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CLASSICAL REVIEW ON BHASMA AS HERBO-METALLIC NANOMEDICINE

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ABSTRACT

Natural products have been used for healing purpose from ancient time of civilization. Ayurveda focuses on the utilization of metals, minerals, and herbs in the treatment of diseases. *Bhasma* is a specialized product processed from metals or minerals following purification. Incineration is used primarily to produce *Bhasma*, which acts as nano-medicine; in which toxic metals are converted into nontoxic, biocompatible forms through the various purification processes. Its therapeutic action and good pharmacokinetics owe a great deal to its extremely fine particle size, which makes target site delivery effective. *Rasa Shastra* mentions various steps of *Bhasma* preparation which imparts desirable qualities into the final formulations. *Shodhana*, *Bhavana* and *Marana* are some important processes which utilizes in the preparations of herbo-metallic nano-medicines. *Bhasma Pariksha* is employed to assess qualities of *Bhasma* formulations. *Nischandratvam*, *Rekhapurnatvam, Varitaratvam, Nisvadutvam* and *Apunarabhavata*, etc. are some important tests performed for the quality evaluation of *Bhasma.*

KEYWORDS: *Ayurveda, Bhasma, Nano-medicine, Herbo-metallic, Bhavana.*

INTRODUCTION

Mineral and metal-based drugs possess important therapeutic potential, and their preparation is described in *Rasashastra*, which is an Ayurveda branch dealing with metallic formulations used for therapeutic purpose. These drugs are subjected to highly complex procedures for achieving both safety and efficacy. The main procedures include *Shodhana* and *Marana* during their preparations, in which metallic materials are subjected to purification and incineration respectively. Ayurveda science encompasses information about the many herbo-metallic preparations and *Bhasma* is one of them.[1-3]

Bhasma is one of the main herbo-metallic preparations categories and processing of *Bhasma* involves several steps as depicted in **Figure 1**. These preparations processes imparts some advantages like improved palatability, high potency, improved bioavailability, effective absorption and reduces dosing frequency. Some of the commonly employed *Bhasmas* are *Swarna Bhasma*, *Makshika Bhasma*, *Abhraka Bhasma*, *Tamra Bhasma* and *Lauha Bhasma*, etc. These are used for the treatment of skin diseases, respiratory diseases, sexual disorders, infections and gastrointestinal disorders, etc.[3-5]

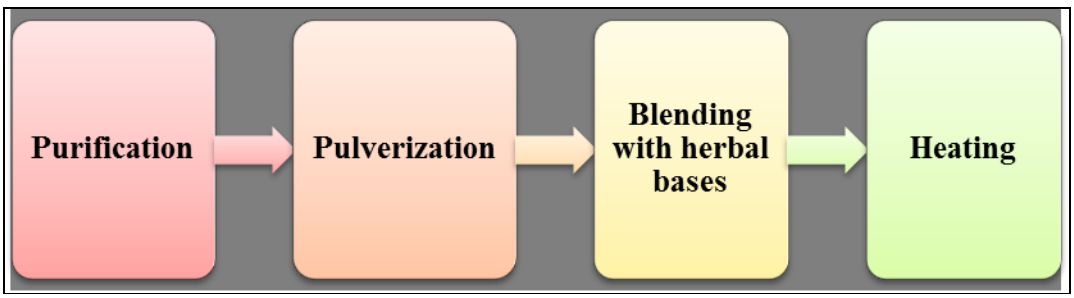

Figure 1: Various steps involved in the preparations of herbo-metallic formualtions.

The preparation techniques applied in *Bhasma* not only improves therapeutic utility of formulation by converting poisonous or biologically incompatible forms of metals and minerals into bio-compatible, safe forms, but also boost their absorption and stability, etc.

The *Bhasmikaran* process involves certain *Samskaras* that purify the crude material while maintaining its medicinal potential. The micronization gained in this process ensures the drug to be easily absorbed and able to pass through the subtle channels of the body. One of the most important stages in *Bhasma* preparation involves treating metals/minerals with the juice/decoction of some herb for specified time duration. This facilitates detoxification of the materials and the selection of the herbal vehicle is based upon the type of *Bhasma* being prepared. The pre, main and post procedural approaches is depicted in **Table 1**, which play vital role to achieve desirable formulations.[4-6]

Table 1: Sequential stages involves in the preparations of *Bhasma.*

Stage	Process
Pre-Treatment	*Shodhana* for the removal of toxic components using herbal extracts, juices, or decoctions.
Main Procedure	*Bhavana* involves moist trituration for uniform mixing. *Chakrikanirmana* involves pellet formation for even heating. *Sarava-Samputikarana* means sealing the crucible to prevent contamination and material loss.
Post-Procedure	*Lohitikarana* & *Amritikarana* techniques are employed to enhance the product's quality, therapeutic efficacy and stability, etc.

