PUTA

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INTRODUCTION

RASADRAVYAS can be used safely only after pharmaceutical processing.

- These include, Maradana, Dhalana, Jarana etc.
- Agni plays an important role.
- For providing Agni, various Putas have been described.

IMPORTANCE OF AGNI

- Agni is the basic.
- One of the panchmahabhoota.
- Plays a very important role in formation of any type of medicine.
- Transformation and conversion of dravya and making them for suitable for use.
- Arkaprakash explained 6 types of agni.

  Dhumaagni, Mandagni, Deepaagni,

  Madhymaagni, Kharagni, Bhutaagni.

DEFINITION

RASADIDRAVYA PAKANAM PRAMANA JNAPANAM PUTAM|

NESHTO NYOONADHIKAH PAKA: SUPAKWAM HITAMOUSHADHAM ||(r.r.s.10/47)

- Agni used for the paka of Rasa, Uprasa, Sadaranarasa, Dhatu, Updhatu, Ratna,Upratna known as Puta.
- If less or more agni subjected to dravya can destroy its properties. Only “SUPAKWA” dravya considered as Hita oushadha.

USES OF PUTA

- Bhasamikarana
- Remove doshas
- Increases quality (Guna`s)
- Convert drugs of minerals, metals origin in to light form as a result these do not sink in water.
- Develop dipana property which stimulate whole metabolic process of the body.

PUTA SANKHYA

- Depends on the Drug subjected for puta
- i.e. Mridu, Madyam, Kathin dravya.
- Varies acc. to different Acharyas .
- Normally it contains 10 – 100 Puta.
- In case of Rasayana Karma of Abhraka it contains 100 – 1000 .
- For vajikarna 10 – 500 (R.S.S.1/35)
- In somala – 1 puta
- Sankha, shukti – 3 puta
- In Suvarna and Tamra number varies from 1 – 40.
- Depends upon the process and nature of drug.

PUTA KRAMA

- Shodhita → Bhavana → Chakrika (Pellets) → Dry → Sharava samputa → Sandhibandhana → Dry → Puta → Swangasheeta → Collection of Bhasma → Bhasma pareeksha

Types of Puta

- Divided in to 3 types, depending upon source of energy:
- Chandra Puta
- Surya Puta
- Agni Puta

Above 3, Chandra and Surya Puta depends on the natural source of energy. i.e. on sun and moon.

CHANDRA PUTA

Acc to (Rasa Tantra Sara.- 1 Pg No.191).

- Explained for Pravla Bhasma.
- Also known as samskra vishesha.

SURYA PUTA

- Also known as Rudra / Bhanu Puta.
- After bhavna subjected for Sunlight.
- Paka takes place due to sun light.
- Explaination given in Rasa Tantra Sara-2 Pg no 21
- Pravla Bhasma (Surya Puti).
- Also in RRS 5/134.
- RT 3/38,20/22,24.
- Ayurved Prakash 3/255.

AGNI PUTA

- Artificial source of energy.

Types explained depending upon Agni(Fire)

- For more (Atitivra): Mahaputa etc.
- For moderate(Madhyam): Gajaputa, Kukutaputa etc
- For less (Manda or Atimanda) : Laghuputa etc.

Agni Puta Types

- Mahaputa
- Gajaputa
- Kukutaputa
- Varahaputa
- Laghu (Kapota) Puta
- Bhudhraputa

Acc to fuel / Instrument used :

- Govar (Lavakaputa)
- Bhanda (Kumbhaputa)
- Valukaputa

MAHAPUTA

- Total no of Cow Dung :1500
- 2 x 2 x 2 (Rajahasta)
- Used for Tamra, Parda, Suvrna,Vajra and Trivanga Bhasma.
- Acc.to Shargdhara 30 vanyopala.

GAJAPUTA

- 1.1/4 x 1.1/4 x 1.1/4 (Rajhasta)
- Ground should be flat and dry.
- Total no. of Cow Dung Used : 1000
- Akika, abhraka, rajata ,yashada, loha, suvarna, vajra, hartala, godanti, trivanga bhasma.

ARDHAGAJAPUTA

- Told in different Rasa text but no one explained
- Acharya Yadavji explained about Ardhagajaputa for the marana of Tamra and Vanga. (45.3x45.3x45.3)cm.
- Cow dung used: 500

Varaha Puta

- 1 x 1 x 1 (Aratni) (42cm)

Different opinion about no of vanyopala.

- No. of Cow Dung : 150

Acc. to RPS : 500(400+100)

- Also known as krodaputa, varnayakhya.
- Used for abraka, tamra, rajta.

