



# Potential of Bhasma as Nanomedicine for Disease Management: A Synopsis

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## ABSTRACT

Bhasma, which are ayurvedic nano preparations, originate from herbal, mineral, and metallic sources. Utilising nanotechnology concepts, there is significant potential in creating new drugs from bhasma. It is crucial to standardise these bhasma to uphold their quality. The method of preparation greatly influences the effectiveness and structure of bhasma. While generally safe for human use, recent analytical studies have revealed the presence of toxic metals or elements in bhasma, which can have severe adverse effects on human health. Further research is necessary to explore the potential of bhasma as nanomedicine.

**Keywords:** Bhasma; Standardization; Disease management; Parameters

## INTRODUCTION

Bhasma is a special ayurvedic preparation of minerals and metals infused in a decoction or juice of herbs. Bhasma is the ash produced by combustion. The raw material goes through a complex purification process. That's the case includes the addition of plants and minerals based on minerals. Bhasma is a plant, bhasma metal, and mineral busma. Bhasma is a very fine ayurvedic medicinal powder obtained by calcining minerals and metals that occur naturally on Earth. Calcination involves heating the minerals and metals to very high temperatures so that they are transformed into oxides. Animal by-products such as feathers, shells, horns, non-metallic and metallic minerals are commonly called bhasma. Ash produced during combustion is called bhasma. After the raw materials undergo a complex purification process called shodhana, additional plant extracts and minerals are added to the reaction stage. A furnace is then used to bake the ingredients. The final product is expected to become a harmless substance. Examples include taura bhasma, bhasmu, and swarna bhasma. Spherical gold particles (56-57 nm) are used in traditional Indian ayurvedic medicine called Swarna bhasma. Mercury sulfide with crystal sizes of 25-50 nm is present in mercury compounds.

## MATERIALS AND METHODS

### Types of bhasma

**Jasad bhasma:** Ayurvedic medicinal formulations, known as bhasmas, are developed through a long iterative process using herbs and minerals, but in industrial settings, sulphur and mercury are most commonly used to prepare bhasmas from base materials. Jasad Bhasma is characterised by physicochemical evaluation using CHNS(O) analysis, X-ray diffraction, and electron microscopy. Using CHNS(O) analysis, electron microscopy and X-ray diffraction, the physicochemical characteristics of Jasad bhasma are studied. Further research is underway on the biological effects of both formulations. The study uses the Swiss albino mouse model to study zinc bioaccumulation, its effect on liver antioxidant status, liver and kidney function as determined by conventional and Single-Photon Emission Computed Tomography (SPECT) tests, blood cell viability, and immune system function. Anupam is served with bhasma, hence, all bioactivity tests involved serving the dish with or without the addition of (*Phyllanthus emblica* L., crushed dried fruit), also known as amla powder. Jasad bhasma is used for many ailments such as cough, anaemia, ulcers, diabetes, depression, eye problems, etc.

**Tamra bhasma:** The one and only Tamra Bhasma (TB) has the properties of (laxative) salaka, (fat scraping) lekhana, (medicine)

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lopana, and (rejuvenating) brimhana. It is often used to treat various conditions, including parinama and relieves the symptoms of diseases caused by pitta and kapha. Peptic ulcer of shul, anaemia of pandu, stomachache of udarashola, piles of arsha, skin problems of kushta, breathlessness of shwas, etc. Many diseases, including vanthi (vomiting), murchcha (fainting), bhrama (hallucinations), shula (spastic pain), daha (burning), moha (delirium), aruchi (anorexia) and even ayunasha (death), can be caused by raw tamra (copper) or improperly prepared TB. So, it's very important to prepare for the highest TB. The sensual TB was a black, soft, smooth, drunk powder with no accuracy. The smell of tamura basma deals with various conditions such as anaemia lead, anorexia, heart disease, colitis, and liver. Spleen, abdominal pain, tuberculosis. tamra basma shows some pharmacological scale, included a liver protection effect on the oxidation that is guided by oxidation significant decrease in lipids. Level oxide is a strong antioxidant used to treat lipid peroxide. Not noticeable incinerated effect; Increased level of pain [1].