As mentioned above in Table, the process starts with *Shodhana*, which is the purification of the raw material by using particular herbal media to remove impurities and toxic factors. This is followed by *Bhavana*, which is a method of moist trituration not only to add wetness to facilitate grinding but also to allow for uniform blending of the materials. Then *Chakrikanirmana* is performed, in which the substance is molded into equal pellets so that proper dosing can be ensured and proper heating can be achieved in the process of incineration. Pellets are then exposed to *Aatapa Shoshana*, in which they are dried under the sun so that the remaining moisture is eliminated. *Sarava-Samputikarana* is done finally, where the pellets are enclosed in a closed container to keep the contents intact and ensure even heat distribution during calcinations.[6-8]

***Putapaka* Method**

In this process, metals/minerals are cleaned by *Shodhana*, then *Bhavana* and *Marana*. The cleaned metals are pulverized to coarse powder, heated red-hot and quenched in particular liquids. *Chakrikas* are made after further processing with herbal drugs and sealed in crucibles smeared with *Sharava Samputa*, and then given controlled heat in *Puta*. This process is repeated a number of times to achieve the final *Bhasma*.

For metals with low melting points such as zinc, lead and tin, etc. an intermediate process known as *Jarana* is needed between *Shodhana* and *Bhavana*. This involves melting the metal and blending it with certain materials to facilitate further processing.

Kupipakwa Bhasma

Kupipakwa Bhasma is made following a well-defined process of *Shodhana*, *Kajjali Nirmana*, *Bhavana* and *Kupipakwa*. Following purification, the metal is amalgamated with mercury and subsequently mixed with purified sulfur. The mixture is triturated to obtain a fine, black powder called *Kajjali*. The *Kajjali* is then ground further with a defined liquid medium for a specified duration. After preparation, the dried mixture is put into a *Kachkupi*, which is sealed with seven layers of mud-stained cloth. The sealed bottle is given controlled heat by a *Valuka Yantra*. After the process is completed, the bottle is shattered, and the *Bhasma* is scooped out from the bottom part.[8-10]

Bhasma Pariksha

Bhasma should exhibit specific characteristics; these qualities are assessed through traditional tests known as *Bhasma Pariksha*, which help to determine the efficacy, safety and suitability of the final product. The analytical assessment of *Bhasma* includes both conventional Ayurvedic procedures and contemporary scientific methods. In clinical practice, a number of traditional tests referred to as *Bhasma Pariksha* are employed such as *Nischandratvam*, *Rekhapurnatvam*, *Varitaratvam*, *Nisvadutvam* and *Apunarabhavata*, etc. *Nischandratvam* refers to the lack of metallic sheen, assuring complete burning of the metal or mineral. *Rekhapurnatvam* verifies the fineness of the *Bhasma*, wherein the powder settles into the fine lines of the fingers upon rubbing. *Varitaratvam* verifies whether the *Bhasma* floats on water, based on its lightness and fineness of particles. *Nisvadutvam* is another critical test wherein the *Bhasma* remains tasteless, showing proper processing. *Nirdhumatvam* verifies that *Bhasma* does not give off smoke when brought to heat, assuring complete incineration. *Apunarabhavata* is applied to ensure that the *Bhasma* will not turn back into its original metal form under certain conditions in order to prove its stability. The *Unama* test is performed by putting a grain of rice on water with *Bhasma*; if the rice floats on water, it reflects the light and purity of *Bhasma*. These ancient practices serve a key role in preliminary determination of *Bhasma* quality and ensure their efficacy and safety for therapeutic purposes.[8-10]

CONCLUSION

Bhasma is an ancient preparation which also follows the contemporary science of nanotechnology, wherein drug

particles are minimized to micro or nano-size to facilitate quicker absorption and effortless assimilation in the body. The primary processes involved in *Bhasma* preparation are *Shodhana* and *Marana* which assist in converting metals into non-toxic, absorbable, digestible and biologically compatible entities with high therapeutic potential. *Bhasmas* are said to possess *Rasayana*, *Yogavahi*, immunomodulatory, anti-aging and restorative properties, etc. Generally accepted features of properly prepared *Bhasma* are *Nischandratvam*, *Varitara*, *Rekhapurnatva*, *Susukshma*, *Gatarasatvam* and *Apunarbhavata*. These characteristics of *Bhasma* ensure their efficacy and potency for therapeutic purposes.

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