ISSN 2456-3110
Vol 6 · Issue 5
Sept-Oct 2021

JAiMS
INTERNATIONAL

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Maharshi Charaka
Ayurveda

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
ORIGINAL ARTICLE Sept-Oct 2021

Pharmaceutical study of *Pairojaka Bhasma*

Ramya Shetty[1], Surekha S. Medikeri[2]

[1]*Final Year Post Graduate Scholar, Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda Medical College, Bengaluru, Karnataka, India.*

[2]*HOD and Professor, Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda Medical College, Bengaluru, Karnataka, India.*

ABSTRACT

Bhasma is unique Ayurvedic metallic or mineral preparation, its use as therapeutics in Ayurveda has enormous clinical importance. *Pairojaka* is a gem and ornamental stone, included in *Uparatna* group of drugs. *Pairojaka Bhasma* having its clinical indication as *Sthavara, Jangama* and *Kritrima Visha Nashana*. The objective of the study was to prepare *Pairojaka Bhasma* as per textual reference with the help of 8 *Puta*. Prepared *Bhasma* was subjected to ancient as well as modern physio-chemical analysis. In this study an attempt has been made to standardize the process of the preparation of the *Pairojaka Bhasma*.

Key words: *Pairojaka Bhasma, Shodhana, Marana, Bhasma Pareeksha.*

INTRODUCTION

Rasa Shastra is a specialized branch of Ayurveda which mainly deals with the pharmaceutical preparations. *Bhasmas* are unique Ayurvedic metallic or mineral preparations, obtained by subjecting the same to high temperature along with media like herbal juice or decoctions for specified times. As they have good palatability and higher efficacy, its use as therapeutics in Ayurveda has enormous clinical importance. *Bhasmeekarana* not only nullifies the toxic effects of the metals or minerals but transforms it into biologically active nanoparticles. Hence, *Bhasmas* can be administered in lower doses.

Address for correspondence:
Dr. Ramya Shetty
Final Year Post Graduate Scholar, Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda Medical College, Bengaluru, Karnataka, India.
E-mail: shettyramya023@gmail.com

Submission Date: 08/09/2021 Accepted Date: 13/10/2021

Access this article online

Quick Response Code

Website: www.jaims.in

DOI: 10.21760/jaims.6.5.19

Pairojaka is a gem and ornamental stone, mineral in origin included in *Uparatna* group of drugs. It is composed of Hydrous Phosphate of Copper and Aluminium, with the chemical formula $CuAl_6(PO_4)_4(OH)_8.4H_2O$. *Pairojaka Bhasma* possesses *Kashaya* and *Madhura Rasa*, it is *Agni Deepaka* and *Udara Shoola Nashaka.* It is a good laxative and nullifies the influence of *Sthavara, Jangama, Samyogaja Visha* over the body.[1] *Pairojaka* is correlated to Turquoise, which dates to the 16th century. The healing powers of Turquoise can benefit whole body with special strengths in healing of immune, respiratory and skeletal system.[2]

As *Pairojaka* is not commonly available in the market due to high value and scarcity, there is no sufficient work available on *Pairojaka*. Henceforth it is of paramount importance to conduct work on the pharmaceutical study of *Pairojaka Bhasma*.

OBJECTIVES OF THE STUDY

1. To select genuine raw drug
2. To carry out *Shodhana* of *Pairojaka*
3. To carry out *Shodhana* of *Gandhaka*
4. To prepare *Pairojaka Bhasma*
5. To study its Physio-Chemical properties

ISSN: 2456-3110 ORIGINAL ARTICLE Sept-Oct 2021

Materials and Methods

Materials

Major Drugs: *Pairojaka* and *Gandhaka*

Associated Drugs: *Gomutra, Yavakshara, Nimbu, Godugdha*

Equipments: *Khalva Yantra, Dola Yantra*, Muffle furnace.

Methods

1. Identification and collection of Raw Drug
2. Preparation of *Pairojaka Bhasma*
3. To study its Physio-chemical properties.

