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EXPLORING PHARMACEUTICS IN SUSHRUTA SAMHITA: A CONCEPTUAL ANALYSIS

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ABSTRACT:
Ayurvedic literature places a lot of emphasis on the Sanskara medicinal method. The goal of this procedure is to improve the drug's properties. Bhasmas are typically given as both metallic and non-metallic minerals; they are an ash that is produced by burning. The medication is more effective because of the different cleansing and cooking processes (Shodhana, Maarana, and assimilation of herbal juices, Bhawna). The finished product is transformed into Bhasma (1-2 u) nanoparticles by a variety of manufacturing techniques, which may aid in the drug's absorption and assimilation. The product's acceptability and effectiveness are confirmed by the physical and chemical Ayurvedic testing. Standardization is essential to verify the identify and assess the product's efficacy, purity, and quality. Bhasmas stimulate the enzymes responsible for metabolizing drugs and improve bioavailability through the digestive tract.
These mineral and metal therapies work instantly and are used in very little quantities due to their high efficacy. The absence of total uniformity by physicochemical characteristics, however, is the most obstacle. Thus, the primary goal of this paper is to examine the fundamental idea of Bhasma Kalpana through the standardization and preparation of Tamra Bhasma using traditional techniques.

KEYWORDS: Bhasma, Sodhana, Maarana, Standardization and Tamra Bhasma

INTRODUCTION:

The medical system takes great pleasure in minerals and metals. The "Rasa Shastra" provides a detailed explanation of the use of all metals, including gold, silver, iron, lead, tin, zinc, brass, copper, and mercury. In Rasa Shastra, "bhasma" refers to the transformation of a metal into an irreversible condition—that is, a state from which it cannot return to its original form—as opposed to the literary meaning of "ash" (Apunarbhava)[1].

The use of metals in medicine has been documented in all Ayurvedic texts, such as Charaka Samhita, Susruta Samhita, and Bhav Prakash, since the beginning of Ayurvedic literature and the ancient Chinese and Egyptian civilizations in 2500 B.C. Metals and minerals are used to treat a variety of diseases[2,3].

Purification is a notion used by Ayurveda to prevent sickness rather than treat it. The goal of Ayurveda is not to eradicate microorganisms; instead, Rasayana, or the balancing of doshas, and host immunity guarantee that the infectious agent is eliminated[4].

Ayurvedic Metal & Mineral Drugs

Drugs related to earth (Bhauma) include metals like gold, silver, copper, lead, tin, and iron, as well as minerals like Manahshila (red arsenic), Gairika (red chalk), and Ratnas (gems). Animal byproducts like feathers, shells, and horns are also given as bhasmas. Metals are referred to as "Loha" in Indian metallurgy (Ores)[5].

There are seven updhatus (secondary metals) and seven dhatus (basic metals) in all.

Rasa Ratna Samuchhay claims that these compounds are divided into a number of categories. Parpati, Rasa Yoga, Kupi Pakwa, and Bhasmas are these Rasa Preparations (Mercurial preparations). We are now thinking about Bhasma's preparations[6].

Types & BHASMA

Since Bhasma is, as you are aware, an ash that is produced by burning, it first goes through the purification process (Shodhana) and then the reaction phase (Maaran), when mineral and herbal extracts are added (Bhawna).

Preparation of BHASHMA

Metals, minerals, and animal products are first purified (Shodhit), after which they are mashed with particular juices in a khalva (stone mortar and pestle), and finally arranged in a single layer on a shallow clay plate (Sarava). Another plate is used to seal this, and it is cured after being plastered with clay. According to the recipe, this pot is maintained in a puta (a fire parameter) and burned. The medication is then pounded into a fine powder and the seal is opened once it has cooled on its own[6].

SHODHANA

The method used to purge metals and minerals of their internal and exterior impurities is called shodhana. Medical purification and chemical purification are not the same. Shodhana's primary goals are the removal of hazardous substances (chemical and physical) from the medicine, the conversion of hard, non-homogeneous material into soft, brittle, ductile, and homogenous material, and the creation of desired properties[7]. Since the Charaka Samhita, the idea of employing nanoparticles has been prevalent. General Purification, or Samanya Shodhana, involves heating thin metal sheets until they are red hot and then quenching them in liquid media like oil (Taila), extract (Takra), cow urine (Gau Mutra), and other substances. This process can be applied to a wide variety of metals. Only certain metals can benefit from Vishesh Shodhana (Special Purification), which includes Bhawna, Swedana, Nirvapana, Bharjana, Galana, and Mardana[8,9,10].