KUKKUTA PUTA

- 2 x 2 x 2 beeta (46 cm) pit is made on dry and plane surface.
- Shrava placed in between and ignite fire.
- Acc to RPS 10/46 : Use of 300 vanyopala.
- Some other mentioned about the use of 10 vanyopala.
- *Used for Tutha, Parada, Loha, Svarna Bhasma.*

KAPOTA PUTA

- Also known as laghu puta, mriduputa, and swalpa puta.
- Small pit is made on dry surface
- Shrava samputa is taken and place in between of 8 vanyopala.
- *Used for marana of rajata, svarna.*

GORVARA PUTA

- Use of dry Cow Dung Powder.
- Mix it with Tusha.
- Acc. to AchryaYadavji (64 tola Dry Cow Dung Powder + 64 tola Tusha).
- *Used for Parada Bhasma.*

KUMBHA PUTA

- Also known as Bhandaputa, mridubhandaputa.
- Tusha is taken in earthen mud pot .
- Fill it up to neck and put the shrava samputa in middle of pot and ignite fire.
- Bhavaprakasha also explained the same.
- Used for Hartala, Somal Bhasma.
- No explanation about duration of agni.

Valuka puta

- Different opinion of different Acharyas:
- Acc to RRS : Valuka is taken in earthen mud pot
- Fill it up to neck and put the shrava samputa in middle of pot and ignite fire.
- Acc to Vagbhata : explained use of Baluka only.
- Some text told about the use of Lavana, Kshara, etc.

BHUDARA PUTA

- 2 angula prmana of pit should be made.
- Put aushadhi yukta shrava inside pit .
- Cover pit with vanyopal.
- Set fire.
- Used for jarna and parada bhasma.

LAVAKA PUTA

- Smallest among all.
- Shodashi pramana (4 tola acc. To KalingaMana).
- *Used for bhasmikarna of mridu dravya*

  i.e.gandhak
- Resembles with Lavaka bird(goraiya).

ANUKTA PUTA

- ANUKTA PUTAMANENA TU SADHYADRAVYA BALAABALAAT|
- PUTAM VIJYAYA DAATAVYAM OOHAPOOHAVICHAKSHANAI:|| (r.r.s.10/64)

Synonyms of Vanopala

- Upala
- Chhana
- Utpala
- Chagana
- Gerenideka
- Gobar

PUTA IN PRESENT DAY

- Compared with Muffle Furnace.
- A **furnace is a device used for heating.** sometimes as a synonym for kiln, a device used to fire clay to produce ceramics.
- In British English the term *furnace is used*

  exclusively to mean industrial furnaces which are used for many things, such as the extraction of metal from ore (smelting).

Contd…

- *Furnace can also refer to a direct fired heater,* used in boiler applications in chemical industries or for providing heat to chemical reactions for processes like cracking, and is part of the standard English names for many metallurgical furnaces worldwide.

TYPES

- Blast furnace
- Steelmaking furnaces:
- Paddling furnace
- Bessemer converter
- Open hearth furnace
- Basic oxygen furnace
- Electric arc furnace
- Electric induction furnace
- Vacuum furnaces

