



Original Research Article- Pharmaceutical Study

TAMRA SINDOORA : A CONCEPTUAL FRAMEWORK AND EMPIRICAL EXPLORATION

M.S.DODDAMANI¹, SWAROOPA.P², ROHIT A GOKARN³

ABSTRACT:

Background: Introduction of *Rasashastra* has opened new frontiers for Ayurvedic pharmacology and pharmacotherapeutics. *Kupipakva Kalpana* (medicine prepared in glass bottle) is one among important drug preparatory methods. Though this method is complex and exhaustive, it has an important role in the field of treatment in this Nuclear era. Validity of this branch of science totally depends on the successful completion of the practical aspects. The present study was executed to establish a fingerprint for this unique formulation which can be used further for drug standardization. **Objective:** Preparation of *Tamra Sindoor* as per classical reference. **Materials and methods:** The *Kajjali* (fine black lustreless powder) of *Tamra Sindoor* in *Kacha Kupi* (glass bottle) was processed with *Kramagni tapa* (graded heat pattern) in *Bhatti* (traditional furnace) for 36hrs. **Observation & Results:** Melting of *Kajjali* (Black lustreless mercurial compound) was observed at around 260⁰C, whereas the flame started at 580⁰C. Maximum temperature required for production was 676⁰C. Final yield of 39% was observed in preparation of *Tamra Sindoor*. **Conclusion:** *Tamra Sindoor* is *Sagandha, Bahirdhuma, Kantastha Kupipakwa Rasayana* (Sublimated compound formed in glass bottle). It can be prepared in 36 hours following classical guidelines.

Key words : *Tamra Sindoor, Kupipakwa Rasayana, Parada, Gandhaka, Tamra.*

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INTRODUCTION

Indian alchemy developed a wide variety of chemical processes for the transmutation of metals, in which mercury occupied a prime position. The literature on *Rasashastra* is perceptibly voluminous and methodical in the presentation of a variety of processes with wide range of applicability. *Kupi Pakva Rasayana* (medicine prepared in glass bottle) one among these *Kupipakwa rasayana* is a unique pharmaceutical preparation where the drug is prepared in a glass bottle called *kupi* and the processed in a *Bhatti* (traditional furnace) with a gradual rise in temperature.^[1]

Tamra Sindoor, a classical *Kupipakwa Rasayana* containing *Parada* (Mercury), *Gandhaka* (Sulphur) & *Tamra* (Copper) in 1:2:2 proportions. As per classics it is *Sagandha* (Preparation with sulphur), *Bahirdhuma* (formulation which is prepared without closing the lid of bottle), *Kantastha* (Product collected in the neck region) *Kupipakwa Rasayana* potentiated with *Agni samskara* (Heat treatment) for 36 hours.^[2] The process converts the metal in to a chemical compound with necessary medicinal benefits.

In the wake of the present surge of increased global, curiosity regarding safety and efficacy of various metallic and mineral

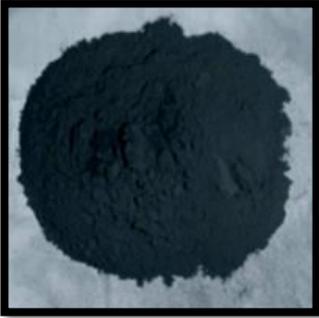
preparations in *Rasashastra* along with the reproducibility of a good quality product there is an imminent need to pay attention to the establishment of standard pharmaceutical procedure. Hence the preparation of *Tamra Sindoor* was taken up for present study to establish its feasibility.

MATERIALS AND METHODS:

Raw materials like *Parada* (Mercury), *Gandhaka* (Sulphur), *Tamra* (Copper) were procured from authentic sources. Extraction of *Parada* (mercury) from *Hingula* (cinnabar) was done by *Urdhwa Patana yantra* (upward sublimation).^[3] [Fig 1] *Gandhaka Shodhana* (purification of sulphur) was carried out in *Godugdha* (cow's milk) by subjecting to *Kurmaputa* by *Bhudhara yantra* method.^[4] [Fig 2]

Samanya shodhana (purification of copper) of *Tamra* (copper) was done by *Nirvapa* (quenching) method in the following medias- *Taila* (sesame oil), *Takra* (buttermilk), *Gomootra* (cow's urine), *Aaranala* (fermented rice gruel) and *Kulatha kwatha* decoction of horse gram) – 7 times in each media.^[5] [Fig 3] *Tamra patra* (copper pieces) applied with a paste of *Saindhava lavana* (rock salt) and *Nimbu swarasa* (juice of citrus limon) was subjected to *Nirvapa* (quenching) in *Kanji* (fermented rice gruel) for 8 times for *Vishesha*

shodhana of Tamra (special method of copper purification).^[6][Fig.4]