Identification and collection of Raw Drug

Identification and collection of raw drugs are necessary because without this we can't assure the quality. The raw drug *Pairojaka* (Turqouise) was purchased from Bellari. Authentication was given by Gem Testing Laboratory, Rajasthan, Jaipur.

Gandhaka,Yavakshara were collected from Amrutkesari depot, Chikpete, Bengaluru

Gomutra was collected from local area and *Nimbu* was collected from local market.

Preparation of *Pairojaka Bhasma*

a) *Shodhana of Pairojaka*[3]

Drugs used

- Raw *Pairojaka* - 180 gms
- *Gomutra* - 800 ml
- *Yavakshara* - 500 gms
- *Nimbu Swarasa* - 800 ml
- Apparatus - *Dola Yantra*, juice extractor, knife, spatula, mud pots, cloth, *Chulika*, thread, spoon, pH paper.

Method

180gm of *Pairojaka* was taken in a clean dry *Khalva Yantra* and made it into coarse powder.

This powdered *Pairojaka* was taken in a sufficiently large cloth and *Pottali* is prepared.

The *Pottali* is arranged in a *Dolayantra* containing mixture of *Nimbu Swarasa, Gomutra*, *Yava kshara*. The *Pottali* is arranged in such a way that, it is immersed in media to the level of its neck. The whole set is placed on Gas stove and is boiled in moderate flame. The boiling is carried out for three hours. On cooling the bundle is untied and the *Pairojaka* is removed. The *Pairojaka* is washed in warm water and is dried thoroughly and preserved. Thus, *Shodhita Pairojaka* was collected and stored in clean, dry glass bottle for further use.

Precautions

Heat should be given continuously. Care should be taken that the level of *Pottali* in *Dolayantra* should immerse in *Drava Dravya* up-to its neck. The *Pottali* should not touch the bottom of the *Yantra*. *Swarasa* should be added time to time when the liquid is evaporated.

Table 1: Observation of *Swedana* process of *Pairojaka*

Time	Quantity of Media	Temperature	Litmus Test, Ph	Observation during procedure
2pm	800 ml	25°c	Acidic, 1.5	The media was brown in colour
2.30pm	-	100°c	Acidic, 1.5	Boiling started
3.00pm	+400ml	100°c	Acidic, 2	Cream colored froth started to appear, with the odour of *Nimbu Swarasa* and *Gomootra*
3.30pm	+300ml	100°c	Acidic, 2	Colour appears to be, in between brown and dark brown.
4.00pm	+200 ml	100°c	Acidic, 2.5	Media turned to dark brown colour; frothing was reduced.
4.30pm	+200ml	100°c	Acidic, 2.5	Started to emit of pungent odor, frothing stopped completely.

ISSN: 2456-3110 ORIGINAL ARTICLE Sept-Oct 2021

5.00pm	+200ml	100°c	Acidic, 3	Media was turned to completely dark brown in colour.

Observation after the procedure

- The luster of *Pairojaka* was decreased after *Shodhana.*
- Weight of *Pairojaka* before *Shodhana* - 180 gms
- Weight of *Pairojaka* after *Shodhana* - 175 gms
- Loss - 5 gms

b) *Gandhaka Shodhana* [4]

Drugs used

Gandhaka - 1.5kg

Godugdha - 12 liters

Goghrita - 1.5kg

Hot water for washing.

Apparatus: *Khalva Yantra,* mud pot, cloth, thread, vessel, spoon, match box.

Method

Ashuddha Gandhaka was powdered in the *Khalva Yantra* and 1.5 kg of it was weighed and taken. A medium sized mud pot was taken and *Ghrita* was smeared in its inner layer. 1.5 ltr of warm *Godugdha* was poured in the mud pot and its mouth was tied with the clean muslin cloth. 1.5 kg of *Goghrita* was taken in a steel vessel and was kept on the gas stove. Powdered *Gandhaka* was then added in the vessel and was allowed to melt. After melting of *Gandhaka,* it was immediately poured in the mud pot through muslin cloth. The muslin cloth was then removed and the *Gandhaka* collected in the milk was taken. *Gandhaka* was then washed with hot water, dried and stored. This process was repeated for 6 times.

