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Research Article

STANDARDIZATION OF SAPTAMRUTA LOHA

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ABSTRACT
Ras-shastra is a science of metal, minerals, as well as herbomineral preparations. Standardization of herbomineral drug is today's burning issue due to its complexity. So multi dimensional approach is essential for standardizing compound drugs. In the present time apart from insufficient knowledge of Ayurveda, the standards of Ayurvedic formulations are into worst predicament than ever before because of highly evolved technology and scanning of human system coupled with health awareness. So that study Standardization of Saptamruta Loha was undertaken to understand the basic idea about the present Drug Standardization, Bhasma kalpana and Kharaliya kalpana, as per modern analytical methods as well as Ayurvedic textual parameters.
Keywords: Saptamrutra Loha, Standardization, Hingula, Namboori Test, Loha Bhasma.

INTRODUCTION

Apart from the Ashatanga's of Ayurveda, there is the backbone of chikitsa is Ras shastra, which has contributed much in field of pharmaceutical science. In present era Ayurvedic physicians use medicines made up of minerals, metals, gems and animal as well as vegetable products. Among these preparations from minerals-metal, supposed to be harmful to our body as per western medicines. But it is very surprising to know that in Ras-shastra text the side effect are already mentioned if we use this medicine not made properly. And to avoid such side effects different Ayurvedic pharmaceutical processing techniques such as shodhana, marana, murchana, jarana etc. to convert metallic preparation into non toxic form of medicines are mentioned and also standardization of that processes according to Ayurveda as well as modern analytical methods of standardization also given in Ayurvedic texts. Standard is a numerical value which quantifies the parameters and thus denotes quality and purity of material. The present study Standardization of Saptamruta Loha was undertaken for standardization of metallic i.e. herbomineral preparation on the basis of modern analytical methods and simultaneous Ayurvedic textual standards. This study was carried out in following three parts

1. Raw material standardization
2. Process standardization
3. Finish product standardization

These all standardizations are followed by Ayurvedic parameters such as Loha bhasma as per Bhasma pariksha with reference to Ras tarangini. (2/53-57.)[1] All analytical methods like Atomic absorption spectrophotometry, ICP, Ash value, loss on drying, loss on heating, pH value, Namburi spot biphasic test, T.L.C., Limit test for iron etc. are used to standardize saptamruta loha, loha bhasma as well as all herbal churna's used in this combination.

Aims and Objectives

- To prepare Loha Bhasma
- To prepare Saptamruta Loha
- Standerdization of saptamruta loha.

MATERIALS AND METHODS

Before preparation of saptamruta loha constituents drugs were purified and prepared ready, the gross methodology is as follows.

- Selection and authentification of crude drugs, as per modern and ancient parameters.
- Shodhan of crude drugs i.e. Loha shodhan, Hingula shodhan. (Ras Tarangini)
- Preparation of Loha bhasma as per Ayurved Prakash. (3/262-263)
- Preparation of churna from bharad of Triphala and Yashtimadhu.
- Preparation of Saptamruta Loha as per Yogratnakar Netrogadhikar. [1-2]

Loha shodhan

Ref.:- Ras-Tarangini- 20/18

- Materials:- Crude iron powder - 1 kg
- Triphala bharad - 500 g
- Water – 8 liters
- Gomutra - 2 liters

Equipments

Weighing machine, utensil, iron pan, kadhai, cotton cloth, spoon etc.[1]

Procedure

First 500 g Triphala bharad mixed with 8 liters of water and boiled up to 2 liters. Then 2 liters of gomutra is mixed with 2 liters triphala decoction. 1 kg Iron powder was heated in iron pan up to dark reddish colored and then poured into triphala gomutra decoction. Same procedure is repeated for seven times. Every time the decoction was different.

Observation and Precautions

- After completion of shodhan color of iron powder was changed from gray silver to dark black in color.
- After shodhan weight of iron powder was increased by 75 g due to oxidation.

Results
Purified iron was obtained

Hingula shodhan
Ref.: Ras Tarangini 9/ 12

Materials
- Crude Hingula – 500 g
- Ardrak swaras – as per requirement

Equipments
Weighing machine, utensil, Mixer, khalwa yantra, cotton cloth, spoon etc.[2]

Method
First 200 g Ardark was washed and 50 ml juice was obtained. The crude hingula churna was triturated with ardrak swaras in khalwayantra up to soft mass and allowed to dry. Same was repeated for 7 times.

Observation and Precautions
- Color of Hingula becomes dark reddish orange color.
- Weight of Hingula was reduced after shodhan by 10 g may be due to removal of impurities.