**Mandura basma:** Ayurveda is a unique system of medicine that uses metals and minerals in the form of fine powders called bhasmas. They are prepared by calcination. One of the minerals with various medicinal properties is manjula. The basic processes- shodhana, dravana and marana-are present in iron bhasmas. Iron preparations include two procedures: Red hot leaves are purified by shaking them in a liquid (such as freshly prepared Triphala decoction) and then quenched (fake) cow urine and nine times the size. In the karva yantra, a large amount of sulphur is added, and bhavana and a small amount of dewadhari swara are applied. It is then completely purified for at least seven days. This process is then repeated. To ensure the quality of the produced basma, quality control tests like rehapurnatvam (particles falling into the grooves of human hands), varitara (product particles floating on water), etc. are used. In these tests, X-ray diffraction analysis was used to test the performance of basma. He showed the presence of  $\text{Fe}_2\text{SiO}_4$  in raw manjula and  $\text{Fe}_2\text{O}_3\cdot\text{SiO}_2$ . Compared to raw mandura, which appeared as scattered grains measuring  $10^{-2}$  microns, tests using SEM showed that mandora basma grains were uniformly distributed in larger globules measuring 200–300 nm. Mandura basma is widely used in ayurvedic medicine as a formula for the treatment of iron deficiency anaemia, also known as microcytic anaemia. It is a calcined iron of Ayurvedic composition. In addition, it is used for liver treatment. Spleen, hemolytic yellow UND, menstrual and menstruation [2].

**Swarna basma:** The preparation of swarna basma involves three processes, namely dravana, shodhana and malana. Once it is lit and turns golden red, it is immersed in sesame oil (*Sesamum indicum*). Repeat this process seven times in various things batch. Preparation of swarna is frequently used as a drug. Achieve the requirements to support the latest use of those, and the latest standardisation of metallic baska preparations requires both physical and chemical characteristics. Basma formulation in vitro biological evaluation. Soft leaves are buttermilk, or cow's urine is injected with radish (*Rafanus satibus*), clatta, and kanji. Finally, heat is used for drying the leaves. After grinding the mixture, the resulting paste is dried in the sun. The final product is obtained by repeating the grinding and sun-drying procedure seven to

fourteen times with new aliquots of latex. Its morphological characteristics are as follows: Soft to the touch, dark brown, and tasteless. In traditional Indian ayurvedic medicine, swarna (golden) basma is used as a remedy for many clinical conditions such as rheumatoid arthritis, diabetes, bronchial asthma and nervous system disorders. Swarna basma is usually taken orally and mixed with milk, ghee and honey.

**Moukta shouktik basma:** Mukta Shouktic Bhasma (MSB), an ayurvedic formulation based on pearls, aloe vera and vinegar, prevented acute and subacute inflammation in albino rats caused by subcutaneous implantation of cotton balls and injection of carrageenan by subcutaneous implantation. Histamine, 5-HT and nystatin. Mukta Shouktic Bhasma (MSB) is a traditional ayurvedic medicine. It is a biomedicine. It is synthesised from special mother-of-pearl by calcination as described in the ayurvedic classics. Physicochemical characterisation of MSB was carried out using advanced techniques such as transmission electron microscopy, scanning electron microscopy, powder X-ray diffraction analysis, Fourier transform infrared spectroscopy, inductively coupled plasma analysis, energy dispersive X-ray analysis, and thermogravimetry. Normalized parameters of mukta shouting basma:

- Compacted density and apparent density.
- Particle size analysis by dynamic light scattering (MSB particle size is 1.22 to 10.20  $\mu\text{m}$ , and the average particle size is  $22.52 \pm 0.45 \mu\text{m}$ ).
- TEM, i.e., Transmission electron microscopy (irregular rod-shaped particles).

