International Journal of Nursing and Medical Science 2024:13(1), 13-18

IJNMS ISSN: 2454-6674

INTERNATIONAL JOURNAL OF NURSING AND MEDICAL SCIENCE

Nursing Education Health Science Research

PANACEA INTERNATIONAL JOURNAL PRL PUBLISHER

Original Research Article **Volume 13 Issue 1** **Jan-Feb 2024**

ANALYTICAL STANDARDIZATION AND QUALITY EVALUATION OF *BHASMA* AS AN ANCIENT AYURVEDA FORMULATION

Dr. Yogendra Manakchand Kasat[1], Dr. Prasanna Bhalerao[2],

Dr. Amolsingh Chauhan[3]

[1]Professor, Rasashastra and Bhaishajya Kalpana Dept., Chaitanya Ayurved Mahavidya, Sakegaon, Bhusawal, Maharashtra, India.

[2]Assistant Professor, Rog Nidan Dept., Chaitanya Ayurved Mahavidya, Sakegaon, Bhusawal, Maharashtra, India.

[3]Assistant Professor, Balrog Dept., Chaitanya Ayurved Mahavidya, Sakegaon, Bhusawal, Maharashtra, India.

Abstract

Rasa-Shastra utilizes medicinal products sourced from mineral and metallic origin to handle different health ailments. These formulations are designed to possess desired qualities such as non-toxicity, palatability, easy assimilation, adaptability and therapeutic potency. The Ayurvedic herbo-mineral preparations come under the umbrella of *Rasa-Shastra* and these formulations renowned for their properties and ability to treat wide range of diseases. These formulations commonly take the form of *Rasayoga, Parpati, Pishti* and *Sindoora*. However, quality evaluation and standardization protocol of these formulations prerequisite to ensure their quality and desired therapeutic potency. Ayurveda as well as modern science suggested various quality parameters and methods to evaluate them for establishing quality standard of these ancient formulations. Present article described analytical standardization and quality evaluation of *Bhasma* formulations.

Key-Words: *Ayurveda, Bhasma, Standardization, Quality, Rasa-Shastra*

Introduction:

Bhasma are important Ayurvedic medicine well known for their ability to maintain normal physiology of body. They are prepared by neutralizing harmful heavy metals and they counteract radicals within the body. The efficacy of *Bhasma* in alleviating disease merely depends upon their quality that can be assessed by standardized procedures. Standardization of *Bhasma* is paramount to ascertain their quality, identity, purity and safety, etc.

The incinerating metals alongside herbal decoctions mainly used to prepare *Bhasma*. Therefore *Bhasma* comprises physically transformed metallic nano-particles obtained through the calcination of substances treated with decoctions of natural compounds (herbs/animal materials). Along with metallic substances, animal derivatives such as shells, feathers and horns, etc. are utilized in *Bhasma* preparation. The preparation of *Bhasma* involves considerations of standard procedures and uses of high-quality raw materials for acquiring optimum quality of desired *Bhasma* formulations [1-4].

Preparation of *Bhasma*:

Based on chief component or method of preparation the *Bhasma* can be classified into three categories which includes; metal-based *Bhasma,* mineral-based *Bhasma* and herbal *Bhasma. Bhasmikaran* is the process used for the preparation of *Bhasma,* this process converting non-bio-incompatible substances into biocompatible products. The *Bhasmikaran* process helps in elimination of harmful substances, modifies undesirable physical properties, convert undesired characteristics into desired features and enhances therapeutic action of drugs by minimizing their side effects. The various steps involved in *Bhasmikaran* are depicted in **Figure 1**. *Shodhan* first performed for removing unwanted parts of raw materials to render product suitable for further use. Metals are heated and then dipped into liquids for several times for purification purpose. Subsequently *Maran* induces change in unsuitable form of the metal into a suitable form for human administration, this process eliminating toxic metallic character. Stirring is carried out using rod to enhance therapeutic effect and accomplish proper mixing of ingredients. Excess amounts of agents are removed through washing and the product is subjected further by cloth mesh sieving to separate material of larger

size. *Puttan* is critical step in *Bhasma* manufacturing uses special earthen pot to facilitate direct and uniform heating of the material [4-6].

