana* which involves removal of physical & chemical impurities. The reduction in particle size is brought about *Churnikarana*. This is followed by *Bhavana* of drugs with juices or decoction of herbs. Small flat round pellets called *Chakrikas* are made dried & kept inside earthen plate called *Sarava* & than closed with another. Clay smeared clothes are made use for sealing earthen plate & kept for drying. Cow dung cakes are used for heating of sealed earthen pots.

Marana is a process by which metals and minerals are converted into a consumable form (*Bhasma*), which makes them easily assailable with higher medicinal values. *Putas* is one of the major principles of *Marana*. It indicates the quantum of heat required for the *Paka* of *Rasadi Dravyas*. To save the manual labour, prevention of pollution, bulk production and ultimately for the better result the modern devices are the need of the time. Among the various types of furnace, muffle furnace can be correlated to *Putas*. Details of their working performance and output should be established, drying, heating are the important steps hence before shifting on them temperature pattern should be standardized and then these can be utilized.

Furnace Definition

A furnace is a device used for high-temperature heating. The name derives from Latin word *formax*, which means oven. The heat energy to fuel a furnace may be supplied directly by fuel combustion, by electricity such

as the electric arc furnace, or through induction heating in induction furnaces.

Muffle furnace is a furnace in which the subject material is isolated from the fuel. It is usually a front-loading box-type oven or kiln for high-temperature applications. The furnace is usually heated to desired temperatures by conduction, convection or blackbody radiation from electrical resistance heating elements.^[6]

STRUCTURE

Outer chamber of the muffle furnace is created using mild steel sheet because it has better malleability, weld ability and ductility properties than cast iron along with corrosion resistance. Outer chamber of the muffle furnace has a thick epoxy paint coating to give it an aesthetically desirable appeal and also to induce few more years to the shelf life of the equipment on being operated at elevated temperatures.

Inner chamber of the muffle furnace is made of either pre fabricated ceramic molds or firebricks depending upon the size and temperature requirements of the finished equipment. PID Digital temperature controller cum indicator can be used for its exemplary reputation as immaculate temperature control device. Insulation is the most important factor in working of a muffle furnace and hence extra care is taken while designing this part of the furnace. The insulation being used in our muffle furnace is a combination of ceramic wool and mineral wool because we have engineered and found out that when used in combination they prove to provide better thermal insulation and less heat loss. Lab muffle furnaces are constructed to generate heat up to 1200°C.

The high temperatures inside a muffle furnace attained by utilizing heating properties of Nichrome (nickel-chromium) wires which are called electrically operated heating elements. The temperature regulation in a furnace is highly dependent on the efficiency of electronic controller unit, although best results can only be obtained by applying PID (Proportional integral derivative controller). The laboratory muffle furnaces are not equipped with sophisticated cooling system as it is mostly not required. Most of the time a simple fan based exhaust system is installed and cooling is performed by this simple fan system supported by a chimney that too if desired in special cases. The main utility of this furnace

exhaust system is to take out the toxic gases from the inner chamber which comes out during heating of the testing material / specimen inside the chamber. Hence the chamber gets sanitized of any toxic gases which may have evolved during the heating of material inside the lab muffle furnace. The muffle furnace is used when a controlled atmosphere is desired to prevent oxidation during heat treatment in high temperatures.^[7]

Similarities between *Putra* & Muffle Furnace

1. Both *Putra* and muffle furnace are meant for high temperature applications.
2. Subject material is isolated from the fuel.
3. Gradual reduction in the temperature after heating.
4. Available in different types depending upon the substance to be subjected for heating.

MUFFLE FURNACE –ADVANTAGES

1. Less labour work.
2. Uniform distribution of heat
3. Gradual increase and decrease in the temperature.
4. Regulation of temperature.
5. Temperature indicator.
6. Environmental friendly.

DISADVANTAGES

1. Consumes more electricity.
2. Not suitable in the areas prone to power cuts.

PUTA –ADVANTAGES

1. Can be given at any place
2. Cheap compared to muffle furnace.

DISADVANTAGES

1. Lack of availability of *Upala*.
2. Lack of standardization of *Upala*.
3. Difficulty in maintaining the temperature.
4. More labour work.
5. Temperature has to be recorded manually using a pyrometer.
6. Climatic conditions can vary the temperature.
7. Pits of various sizes are required for different *Putra*.
8. Maximum heat loss as it is an open structure.

CONCLUSION

Marana literally means killing the metal and minerals which is possible by subjecting a drug to a particular temperature through *Putra*. In the present era where there is a huge demand for *Bhasma*, preparation of the same using a *Putra* is not a convenient method due to lack of availability of fuel and other reasons mentioned. On the other hand muffle furnace can be used instead of *Putra* provided the temperature pattern is standardized.

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