MAARANA

In essence, it is the calcination or burning process. After material has been cleansed, it is put in a mortar and pounded for a predetermined amount of time using a paste made from particular juices (Kashyas). Primary metal (Pradhana Dhatu) is the metal meant for Maarana, and secondary metal (Sahay Dhatu) is the other metal that is consumed in lesser amounts. The reduction of particle size is the goal of Bhawna. The weakest fault structures and fissures in materials cause particle size to drop and surface area to grow, according to Griffith's theory.The drug's active ingredient is oxidized in this area that is exposed to the air.Sun-dried chakkrikas, or little pellets, are produced. The weight and dimensions of the substance determine the chakrikas' dimensions. Thermodynamics' Fourier heat flow principle states that the thinner the pellets, the heavier the medication.The pellets are thoroughly dried in the shade to prevent rapid moisture loss and subsequent cracking. Sunlight induces an electron transfer reaction by allowing unpaired electrons on metal surfaces to vibrate freely. These pellets are stored in Puta (fire parameter) and arranged in a single layer in Sarav (mud tray). It facilitates appropriate calcinations and offers a specific temperature pattern. It increases the material's medicinal efficacy by making it more soluble, flexible, and assimilable[12].

BHASMA Quality Control

a. Physical Test[13]

1. Varitara: Bhasma is dependent on the surface tension law to float on the water's surface.
2. Rekha Poornatvam: This is the process of rubbing a Bhasma between the thumb and index finger. It ought to fit into the creases and nooks of the fingers with ease.
3. Nischandratramanam: Bhasma needs to be glossy before being applied therapeutically. When Bhasma is viewed in direct sunlight, the presence of luster suggests additional burning.
4. Anjan Vat Sukshamtva: Bhasma particles should be extremely minute, or nanoparticle-sized, or they should resemble Pondamus Odoratissimus pollen grains (Ketaki Rajah).
5. Shaklakshanatva: The body is capable of absorbing and assimilating tactile experience.
6. Avami: The bhasma should be tasteless and should not cause nausea when taken.

b. **Chemical Test[14]**

1. Niruttha-Bhasma is stored in sealed clay jars after being combined with a set weight of silver leaf. When heat is applied, the weight of the silver leaf in a correctly constructed Bhasma cools on its own.

2. Apunarbhava: When Bhasma is heated in an earthen pot along with an equal amount of Mitra Panchaka (Jaggery Abrus precatorious), borax, honey, and ghee (fat), a specific Bhasma is produced that cools on its own.

Statudated in TAMRA BHASMA

Tamra bhasma is made using the techniques described in Rasa Ratna Samuchhay and Rasa Tarangini. to determine Puta's specificity, the completed product's conformance (pakv bhasm), and quality control through several tests. Simple dhatu shodhana, or dipping each in Tail, Takra, Gaumutra, Kanji, and Kulth Kwath seven times apiece, is the main method used for Samanya shodhana of Tamra (copper). It demonstrates Copper's (Tamra) brittleness. Brittleness significantly increases after this, when vishesh shodhana is performed with the Rasa Tarangini method (with Gaumutra and Saindhav Lavan). It demonstrates the significance of purification, or shodhana. Next, the Maaran procedure is carried out in accordance with Rasa Ratna Samuchay.The remaining steps are the same as for Maarana. Tamra Patra is covered with Kajjali, a blend of pure Paarad (mercury) and pure Sulphur (Gandhaka), and stored in an earthen jar called a Sarav. Pallets become harder when Gaja Puta is used for incineration, according to research. Thus, varahaputa was burned at a temperature of up to 580 degrees Celsius, and the procedure was carried out seven times. Following the collection of distinct samples from each puta, it was seen that the hue of the bhasma had turned black and the pellets were getting lighter following the completion of the seventh puta[15].

Blue tint disappeared when doing bhasma pariksha, a unique test using curd to check Tamra Bhasma's doshas. According to Rasa Tarangini, the Amritikarana procedure was carried out to eliminate the remaining doshas and improve characteristics. Tamra Bhasma is combined with pure sulfur, or shudh gandhaka, and then triturated with panchamrita, which is made of milk, curd, ghee, honey, and sugar. After three cycles of production and storage at 690 degrees Celsius in the traditional Puta, Tamra Bhasma was deemed suitable for use as medicine. after assessing using every Ayurvedic criterion.

Three Tamra Bhasma samples were run through AAS in order to analyze the elements As, Fe, Cd, and Pb. Findings indicated that there are residues of every heavy metal. Therefore, this Bhasma has therapeutic uses[16].

CONCLUSION:

The final product's raw material blend is specifically influenced by the Bhasma production process. These might be significant indicators for Bhasma made in a specific way. Particle size is greatly reduced using a variety of Maaran (with Bhavna) procedures, including wet trituration, the puta system of heating, and shodhana (which includes raosting, quenching, and constant stirring). These procedures can also transform the metalloids into an emulsified form, which can then be used as an adjuvant and trigger a variety of reactions, most notably immunological ones. Any pharmacologically active substance's activity depends on how much is administered, for how long, and how often, all of which might affect the substance's bioavailability. Because all these processes enhance the medicinal benefits of bhasmas, they are also employed in extremely small amounts.Modern approaches such as physico-chemical analysis are best suitable for standardizing bhasmas. Standardizing Tamra Bhaska will undoubtedly contribute to the development of trust in each of these procedures and guarantee the safety, effectiveness, and consistency of Tamra Bhaska's therapeutic application in the body.

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