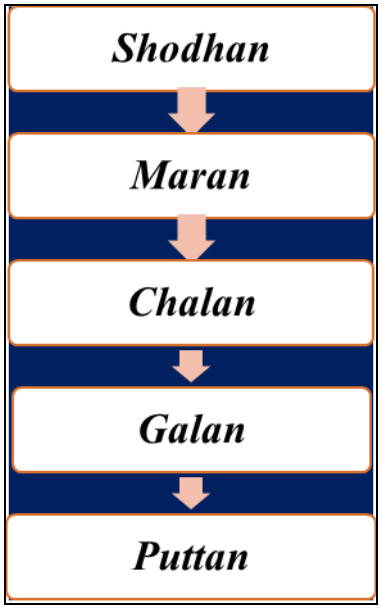

Table 1: Various steps involved in the preparation of *Bhasma*

STANDARDIZATION/QUALITY EVALUATION OF *BHASMA*:

Standardization ensuring quality and consistency throughout the manufacturing process, thereby leading to the formation of good quality products. Ayurveda and modern science suggested various approaches for ensuring quality of *Bhasma* preparations. These approaches can be used for standardizing herbo-metallic preparations. The major techniques of quality standardization of *Bhasma* are as follows:

Test for Physical Characteristics:

- ***Verna***: *Bhasma* must possess specific color, derived from its parent material. Colors such as red, pale and white, etc. are mentioned.
- ***Nisvadutam***: *Bhasma* should be tasteless, incinerated *Bhasma* lack distinct taste and not possess metallic taste.
- ***Nishchandratvam***: *Bhasma* should lack luster since this feature is lost during incineration process. In this test *Bhasma* is observed under the sunlight to determine presence of luster. If test reported failed remark then further incineration required till to get luster free formulation.

- ***Varitara***: *Bhasma* should exhibit fineness and lightness, which can be determined by sprinkling small amount of *Bhasma* over stagnant water, *Bhasma* should flow on water.
- ***Unama:*** This test is performed subsequently after the *Varitara* test by placing a grain on the floated layer of *Bhasma*, Good quality *Bhasma* should float over the water.
- ***Rekhapurnatvam***: *Bhasma* test confirm fineness of formulation and performed by rubbing *Bhasma* between index finger and thumb. *Bhasma* should fill the lines of the fingers.
- ***Slakshnatvam***: The *Bhasma* should not cause irritation when touched with fingertips; this property is required for proper absorption and assimilation of formulation into the body.
- ***Anjana Sannibha***: *Bhasma* should exhibit smoothness if incinerated properly, this property prevents irritating the mucous membrane of the gastrointestinal tract by *Bhasma*.
- ***Avami***: *Bhasma* should not induce nausea or vomiting after administration [6-8].

Test for Chemical Characteristics:

- ***Apurnabhavta***: This feature denotes incapability to retain metallic form, this test assesses inability of *Bhasma* to maintain metallic form. In this test equal quantities of *Mitrapanchaka*, comprising the seeds of *Ghee*, *Abrus precatorius,* borax, honey and jaggery, etc. are sealed in a *Sarava samputa*. The mixture is heated and allowed to cool. Free metal remains inactive after incineration.
- ***Niruttha***: This test is performed to ensure inability to regain metallic form. Weight of silver leaf is fixed in a *Sarava samputa* and heated, that after allowed to cool and weight of silver is measured. Improperly incinerated *Bhasma* may increase weight of silver leaf.
- ***Amla Pariksha***: This test is performed to check ability of *Bhasma* to maintain its colour that should not get changed during procedure. In this test a small amount of curd is placed in a Petri dish and lemon juice is added followed by addition of *Bhasma* and observed for any color change [9-12].