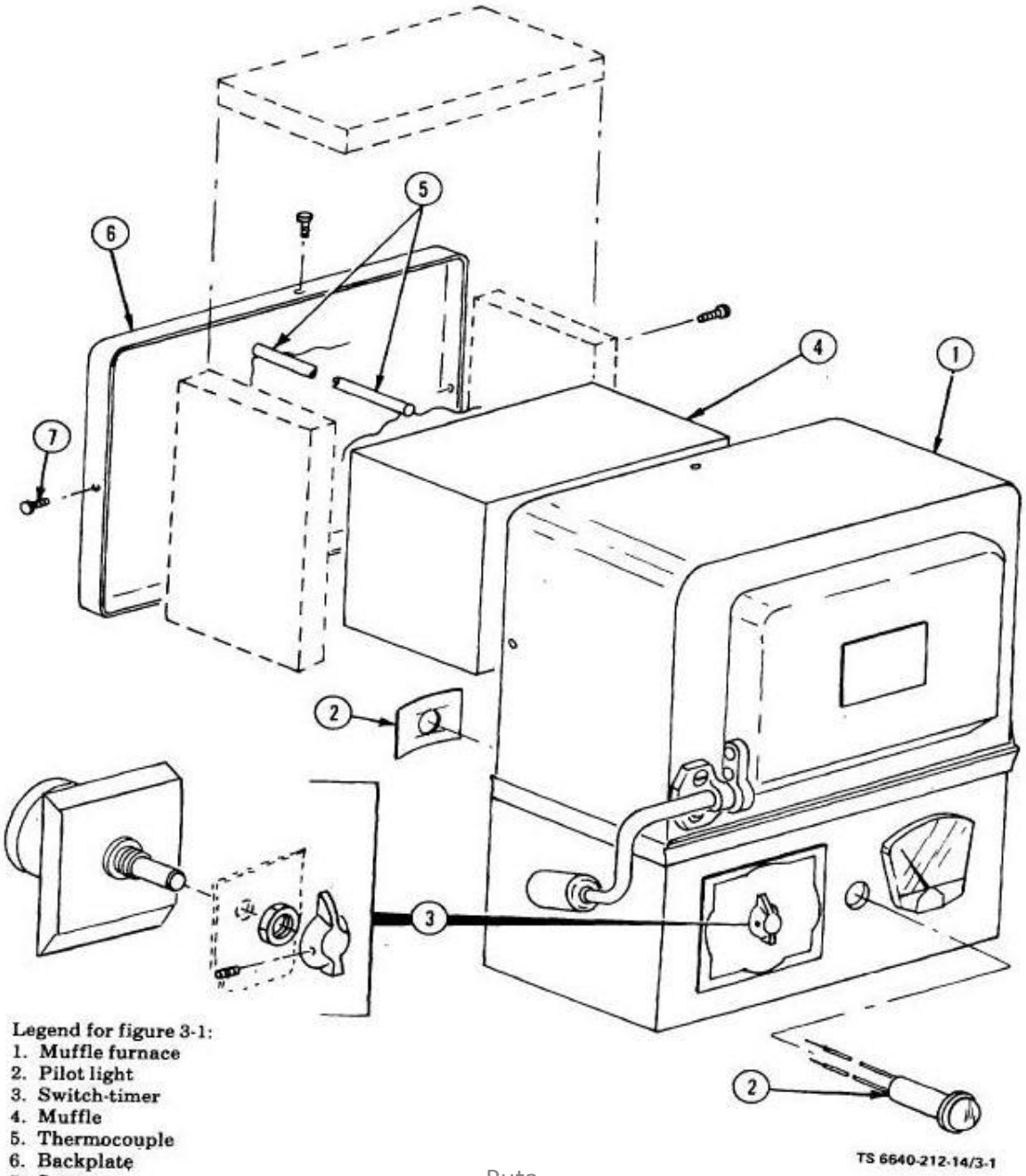
INTRODUCTION

What is a Furnace?

- Equipment to melt metals
  - Casting
  - Change shape
  - Change properties
- Type of fuel important
  - Mostly liquid/gaseous fuel or electricity
- Low efficiencies due to
  - High operating temperature
  - Emission of hot exhaust gases

PARTS

1. Burners: raise or maintain chamber temperature
2. Chimney: remove combustion gases
3. Furnace chamber: constructed of insulating materials
4. Hearth: support or carry the steel. Consists of refractory materials
5. Charging & discharging doors for loading & unloading stock



Legend for figure 3-1:
1. Muffle furnace
2. Pilot light
3. Switch-timer
4. Muffle
5. Thermocouple
6. Backplate
7. Screw

DIGITAL MUFFLE FURNACE

VERTICLE MUFFLE FURNACE

BARRIER MATERIAL

- **Silica Brick**
- >93% SiO2 made from quality rocks
- Iron & steel, glass industry
- Advantages: no softening until fusion point is reached; high refractoriness; high resistance to spalling, flux and slag, volume stability

TYPE OF FURNACES

1.Forging Furnace

- Used to preheat billets/ingots
- Use open fireplace system with radiation heat transmission (Genration of Radiatior).
- Temp 1200-1250 oC
- Operating cycle
  - Heat-up time
  - Soaking time
  - Forging time (adjustment –cooling)
- Fuel use: depends on material and number of reheats

TYPE OF FURNACES

2.Re-rolling Mill Furnace – Batch type

- Box type furnace
- Used for heating up scrap/ingots/billets
- Manual charge / discharge of batches
- Temp 1200 oC
- Operating cycle: heat-up, re-rolling
- Output 10 - 15 tons/day
- Fuel use: 180-280 kg coal/ton material

TYPE OF FURNACES

3.Re-rolling Mill Furnace – Continuous pusher type

- Not batch, but continuous charge and discharge
- Temp 1250 C
- Operating cycle: heat-up, re-rolling
- Output 20-25 tons/day
- Heat absorption by material is slow, steady, uniform

Refractory walls of a furnace interior with burner blocks

Refractory lining of a furnace arc

TYPE OF FURNACES

4.Continuous Reheating Furnaces

- Continuous material flow
- Material temp 900 – 1250 C
- Door size minimal to avoid air infiltration
- Stock kept together and pushed
  - Pusher type furnaces
- Stock on moving hearth or structure
  - Walking beam, walking hearth, continuous recirculating bogie, rotary hearth furnaces

PRECAUTION DURING OPERATION

To avoid electrical shock,

- 1. Be installed by a competent, qualified electrician who insures compatibility among furnace specifications

- 2. Always be disconnected from the electrical supply prior to maintenance and servicing.

Contd..

To avoid personal injury:

1. Do not stand directly in front of the chamber without wearing a heat resistant face shield, gloves and apron.
2. Do not operate or clean furnace without proper eye protection.
3. Do not use in the presence of flammable or combustible materials; fire or explosion may result.

IMPORTANCE OVER PUTA

- Cost effective
- Any time operatable
- Can adjust temp.according to need
- Minimum heat loss.

APPLICATION

- To prepare Ash of organic, inorganic samples.
- Heat treating small steel parts.
- Ignition tests.
- Gravimetric analysis.
- Determination of volatile and suspended solids.
- Material testing.
- Pre-heating, melting, incinerating.
- Drying

PRESENT DAY NEED

- No standard made for Cow Dung in classical text. e.g. about shape, size , weight etc.
- No explanation found regarding temperature and its duration.
- Not possible to use on large scale (Industrial level)
- Availablity of Standard Cow Dung cakes in present time.

Kasisa bhasma nirmana (laghu puta)

Godanti bhasma nirmana (Gaja puta)

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Thank u…