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Physico-chemical analysis of a Herbo-mineral compound *Vidangadi Lauh*

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Abstract
Vidangadi Lauha is herbo-mineral compound described in ayurvedic text. Its main ingredient is Lauha Bhasma. During process of Shodhana and Marana there is physico-chemical changes in the raw Lauha. The present study has been carried out with aims and objectives to develop analytical profile of Vidangadi Lauha and by assessing its physico-chemical parameters including pH, loss on drying, ash value, acid insoluble ash and iron content.
Keywords: *Vidangadi Lauha, Lauha Bhasma, Shodhana, Marana, analytical profile.*

Introduction

In ancient days, Vaidhya himself was producer and user of Ayurvedic aushadhi. So there was no doubt about genuineness and quality of drug. Due to huge demand the adulteration may be done and short cuts may be adopted at preparation level by commercial producer. So it is necessary to standardize drug on physico-chemical parameter. Physico-chemical analysis provides the objective parameters to fix the standards for quality of raw drugs and finished products. A study of a drug is incomplete without analytical study. It also helps to interpret the pharmacokinetics and pharmaco-dynamics of a drug. The drugs, which are being manufactured, should be analyzed with the help of different analytical methods like organoleptic tests, physical parameters, chemical parameters, etc.

Materials and Methods

All the raw materials were collected from P.G. Deptt. of Rasa Shastra, Govt. Ayu. College, Patna. These were identified by experts of the Department to confirm their genuineness. This was done by evaluating their quality on various parameters. *Lauha Bhasma* was prepared. All herbal ingredients were made into fine powder and mixed with *Lauha Bhasma*. *Vidangadi Lauha* contains herbals and mineral constituents.

Table No. 1 Ingredients of *Vidangadi Lauh*

No.	Ingredient	Parts
1.	*Lauha Bhasma*	7 parts
2.	*Vidanga*	1 parts
3.	*Haritaki*	1 parts
4.	*Bibhitaki*	1 parts
5.	*Amalaki*	1 parts
6.	*Shunthi*	1 parts
7.	*Pippali*	1 parts
8.	*Maricha*	1 parts

Analytical study of *Vidangadi Lauha* and *Lauha Bhasma* were carried out in Lab. of Post Graduate Department Government Ayurvedic College Patna and Arbro Pharmaceutical Ltd. (Analytical Division) New Delhi.

The samples were analyzed by two different kinds of parameters i.e. classical and modern parameters.

Evaluation on classical analytical parameters

Classical analytical parameters are tools to test the perfection of *Bhasma.*

Test for organoleptic characters

Samples were observed for their *colour*. Samples were *touched* for any perceptible coarse powder. Samples were smelt for any type of *odour*. Samples were *tested* by tongue for any specific taste. Samples were *chewed* in between teeth to hear any perceptible sound.

Nishchandratva test

A little amount of *Bhasma* was taken on palm. Observed in sunlight for presence of any lustre particles.

Varitara test[1]

Water was taken in a Bikar. Then very small amount of *Bhasma* was sprinkled from a short distance on the surface of stagnant water in Bikar and notice that *Bhasma* was float on water or not.

Unam test[2]

In this test, some grains of rice kept carefully on the layer of floated *Lauha Bhasma* and was observed whether the grains float or not.

Slakshanatva

A little amount of *Lauha Bhasma* was taken and rubbed between two fingers and observed it was smooth or not.

Rekhapurnatva test[3]

In this test, little amount of *Lauha Bhasma* was taken in between index finger and thumb and rubbed and observed whether the *Bhasma* fills the minutes lines of the finger tips or not.

Apunarbhavata test[4]

Lauha Bhasma was mixed with *Mitra Panchaka* (Gud, Gunja, Ghrita, Madhu and Tankana) and ground. *Chakrika* were prepared. After drying, kept in *Sharava Samputa* and subjected to the similar amount of heat used for the preparation of *Bhasma* and left for self cooling. After self cooling, *Chakrika* were observed for any lustred particles or accumulated masses.

Gatarasatva

Lauha Bhasma was tested by tongue and observed that there is any taste or tasteless.

Evaluation on modern analytical parameters

The modern analytical parameters are based on knowledge of physics and chemistry. These parameters tell about exact physical and chemical characters, and explain the pharmacodynamics and pharmacokinetics of *Bhasma.* Set up standards for the quality of *Bhasma*.

Determination of p^H

This test was performed to determine the acidity or alkalinity of the samples.

Procedure 10 gm sample was taken and 100 ml distilled water was added to it. Solution was filtered. The p^H of the solution was measured with the help of p^H meter.