Precautions

Fresh cow's milk was used for each procedure. After each procedure *Gandhaka* was washed with hot water to remove the remnants of milk from it. While melting *Gandhaka, Mandagni* should be maintained to avoid its burning. Proper precautions of eyes and face should be taken while melting *Gandhaka* as the fumes are irritating to senses. *Shuddha Gandhaka* was dried properly before storing to avoid its spoilage.

Table 2: Showing observation of before and after *Gandhaka Shodhana*

Particulars	Before *Shodhana*	After *Shodhana*
Smell of milk	No smell	Smell of Sulphur
Colour of Milk	White	Yellow
Colour of Sulphur	Yellow	Pale yellow

Initial weight of *Gandhaka* - 1500 gms

Weight of *Gandhaka* after *Shodhana* - 1440 gms

Loss of weight after *Shodhana* - 60 gms

c) *Pairojaka Bhasma* prepared by *Puta* Method using Muffle Furnace[5]

1st *Gaja Puta*

Materials

Shodhita Pairojaka - 170 gm

Shodhita Gandhaka - 170gm

Nimbu Swarasa - 150 ml

Equipments - Two earthen *Sharavas* of equal size, kora cloth, *Khalva Yantra*, weighing machine, Multani mitti,

Procedure of *Marana*

170gms of *Shoditha Pairojaka* was taken in *Khalwayantra*. Fine powder of equal part (170gms) of *Shuddha Gandhaka* mixed with *Shuddha Pairojaka* respectively. This mixture was triturated with sufficient quantity of *Nimbu Swarasa* for 6 hours. Trituration was done until whole mass attains a viscous and semisolid state. After attaining appropriate consistency, *Chakrikas* were prepared of size 3-4cm and diameter, 2-2.5mm thickness and dried completely. Two concave earthen *Sharava* were taken. Dried *Chakrikas* were kept in earthen *Sharava* and arranged in two layers. Another *Sharava* was placed over it to make *Samputa*. Gap between two *Sharavas* was properly sealed with one layer of

ISSN: 2456-3110 ORIGINAL ARTICLE Sept-Oct 2021

Multani Mitti smeared cloth and then with six layers of *Multani Mitti* smeared cloth. Each layer was wrapped, after drying of previous layer. The dried *Sharava* was kept inside the muffle furnace and required temperature was given. Allowed for *Swangasheeta*. Same procedure was repeated for 7 more times.

Table 3: Showing observation of total *Marana* procedure of *Pairojaka Bhasma.*

Puta	Quantity of *Pairojaka*	Quantity of *Gandhaka*	Quantity of *Nimbu Swarasa*	*Chakrikas* before *Puta*	Max. temperature (°C)	*Chakrikas* after *Puta*
1st puta	170 gm	170 gm	150 ml	335 gm	800	165 gm
2nd puta	165 gm	165 gm	150 ml	329 gm	800	163 gm
3rd puta	163 gm	163 gm	150 ml	325 gm	800	160 gm
4th puta	160 gm	160 gm	140 ml	319 gm	800	158 gm
5th puta	158 gm	158 gm	140 ml	311 gm	700	157 gm
6th puta	157 gm	157 gm	130 ml	313 gm	700	155 gm
7th puta	155 gm	155 gm	130 ml	309 gm	600	153 gm
8th puta	153 gm	153 gm	120 ml	305 gm	600	150 gm

Classical Physico-Chemical Analysis

a) *Rekha Purnatva*

When the *Pairojaka Bhasma* was rubbed between the thumb and index finger it entered the furrows of the fingers.

b) *Varitaratva*

When finely powdered *Pairojaka Bhasma* was carefully sprinkled into a glass containing water, *Bhasma* floats on water.

c) *Unnama*

When *Pairojaka Bhasma* spread on water and rice was placed on that layer is comparatively heavier object and the rice floats like *Hamsa*, then *Mrta Pairojaka* was considered was *Uttama.*

d) *Nirdhuma*

A small quantity of prepared *Pairojaka Bhasma* was put over fire. *Bhasma* did not produce any smoke.