Results
Purified Hingula was obtained

Preparation of Loha Bhasma
Ref.:- Ayurved prakash- 3/262-263

Materials
- Purified Iron powder – 500 g
- Purified Hingula – 40 g
- Kumari swaras - as per requirement

Equipments
Weighing machine, utensil, Mixer, khalwa yantra, cotton cloth, spoon, earthan sharawa samputa, pyrometer, wanyopal[3]

Method
First 500 g iron powder was grinded in khalwayantra then 40 g of hingula was mixed with it and triturated with kumara swaras up to homogeneous mixture for six hours. Then pellets of 3 cm in diameter 0.3 cm in thickness was made and kept in shade up to 48 h for drying. Then dried material kept in sharawa samputa and sandhibandhan made, dried for two days in shade. Gajaputa (1m*1m*1m) was filled with cow dung cakes 2/3, then samputa were kept on it and again filled with remaining cow dung and agni was ignited. Approximately 100 cow dung required for each puta. Temperature was recorded after every hour to know temperature flow. Maximum temperature of gajaputa reached up to 1160 oc; next day after self cooling observation of bhasma done for color, consistency and weight. Same way seven gajaputa given to obtained desired quality of bhasma.

Observation and Precautions
- Total 7 puta's were given
- Cow dung required for each puta is approximately 100.
- Time taken for one puta was approximately 10 hrs.
- Color changes after each puta from brown to dark brown violet.
- Weight of bhasma was noticed to reduce after each puta.

Results
Dark brown colored fine Loha bhasma was obtained.

Table 1: Changes in weight of Bhasma

No. of puta	Before puta wt. of loha + hingula	After puta wt. of bhasma
1.First puta	500 + 40 = 540 g	480 g
2.Second puta	480 + 40 = 520 g	465 g
3. Third puta	465 + 40 = 505 g	450 g
4. Fourth puta	450 + 40 = 490 g	440 g
5 Fifth puta.	440 + 40 = 480 g	428 g
6. Sixth puta	428 + 40 = 458 g	410 g
7. Seventh puta	410 + 40 = 450 g	380 g

Table 2: Changes in weight of Bhasma

No. of puta	Color	Luster	weight	Touch
1.First puta	Eshtika varna	No luster	Heavier	Hard
2.Second puta	Saffron color	No luster	Heavy	Hard
3. Third puta	Saffron color	No luster	Heavy	Hard
4. Fourth puta	Reddish brown	No luster	Light	Smooth
5 Fifth puta.	Dark brown	No luster	Light	Smooth
6. Sixth puta	Violet brown	No luster	Light	Soft
7. Seventh puta	Violet brown	No luster	Light	Soft

Preparation of Saptamruta Loha
Reference: Yogaratnakar Netra-rogadhikar 1-2

Materials
- Triphala bharad – 300 g
- Yastimadhu bharad – 100 g
- Kantaloha bhasma - 100 g[4]

Equipments
Khalwayantra, pulvalizer, Capsule filling machines, empty capsules, Weighing machine, utensil, cotton cloth, spoon etc

Procedure
First all bharad were disintegrated and pulverized to get fine powder of the drug. Then homogeneous mixture of herbal fine powder and loha bhasma made in khalwayantra and mardan sanskar done. Sample of mixture collected for analysis. With help of manual capsule filling machine capsules of saptamruta loha filled and stored into air tight jar.

Observation and Precautions
Weight of 20 empty capsule = 1 g
Wt of 20 filled capsule is = 10 g
So one capsule contains = 500 g medicines
There were 300 holes on the die for capsules so at a time 300 capsules can be filled.

Results
Saptamruta loha capsules obtained.

Advantages of capsule form of medicines
- Easy to take .
- Easy to preserve.
- Easy to carry.
- Attractive form of Ayurvedic medicine.
- Avoid bitter taste of Ayurvedic medicines.

- Proper dose of medicine is given.
- As a new technique experiment in Ayurveda.

Analytical study: Standardization

This study we can divided into two parts

- Ancient Ayurvedic methods of analysis
- Modern methods of analysis

Ancient Ayurvedic methods of analysis

- **Raw material Standardization**
  Raw materials are standardized by panchabhautik prikshan i.e. physical characters, appearance, color size, shape, consistency, smell, weight, shining etc. as per textual grahya grahyatwa lakshanas.
- **Process Standardization**
  All processes are done as per textual references i.e. Loha shodhan, Hingula shodhan as per Ras Tarangini, Loha maran as per Ayurved prakash and Saptamruta loha as per Yogratnakar Netrarogadhikar. All observations were recorded as per stepwise.
- **Finished Product Standardization**
  Loha bhasma was standardized as per Bhasma pariksha given in Ras Tarangini i.e. Varitaratwa, Rekhapurnatwa, Unam, Niruthatwa, Apunarbhava, Bhasma varna, Gata rasatwam, Mrudutwam, Shlakshnatwam, Nirdhumatwa, Niruthatwa.