		
Fig 1. Shuddha Parada	Fig 2. Shuddha Gandhaka	Fig 3. Tamra patra after Samanya Shodhana
		
Fig 4. Tamra patra after Vishesa Shodhana	Fig 5. Kajjali	Fig 6. Stage of fuming
		
Fig 7. Stage of flaming	Fig 8. Final product –Tamra Sindoora	Fig 9. Tamra Sindoora after trituration

Preparation of *Tamra Sindoora*

The whole procedure of *Tamra Sindoora* was divided under 3 headings as follows ^[7]:

Purva karma (preliminary procedures)

Kajjali (fine black lustreless powder) was prepared by adding *Tamra Patra* (copper pieces)

1part, *Parada* (mercury) and *Gandhaka* (sulphur) 2- 2 parts. Initially *Tamra Pisti* was made then *Gandhaka* (sulphur) was added, this mixture was triturated till *Nischandra Kajjali*. This was filled inside a *Kachakupi* (glass bottle) covered with 7 layers of *Kapad mitti* (mud smeared cloth).

Pradhana karma (main procedure)

The *Kajjali*(fine black lustreless powder) filled in *Kacha Kupi* (glass bottle) kept in the *Valuka Yantra* was placed in the *Agni Bhatti* (traditional furnace). *Kramagni tapa* (graded heat pattern)was maintained according to classical reference. For the first 08 hours *Mrudhvagni* (mild heat) was given i.e., temperature maintained between 100⁰C – 250⁰C. Next 13 hours heat was gradually raised to *Madhyamagni* (moderate heat) stage i.e., 250⁰C-450⁰C. *Tivragni* (severe heat) was given for 12 ½ hours i.e., temperature maintained

between 450⁰C- 600 and above. By this time *Sindoor* *Siddha Lakshana* (completion features) were observed, corking was done again heat was given for 5 ½ hours for complete sublimation of product. Later the apparatus was allowed for self-cooling. [Fig 5-7]

Paschat karma (post procedure)

After complete cooling *Kupi* (glass bottle) was removed. The bottle was broken into 2 equal halves and *Sindoor* collected at neck region was removed and stored. [Fig 8-9]

OBSERVATION & RESULTS:

Observations recorded during the preparation in different time interval are depicted in Table 1. Temperature pattern followed during formulation is shown in Graph 1. Results of *Tamra Sindoor* is shown in Table 2.

Table 1. Observations during different stages of *Tamra Sindura* preparation

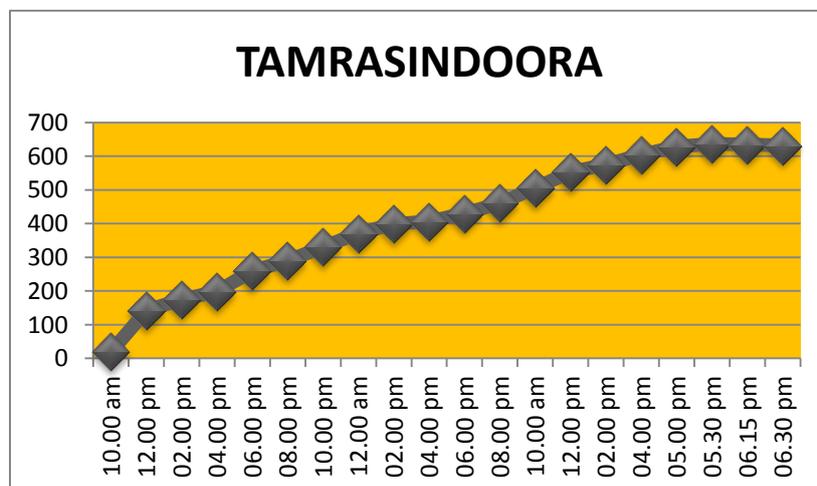
Time in hr.min	Temp In ⁰ C	Observations
0	20	Agni started.
1	123	No fumes inside <i>kupi</i> , bottom of <i>Kupi</i> can be seen clearly with torch.
2	142	Slight white fumes are seen inside <i>kupi</i>
4	175	Thick dense whitish fumes inside the <i>kupi</i> .
6	198	The fumes became dense, can't see the bottom of <i>kupi</i> with torch.
7	234	Still dense whitish fumes found inside <i>Kupi</i> .
8	259	Slight yellow fumes observed.
10	290	<i>Sheeta shalaka</i> is inserted inside <i>Kupi</i> . The <i>Kajjali</i> was little bit sticky in consistency.
12	330	<i>Sheeta shalaka</i> was inserted, <i>Kajjali</i> was slight sticky.
15	380	Dense yellow fumes observed. Bottom of <i>kupi</i> not visible.
17	406	Yellowish particles deposited around the neck of <i>Kupi</i> .
18	418	Dense <i>Gandhaka</i> fumes found. Bottom cannot be seen with torch.
20	454	<i>Sheeta shalaka</i> inserted –melting of <i>Kajjali</i> ascertained.
22	460	Density of yellow fumes reduced gradually.
23	483	<i>Sheeta shalaka</i> inserted – <i>Kajjali</i> started boiling.
24	553	Hot <i>shalaka</i> was inserted to clear the block. Whitish fumes observed with Sulphur smell.