ISSN: 2456-3110 ORIGINAL ARTICLE Sept-Oct 2021

RESULTS

Table 4: Classical parameters of *Pairojaka Bhasma*

Tests	Before *Marana*	1st *Puta*	2nd *Puta*	3rd *Puta*	4th *Puta*	5th *Puta*	6th *Puta*	7th *Puta*	8th *Puta*
Rekhapurnata	-ve	-ve	-ve	+ve	+ve	+ve	+ve	+ve	+ve
Varitaratva	-ve	-ve	-ve	-ve	-ve	Partially positive	Partially positive	positive	Positive
Unnama								positive	Positive
Apunarbhava	-	-	-	-	-	-	-	-	positive
Niruttha	-	-	-	-	-	-	-	-	positive

Table 5: Showing result of Physio-chemical parameters *Pairojaka Bhasma*.

Parameters	*Pairojaka Bhasma*
Colour	Blackish
Taste	Tasteless
Odour	Odourless
Touch	Soft
Ph	4.48
Loss on drying	0.3%
Total ash	71.64%
Acid insoluble ash	63.82%
Loss on ignition	28.36%
Water soluble extractive	6.10%
Alcohol soluble extractive	0.234%

DISCUSSION

Pairojaka is a semi-precious stone grouped under *Uparatna Varga*. Usage of *Pairojaka* was started after 16th century A.D. It has been prized as a gemstone and ornamental stone. Ayurveda *Grantha* and *Rasa Grantha* not explained much about *Pairojaka*. Its use started after *Ananda Kanda* and *Ayurveda Prakasha*. *Pairojaka* is collected from mines found in Iraq, Turkisthan, China, USA. Chemically it is a combination of copper, aluminium, Iron, phosphate and water.[1] There is no mentioning of *Shodhana* and *Marana* procedure while explaining *Pairojaka* and it is mentioned to adopt the procedure of *Shodhana* and *Marana* similar to that of *Rajavarta*. *Pairojaka Bhasma* is having *kashaya, madhura Rasa, Sara Guna, Sheeta Veerya* with its clinical indication as *Sthavara, Jangama* and *Kritrima Visha Nashana.*

Pairojaka Shodhana

Shodhana: Most of the raw materials in *Rasashastra* are extracted from earth, so every chance of impurities, toxicity, heterogenous qualities, mixing of other substances and unwanted qualities to a large extent. So, *Shodhana* is indicated to eliminate all such toxic qualities and to induce certain qualities which are essential for the easy assimilation of the material in the living body.

Shodhana of *Pairojaka* was carried out as the first step of this study as the *Shodhana* is an essential procedure before the preparation of *Bhasma*. Raw *Pairojaka* was subjected to *Swedana* in *Dolayantra* for one *Yama* (3 hours) in mixture of *Gomutra, Yavakshara* and *Nimbu Swarasa*.

Mixture of three drugs i.e., *Gomutra, Yavakshara, Nimbu Swarasa* are acidic in nature whose pH lies within 4-5, and possess *Ksharana* property (corrosive effect). This helps to remove the physical impurities and makes the drug brittle, which helps to dissociate

ISSN: 2456-3110 ORIGINAL ARTICLE Sept-Oct 2021

the mineral molecules like latex and covalent bonding. It may be helpful in reducing the hardness of the drug as heat is given continuously through boiling liquids. Reduction in the hardness may help in further processing of the drug. This process makes the drug to easily grounded in *Marana.*

Gandhaka Shodhana was carried out by *Galana* method, where *Godugdha* was selected as *Shodhana Dravya* as it is an antidote for *Gandhaka. Ghrita* and *Godugda* which were used in *Gandhaka Shodhana* incorporates the unctuous property in it, thus dissolving the fat-soluble impurities present in sulphur. Crystalline sulphur turned into amorphous nature after purification. The repeated heating, melting and sudden cooling of sulphur by pouring it into liquid media may cause the loosening of the bonds between the molecules, making it amorphous in nature. *Shuddha Gandhaka* was observed brittle and shiny, may be due to the change in crystalline structure while passing through the stage of melting. The 4% weight loss was observed. This loss could be because of removal of physical and chemical impurities in the form of sand particles and loss during washing.

