WAY TOWARDS STANDARDISATION OF KANTALAUHA BHASMA

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ABSTRACT
The popularity and demand of Ayurvedic formulations has been increased globally, on the other side blames were also noted on it. Therefore, certain things like standardization & validation became essential requirement of ayurvedic formulations. In this study Kantalauha bhasma was prepared in three batches by classical method and analyzed to provide standard parameters for the assessment of quality. In the present research paper, the work done on pharmaceutical study of Kantalauha Bhasma conducted in the Department of Rasa Shastra. The pharmaceutical processing of Kantalauha Bhasma was performed by following Samanya Shodhana, Vishesha Shodhana and Marana of Kantalauha. After 40 Putas, Kantalauha Bhasma was obtained. Physicochemical test were performed after 40 Putas. After XRD final product was detected to be Fe₃O₄.

INTRODUCTION
The basic purpose of this science is to keep the human beings free from disease, old age & death. Rasashastra is one of the branches of Ayurveda which has a rich knowledge of mineral and metallic preparations.

Rasashastra is a subject which deals with metals and its therapeutic effect. It mentions the use of metals in a refined form as Bhasma. Their use reduced the quantity of the dose administered and increased the palatability, tissue availability and shelf-life of the drugs.

Kanta Lauha is a variety of Lauha which is a well known metal.

Rasatarangini had mentioned that, many diseases can be treated by Kanta Lauha. Preparations of Kantalauha Bhasma are used in Pandu, Kshaya, Udara, Medovikar, etc. It is
also said that Kantalauha Bhasma is Rasayana and Ayurvedhak (to extend the life expectancy).

Administration of impure form of the Kantalauha leads to many medical problems which may damage the kidneys, liver etc. This can be achieved by Shodhana followed by Marana procedure to convert Kantalauha into Bhasma. To know the changes that occur after Shodhana, and Marana procedure & also to bring to the lime light the pharmaceutical & analytical changes that occur during preparation of Kantalauha bhasma this study is intended.

AIMS AND OBJECTIVES
* To conduct Shodhana of Kantalauha
* To prepare Kantalauha Bhasma
* Physical & chemical Analysis of Kantalauha Bhasma

MATERIALS AND METHODS
Selection of Raw Materials
Kantalauha was collected from local market.

Methods
Preparation of the Kantalauha Bhasma involves two stages.
1. Shodhana
2. Marana

Shodhana: (R.T 15/5)
This is of two types. Samanya Shodhana and Vishesha Shodhana.

Samanya shodhana
Materials

Instruments
Steel Vessels, Cloth, Gas Stove, Big Iron pan, Stirrer
Method
250 gm of Kantalauha was heated until it become red hot & immediately it was quenched into 2000 ml of kanji kept in a wide mouthed vessel & left for 5 min for self cooling. After self cooling of Kantalauha, it was taken out and again heated till red hot and again quenched in Kanji. Each time the Kanji or the liquid used was changed. This procedure is called as Nirvapa and it was repeated for 3 times each in Kanji, Takra, Kulattha kwatha, Gomutra, Tila Taila.

**Vishesha Shodhana:** (R.T 20/18).
It is also similar in procedure to the *Samanya Shodhana* but equal quantity of *Triphala kwatha* and *Gomutra* was taken as media for *vishesh shodhana*.

Ingredients – *Triphala kwatha* and *Gomutra*

Procedure – *Triphala kwatha* was prepared according to the references of Sharangdhar Samhita.

(Sha. Pu.2/2) and equal quantity of *Gomutra* was added in it. The process of *nirvapa* was adopted and repeated three times for the process of *Vishesha Shodhana*.

**Marana of Kantalauha (R.T.20/52)**

*Marana of Kantalauha* was performed according to the process described by *Rasa Tarangini*.

*Triphala kwatha* was prepared according to reference of Sharangdhara Samhita. *Shodhit Kantalauha choorna* was taken in *khalwa yantra* and adequate amount of *Triphala Kwatha* was added. *Mardan* was done 4 hrs for each *puta* and *palletes* were prepared, dried well and then subjected to *puta* procedure with 60 *vanyapala* (350gm for each).

Procedure was repeated for 40 *putas* until *Bhasma* passes all *siddhi lakshanas*.

*Kantalaunha Bhasma* was prepared and then evaluated on the basis of classical and modern analytical parameters. Various analytical techniques, which are mentioned in our classics, were adopted; which reflects the physical as well as chemical characteristics of the *Kantalaunha Bhasma*.

Classical analytical parameters
Varitara
A little amount of Kantalauha Bhasma was sprinkled on stagnant water surface and observed, whether the Bhasma floats water surface or not.

‘Unam’
A grain of rice was kept carefully on the layer of floated Kantalauha Bhasma.

Rekhapurnata
A little amount of Kantalauha Bhasma was taken in between index finger and thumb and rubbed.

Nirchandrata
Kantalauha Bhasma was taken on palm and observed in the sunlight.

Slakshnata: Kantalauha Bhasma was touched by the finger tips.

Gatarasatwa: Small amount of Kantalauha Bhasma was taken and tasted.

Apunarbhavata: 20 g. of Kantalauha Bhasma was mixed with equal quantity of Mitra Panchaka (Seeds of Abrus precatorius, Honey, Ghee, Borux and Gaggery) and it was sealed in Sharava Samputa (Earthen pots), thereafter, the similar grade of heat used for the preparation of the particular Bhasma was applied and after self cooling, product was observed.