Panchabhautic parikshan

Rupa – Ishtika varna
Sparsh – sukshma
Shabda – dantagre – nati kachkach
Ras – gat rastwam
Varitaratwa – present
Rekhapurnatwa – present
Nichandratwa – present
Nirdhumatwa – present
Mrudutwa - present

Modern view of Standardization

Loha bhasma and Saptamruta loha analyzed in B- PHARMA LAB worli, Mumbai, India and herbal drugs analysis done at Anchrome lab Mulund east, Mumbai, India. Following tests done

- Atomic Absorption Spectrophotometry
- Determination of ash value
- Determination of ph value
- Determination of acid insoluble ash
- Contents of Iron
- Acidity / Alkalinity
- Ph value
- Microscopic study for loha bhasma
- Loss on drying
- Water soluble extractive
- Alcohol soluble extractives
- Bulk density
- T. L. C. (Thin layer chromatography)
- Namboori phased spot test for loha bhasma.

Result obtained from analysis is compared with the standards given in pharmacopeial standards of Ayurveda.

Table 3: Analysis results

Analytical Tests	Loha bhasma	Saptamruta loha
Description	Reddish brown powder	Reddish brown powder
Acidity /Alkalinity	Acidic to litmus	Acidic to litmus
PH of 1 % sol^{n}	4.41	---------
PH of 10 % sol^{n}	----------	3.49 %
Acidity	2.892 ml ^{N}/100 Naho reqd	-------
Contest of iron	64.01 %	6.21 % by AAS
Ash value	99.38	34.2 %
Loss on drying	------	6.3 %
Acid insoluble ash	80.88	4.0 %
Water soluble extractive	------	27.6
Alcohol soluble extractives	--------	27.6
Bulk Density	---------	0.4
Microscopic structure	Irregular shape	-----
Particle size	11 micron	-----
Namboori phased spot test	Deep blue colored central solid spot with light blue colored thin priphary which denotes loha bhasma	-----
HPTLC	---------	Finger prints of Triphala and Yashtimadhu finds

AAS: Atomic absorption spectrophotometry

In this technique the sample is introduced into flame using a nebulizer when the inorganic atoms get excited and emits light of specific wave length, it is proportional to their concentration.

Importance

It is used for the quantitative analysis of elements specially metals.

Namboori phased spot test for loha bhasma

This is special test developed by Dr. Hanumant rao Namburi for spot identification of Ayurvedic bhasma. When a drop of clear solution of a substance, bhasma or sindura, that is under examination is placed on one of the chemical reacting paper, a spot with a series of changes in color and pattern will appear. It is the study of this spot and color at three successive phases, spreading over three different time intervals is known as the "Phased Spot Test".

Observation of NPST of Loha bhasma

First phase: Deep Blue colored central solid spot with light blue color thin periphery.
Second phase: All spots fade off.

DISCUSSION AND CONCLUSION

Standardization is a very important aspect of every pharmaceutical preparation. It is mainly based on raw

material standardization, process standardization and finished product standardization.

Raw material standardization

Raw material taken for this study was purchased from local market and authentified from lab.1 kg of loha churna was purchased from merk company which shows specification assay fe > 95 %. Here we can conclude that it is better to use directly iron powder than iron foils or iron solid masses because it makes the further marana process easy.

Process standardization

The process for loha shodhan is from Ras tarangini (20/18) i.e. shodhan of loha dhatu in triphala gomutra decoction for seven times. After shodhan it is observed that weight of loha increased by 75 g, it may be due to oxidation and color changes from silvery shining to dull dark black color. Shodhan of Hingula done as per reference from Ras Tarangini text 9/12. Hingula was triturated with juice of ardrak for 7 times. There are many methods described for loha bhasma in text, but this method from Ayurved prakash is most effective because it contents Hingula which is most important mercury ore and the bhasma made by using mercury or mercury ore are very best quality bhasma which do not coz any harmful effect on human body. This concept is mentioned in ras tarangini i.e. Lohanam Maranam shreshtam sarvesham Ras bhasmanam so paradmarit bhasmas are more potent than any other method (Ayurved prakash 3 /262-263). In this method 12th part of Hingula was mixed with shudhha loha churna and triturated with kumara swaras for 6 h and then gajaputa was given color, weight touch of bhasma was observed and recorded. Same way seven gajputa are given. After 7 puta's color of bhasma changes from light brown to dark brown in color and touch changes from hard to very soft, fine powder and there is reduction in weight of bhasma after every puta. Observations during preparation of drug were recorded timely.

Final product standardization

Prepared loha bhasma was observed for its orgaleptic as well as time parameters. Saptamruta loha as a final product was obtained by capsules filling. Final product physiochemical study was done and reports were compared with standard values. All results found were in normal limits with accordance to pharmacopial standards.

Photo 1

Photo 2: Loha Bhasma

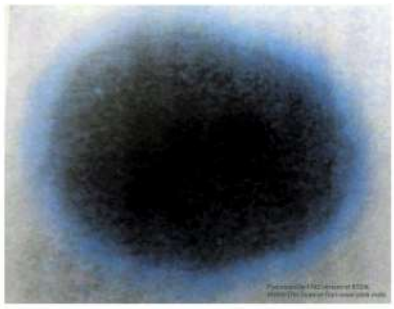

Photo 3: Namboori Spot Test

Photo 4

Photo 5

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