Pairojaka Marana

Here *Gandhaka* was taken as media for *Bhasma* preparation. This helps to convert *Pairojaka* into specific chemical form. *Gandhaka* acts as reducing agent and facilitates the formation of the *Bhasma* easily but at the same time *Gandhaka* will not get completely evaporated. This residual *Gandhaka* may affects the therapeutic efficacy of the *Bhasma* which needs to be further evaluated. The *Maraka Dravya* make the raw drug more brittle and fragile which facilitates its *Marana* and also imposes their own properties on *Bhasma*. *Gandhaka* helps in distorting hardness of *Pairojaka* to achieve characteristic features of an ideal *Bhasma.*

Nimbu Swarasa is used as liquid media for levigation. Levigation is done continuously for 6 hours. This process involves breakdown of the material by rubbing action between two surfaces, i.e., surface phenomena, it is also called as attrition. When stress in the form of attrition is applied, the particle surfaces chip and produce small particles. The finer particle size can be achieved by wet grinding.

The temperature given was *Gajaputa* considering 1000°C as per temperature pattern recorded for *Gajaputa* by previous studies, but based on the nature of the drug and after analysing the changes of drug after each puta, the temperature pattern was altered. From 1st to 4th *puta* 800°C temperature was given with peak stay time for 20 minutes. After 4th *Puta Chakrika* became little hard as compared to previous *Puta*. Hence temperature was reduced to 700°C. And again after 6th *Puta Chakrika* become little hard and 600°C temperature was given for 7th and 8th *Puta* with peak stay time for 20 minutes.

Discussion on Ancient parameters

The colour of *Pairojaka Bhasma* was black. *Sparsha* is smooth and soft, odourless and tasteless. All samples fulfilled *Bhasma Siddhi Lakshanas* which are *Rekhapurnata, Varitara, Unnama, Niruttha* and *Apunarbhava. Rekhapurnata* attained on 3rd *Puta, Varitara* on 6th *Puta, Unnama* on 7th *Puta, Niruttha* and *Apunarbhava* on 8th *Puta*.

The prepared *Pairojaka Bhasma* can be considered as standard one on the basis of Analytical parameters done.

CONCLUSION

As a result of different stages of processing techniques like *Shodhana, Bhavana, Marana*, the particle size reduces significantly, which may facilitate absorption and assimilation of the drug into the body system. The observations in this study could be specified as the quality control parameters confirming all the classical tests under *Bhasma Pariksha*.

REFERENCES

1. Sadananda Sharma, Rasatarangini, Edited by Kashinath Shasthri, 11th Edition, Delhi, Motilal Banarasidas, 2009, 23rd Taranga, 191 verses, 644 pp.
2. http://m.minerals.net/gemstone/turquoise_gemstone.aspx

ISSN: 2456-3110 **ORIGINAL ARTICLE** Sept-Oct 2021

3. Sadananda Sharma, Rasatarangini, Edited by Kashinath Shasthri, 11th Edition, Delhi, Motilal Banarasidas, 2009, 23rd Taranga, 191 verses, 644 pp.
4. Sadananda Sharma, Rasatarangini, Edited by Kashinath Shasthri, 11th Edition, Delhi, Motilal Banarasidas, 2009, 8th Taranga, 13 verses, 177 pp.
5. Sadananda Sharma, Rasatarangini, Edited by Kashinath Shasthri, 11th Edition, Delhi, Motilal Banarasidas, 2009, 23rd Taranga, 191 verses, 644 pp.

How to cite this article: Ramya Shetty, Surekha S. Medikeri. Pharmaceutical study of Pairojaka Bhasma. J Ayurveda Integr Med Sci 2021;5:129-135. http://dx.doi.org/10.21760/jaims.6.5.19

Source of Support: Nil, **Conflict of Interest:** None declared.

****