Niruttha: 50 g of Kantalauha Bhasma was mixed with a fixed weight (0.3958g) of silver (Ag). It was kept in a Sharava Samputa (Earthen Pots) and similar grade of heat was applied as for preparation of Bhasma, and after self cooling, weight of silver was taken.

RESULTS AND DISCUSSION

Varna (colour): The colour of the Bhasma is purple (‘Pakwa Jambshipala Varna’)

Varitara: Kantalauha Bhasma floated on the stagnant water surface.

‘Unam’: The grain remained as it is on the layer of floated Bhasma.

Rekhapurnata: Kantalauha Bhasma filled the minute furrows of the finger tips.

Nischandrata: No Chandrika (lustered particle) was observed in sunlight.
Slakshnata: Kantalauha Bhasma was soft and smooth on touch.

Gatarasatwa: The Bhasma was tasteless.

Apunarbhavata: No accumulated hard mass was felt and no lustered particle was observed after this test.

Nirutttha: Weight of the silver piece was remained almost same (0.3952 g). It was not increased.

_Bhasma_ passed all the _siddhi lakshanas._

_Kantalauha bhasma_ was subjected to various physicochemical analysis such as loss on drying, ash value, acid insoluble ash.

Modern analytical instruments such as XRD and SEM were employed to determine the elemental composition and particle size respectively.

**X-Ray Diffraction**

For analysis _Bhasma_ X-ray diffraction was done. In graphs the sharp peaks represent the crystalline structure while the base represents the amorphous forms of _Bhasma_. Prominent peaks of Fe$_3$O$_4$ were seen which confirms that final product is oxide form of iron.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Peak no.</th>
<th>2Θ value</th>
<th>D value</th>
<th>I/I1</th>
<th>Intensity</th>
<th>Compound</th>
</tr>
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<td>4</td>
<td>26.7015</td>
<td>3.33591</td>
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<tr>
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<td>1.53832</td>
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<td>FeO</td>
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<td>5</td>
<td>33.3371</td>
<td>2.68552</td>
<td>15</td>
<td>252</td>
<td>Fe$_2$O$_3$</td>
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Table 1: X-Ray Diffraction Data for Batch 2

<table>
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<th>Sr.No.</th>
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<th>D value</th>
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<tr>
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Table 2: X-Ray Diffraction Data for Batch 3

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<th>D value</th>
<th>I/I1</th>
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</thead>
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<td>317</td>
<td>Fe$_2$O$_3$</td>
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XRD analysis
1. The results of XRD study revealed that, iron present in the elemental form got converted into different forms of iron oxide in final *bhasma* were estimated by X-ray diffraction.
2. In all three batches, compounds of Iron were found in *Bhasma*. they were Ferric oxide (Fe3O4), ferrous oxide (FeO), ferric oxide (Fe2O3). Ferric oxide was formed due to reaction of oxygen and ferrous. specify which was more and which was less.
3. Due to repeated exposure of *kantaluha* to oxygen different phases might have formed.

SEM observations

![Figure No. 4. SEM Image of Batch 1](5000X)

![Figure No. 5. SEM Image of Batch2](5000X)
Irregular shaped particles of size range <1μm to 20μm have been observed.

The smaller particles have got a significant tendency of adhering to larger particles i.e. agglomerate formation.

Considerable number of particles having size less than 1μm i.e. nano particles have been found.

The general shape of particles is found to be cylindrical however large variations are found in the size.

The surfaces of particles are rough and uneven.

Due to tendency of agglomerate formation, most of them are found in clusters.

In KB1 small particles range between 500 nm- 883 nm with average size of 1μm.
In KB2 small particles range between 400 nm-500 nm with average size of 1μm.
In KB3 small particles range between 300 nm-600 nm with average size of 1μm.

The Bhasma mostly contains nano particles.

EDX observation
Spectrum

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<tr>
<th>El</th>
<th>AN</th>
<th>Series</th>
<th>unn.C</th>
<th>norm.C</th>
<th>Atom.C</th>
<th>Error (1 Sigma)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>[wt.%]</td>
<td>[wt.%]</td>
<td>[at.%]</td>
<td>[wt.%]</td>
</tr>
<tr>
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<td>26</td>
<td>K-series</td>
<td>47.26</td>
<td>53.13</td>
<td>24.56</td>
<td>1.44</td>
</tr>
<tr>
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<td>K-series</td>
<td>41.50</td>
<td>46.66</td>
<td>75.29</td>
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<td>S</td>
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<td>K-series</td>
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<td>0.13</td>
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</tr>
<tr>
<td>Cu</td>
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<td>K-series</td>
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<td>0.05</td>
<td>0.02</td>
<td>0.04</td>
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</table>

Total: 88.94 100.00 100.00

EDS results shows Ferrous, Oxygen, Copper, Sulphur in descending percentage.

Loss on drying
- Batch 1: 0.15%
- Batch 2: 0.10%
- Batch 3: 0.09%

Total Ash value
- Batch 1: 99.10%
- Batch 2: 98.12%
- Batch 3: 98.41%

Acid insoluble ash value
- Batch 1: 0.68%
CONCLUSION

The adopted classical method for Kantalauha Bhasma can be considered easy, convenient. There is no significant batch to batch variation, So this method can be use as standard operating procedure. Data obtained from the present study is reproducible. The values of physicochemical parameters can be taken for quality assurance.

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1. I consider it as my duty to show my gratitude towards all of them, who have helped me in completing my Article successfully. It is only because of these people that I feel contented from the bottom of my heart at this precious moment of Article submission.

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REFERENCES