Determination of *Loss on drying*

This test tells about moisture content of the sample.

Procedure 10g of Accurately weighed sample was kept in a formerly dried and weighed dish and heated in a hot air oven at 105 °C, till constant weight. Then the dish was removed and after self-cooling it was weighed. The loss of weight after drying was determined and expressed as % w/w.

Determination of *Ash value*

This test was carried out to evaluate the *ash* content for the sample.

Procedure 2 gm accurately weighed sample was kept in a silica dish and subjected for incineration at a temperature not exceeding 450 ^{0}C until it became free from carbon. After self cooling it was weighed. From the weight of residue the percentage of *ash* was determined and expressed as % w/w.

Determination of *Acid Insoluble Ash*

This test was performed to determine percentage of acid insoluble inorganic content of the sample.

Procedure

The ash was kept in crucible and 25 ml of dilute HCL added to it. The insoluble matter was collected on an ashless filter paper (Whatman). Then, wash with hot water until filtrate was neutral and ignited to constant weight. The

percentage of acid insoluble ash was determined and expressed as % w/w.

Observations & Results

Organoleptic evaluation

The organoleptic characters of Lauha Bhasma.

Table No. 2 organoleptic characters of *Lauha Bhasma.*

No.	Parameter	*Lauha Bhasma*
1.	Sound	Not any sound produced during chewing
2.	Touch	Smooth
3.	Colour	Pakwa Jambuphala Varna
4.	Taste	Tasteless
5.	Smell	No specific smell

Evaluation on classical analytical methods

Table No. 3 observations of classical analytical test of Lauha Bhasma

No.	Parameter	Result
1.	Nishchandratva test	+ve
2.	Varitara test	+ve
3.	Unam test	+ve
4.	Slakshanatva test	+ve
5.	Rekhapurnatva test	+ve
6.	Apunarbhavata test	+ve
7.	Gatarasatva test	+ve

Evaluation on modern analytical parameters

Table No. 4 Physico-chemical analysis of *Lauha Bhasma*

Parameter	Result
p^H	6.92
Loss on drying at 105^0 C	0.77 % w/w
Ash value	99.17 % w/w
Acid insoluble ash	0.2 % w/w

Observations of AAS

The percentage of iron content in the Lauha Bhasma is tabulated in following table.

Table No. 5

Parameter	Result
Iron (as Fe)	70.21% w/w

Table No. 6 Organoleptic characters of *Vidangadi Lauh*

Appearance	Colour	Touch	Taste	Odour
Crystalline powder	Red	Slightly rough	Katu	No

Table No. 7 Physico-chemical analysis of *Vidangadi Lauh*

Parameter	Result
P^H	3.73
Loss on drying at 105^0C	3.60 % w/w
Total Ash	52.25 % w/w
Acid insoluble Ash	2.34 % w/w
Iron (as Fe)	21.24%

Discussion

All the classical analytical parameters describe definite significance. *Nishchandratva* test of the *Bhasma* indicates lustrelessness after *Marana* process. *Varitara* and *Unam* test indicate lightness and fineness of the *Bhasma. Rekhapurnatva* also indicates fineness of the *Bhasma*. *Apunrbhava* test shows lack of metallic luster.

Analytical test of *Lauha Bhasma* shows that *Lauha Bhasma* has high *Ash value* (99.17%w/w) and very low *loss on drying* value (0.77%w/w). *Ash value* indicates presence of inorganic contents of *Bhasma.* Very high *ash value* of *Lauha Bhasma* is indicative of presence of very high inorganic content. *Loss on drying* indicates moisture content. Low *loss on drying* of the *Lauha Bhasma* is indicative of presence of little amount of moisture. *Acid insoluble ash* indicates insoluble inorganic content of the *Bhasma.* It tells about physiological availability of the *Bhasma. Acid insoluble ash* of *Lauha Bhasma* was found 0.2%w/w. Amount of Iron in *Lauha Bhasma* was 70.21%w/w.

Loss on drying of *Vidangadi Lauh* was observed 3.60%w/w. Total *ash* was found 52.25%w/w. *Acid insoluble ash* was observed 2.34%w/w. Amount of Iron in *Vidangadi Lauh* was 21.24%w/w.

Conclusion

Vidangadi Lauh is red crystalline powder. Its p^H was 3.73 which show its acidic nature.

Analytical profile of *Vidangadi Lauh* deals with Ph, loss on drying, acid insoluble ash, total ash and iron content which indicates quality of same.

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