25	584	Hot <i>shalaka</i> was inserted 8 more times to clear the block. Bluish flame of ½ feet height at the mouth of <i>kupi</i> was present. Block was cleared off.
26	575	Sheeta <i>shalaka</i> inserted some adhered product taken from the neck of <i>kupi</i> , <i>Mardhana</i> done in <i>khalwa yantra</i> , it was slight <i>Sindoora</i> colour.
27	583	Hot <i>shalaka</i> was inserted 7 times. Bluish yellow flame of ½ ft height at the neck of <i>kupi</i> observed. Dancing of Mercury was observed.
28	628	Hot <i>shalaka</i> was inserted 3 more times to clear the block. Flame was 1 inch height out of <i>Kupi</i> .
28.30min	637	Hot <i>shalaka</i> was inserted 2 times. Bluish flame reduced. <i>Sheeta shalaka</i> test was positive. <i>Suryodaya Lakshana</i> clearly seen.
29	635	Copper coin test was done. It was positive.ie copper coin was kept over mouth of the bottle, the surface of the coin turned into greyish white in colour. No flames observed.
29.30mim	632	No fumes and flame found. <i>Suryodaya lakshana</i> was clearly seen. <i>Sheeta shalaka</i> was inserted inside the <i>kupi</i> and the material collected was triturated in <i>khalwa yantra</i> , it was <i>sindoora</i> in colour.
30	631	Preparation for corking - wood removed, <i>valuka</i> surrounding the neck region of <i>kupi</i> is removed. Corking done with the help of <i>Gopichandana</i> smeared cloth. It took ½ an hr. fire given after corking
36	676	Heating continued till the duration of <i>Teevragni</i>

Table 2. Showing result of preparation of *Tamra Sindoora*

T.S.K	200gms
T.S	78gms
T.S.T	57gms
Loss	65gms
Yield	39%
Colour	Vermilion
Time taken	36hrs

Graph: 01 Temperature Vs Time of preparation of *Tamra Sindura*



(X-Axis=Time, Y-Axis=Temperature in °Celsius)

DISCUSSION

Krama Vriddha Agni (gradual heating pattern) plays an important role to obtain a quality product.^[8] The specific mode of heat supplied in this procedure is to potentiate the constituents & to establish firm bondage between the constituents forming a coordinating complex with wide range of therapeutic efficacy. The heating pattern in current study was divided into three equal parts i.e., 12 h each. Total duration was divided into 3 stages *Mridu* (120-250°C), *Madhayma* (250-450°C) and *Tivragni* (450-650°) [Graph 1]. The first stage of heating represents the melting of *Kajjali*, whereas in second and third stage, boiling and sublimation of the product towards the neck of the *kupi*. During *Tivragni* hot *Shalaka* was inserted for around 20 times for clearing the neck from sulphur choking. This process is very important and delicate, if the sulphur is not cleared then bottle breaks due to internal pressure and if the use of hot *shalaka* is more, will result in reduced yield of final product. The confirmative tests of *Kupi paka* are unique, such as copper coin test, *Sheeta Shalaka* test which confirms the absence of free sulfur. Testing of the product collected at the neck to ensure proper formation of compound. Corking was done after confirmation of all these desired characteristics and further heat was provided

for proper sublimation of the product. Optimum heat is necessary at later stages of *Kupi paka* as lowered heat reduce chances of sublimation whereas higher temperature leads to dissociation of compound.^[9] Self-cooling of *Kupi* was ascertained before procuring product as it has a major role to play in re-crystallization.

CONCLUSION:

Tamra Sindoor is *Sagandha, Bahirdhuma, Kantastha Kupipakwa Rasayana* (Sublimated compound formed in glass bottle). Following classical guidelines of *Agni samskara* (heat treatment) for 36 hours, final product yield was 39%.

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