Modern Test for *Bhasma*:

- Atomic Absorption Spectrophotometry
- X-ray Diffraction
- Scanning Electron Microscopy (SEM)
- Transmission Electron Microscopy (TEM)
- Fourier Transform Infrared
- Thermos Gravimetric Analysis (TGA)

Conclusion:

Ayurveda described clinical importance of *Bhasma* as a herbo-mineral formulation. However, it becomes imperative to standardize the preparation processes, raw materials and *Bhasma* itself to ensure their desired physicochemical properties. Ancient and advanced methods of standardizing *Bhasma* can help to ensuring their safety, efficacy and batch-to-batch uniformity. *Shodhan, Maran* and *Puttan* are major approaches used for the preparation of *Bhasma*. The physical characteristics can be determined by various tests which include tests for *Verna, Nisvadutam, Nishchandratvam, Varitara, Unama, Rekhapurnatvam, Slakshnatvam* and *Anjana Sannibha*. Similarly, *Apurnabhavta, Niruttha* and *Amla Pariksha* are used for testing chemical characteristics of *Bhasma*. Modern science also described various approached for quality evaluation of *Bhasma* which includes methods such as; Atomic Absorption Spectrophotometry, X-ray Diffraction, Scanning Electron Microscopy, Transmission Electron Microscopy, Fourier Transform Infrared and Thermos Gravimetric Analysis, etc.

References:

1. Tripathi B. editor,5th edition, Charaka Samhita of Agnivesh, Chikitsa Sthan Kushtha chikitsa chapter 8, Verse32, Varanasi: Choukhambha Sanskrit Sansthaan, Varanasi, 2006, 394.
2. Sagar Bhanu PS, Zafar R, Panwar R, Herbal drug standardization, The Indian Pharmacist, 4(35), 2005, 19-22.

3. Tripathi YB. A multidisciplinary approach to standardize bhasmas (Ayurvedic metallic preparations) J Curr Sci. 2006; 90: 897.
4. Bhutani KK, Herbal medicines an enigma and challenge to science and directions for new initiatives, Indian Journal of Natural Products, 19 (1), 2003, 3-8.
5. Tripathi YB, Singh VP, Sharma GMK, Sinha RK, Singh D, X-rays diffraction and microscopic analysis of tamra bhasma: An Ayurvedic metallic preparation, Indian Traditional Knowledge, 2, 2003, 107–117.
6. Kulkarni SD, editor.2nd edition, Acharya Vagbhat, Rasa Ratna Samuchhaya, Dravyadravya vidaniya, chapter 2, New Delhi: ML Publication; 1998. p. 148
7. Wadekar MP, Patel RK, Preparation and characterization of a copper based Indian traditional drug: Tamra bhasma, Journal of Pharmaceutical and Biomedical Analysis, 39, 2005, 951–955.
8. Kapoor RC, Some observations on the metal-based preparations in the Indian Systems of Medicine, Indian Journal of Traditional Knowledge, 9 (3), 2010, 562-563.
9. Kokate CK, Purohit AP, Gokhale SB, Analytical pharmacognosy, Pharmacognosy, 30th edition, 2005, pp.1-99.
10. Shudaldev mohaptra, Physicchemical characterization of ayurvedic bhasma (swarna mashika bhasma):an approach to standardization, International Journal of Ayurveda Research, 1, 2010, 82-83.
11. Sunil Kumar Singh, Preparation and characterization of a mercury based Indian traditional drug Ras-Sindoor, Indian Journal of Traditional Knowledge, 8 (3), 2009, 346-347.
12. Prasanta Kumar Sarkar, Ayurvedic Bhasma: the most ancient application of nanomedicine, Journal of Scientific & Industrial research, 69, 2010, 901-905.