Mukta shouktic basma is useful for heartburn, sour taste in the mouth, indigestion, abdominal pain, anorexia nervosa, calcium deficiency, osteoporosis, osteopenia, etc. Various newer studies have shown that the addition of Heated oyster shells to an elderly patient's diet increased bone count and lumbar mineral density. Although Mukta shouktic basma is widely used for its antipyretic activity.

**Yashada basma:** Yashada basma is made according to the stages of shodhana, jaran and marana. Its therapeutic properties are enhanced, and its size is reduced to nanoscale by adding herbs and plant extracts during the calcination process. It has been proven that yashada basma is highly beneficial in treating diseases such as diabetes, eye disorders, urinary disorders, etc. In Ayurveda, zinc that has been baked and processed is known as yashada basma. Studies have shown that zinc oxide nanoparticles can be an effective anti-cancer agent. On the other hand, no research on the efficiency of yashada basma. Pancreas cancer has been made.

**Varatika basma:** Ayurvedic holistic medicine includes the herb mineral compound known as varatika basma. The outer shell of the marine creature *Cypraea moneta* Linn, also referred to as money cowry, is called vatika. The calcium carbonate component is the chemical composition of varatka. In this work, varatka is converted into metal oxide through a unique process, which is called bhasmikaran in ayurveda, an ancient Indian medical system. The following are its organoleptic properties. Characteristics. The powder is matte white, tasteless and odourless. It dissolves in dilute hydrochloric acid, and

physicochemical studies indicate a loss of 0.6566% on drying. It contains total potassium (3.49%), total nitrogen (0.72%), total ash (2.06%), organic carbon (1.09%), total zinc (1.48 ppm) and total iron (113.6 ppm). The finished product is evaluated by physicochemical parameters and by using advanced analytical instruments such as particle size analysis, EDAX zeta potential, AFM, SEM, X-ray and thermogravimetric curves. The bhasma that was created was found to be an extremely fine nanoparticle that could have very strong and safe antiulcer properties. The results of the study indicate that varatika bhasma has superior antioxidant activity compared to several *in vitro* antioxidant models [3].

**Abhrak bhasma:** Ayurvedic medicines such as abhrak bhasma are often used to treat various diseases, including hepatitis. Abhrak bhasma, a powerful cell regenerator, is produced by adding mica to various restorative herbal juices. used as a nerve tonic. It is often used to treat anaemia and respiratory tract infections. It contains traces of magnesium, iron, potassium, aluminium and calcium. Abraq bhasma medicine is a fine, amorphous powder. It also contains aluminium, magnesium, and iron silicates.

**Sankha bhasma:** Sankha bhasma is made from calcined shells. It mainly consists of magnesium, iron and calcium. Sankha bhasma is renowned for its digestive and antacid qualities. It helps with sprue, colic, hyperchlorhydria, and hepatosplenomegaly. Rats are protected from the duodenal ulcer by a combination of some ayurvedic drugs. Includes various herbs: *Glycyrrhiza glabra*, *Terminalia chebula*, *Piper longum*, and sankha bhasma. The study indicates that these drugs affect Brunna iron and increase secretion.

### Standardisation of bhasma

Standardisation is a quality assurance measure and includes all steps performed during the manufacturing process and quality control to ensure a reproducible quality level. It plays a vital role in herbal formulation studies from the plant form to the final product and clinical application. It also involves mixing medicinal plants or herbal medicines, adding excipients or modifying a herbal preparation according to the specific content of components or a set of chemicals with recognised therapeutic activity, respectively. Standardization is a complex process

**Table 1:** Permissible limits for heavy/toxic metals.

Heavy/Toxic metals	Permissible limit (ppm)
Lead	10
Cadmium	0.3
Arsenic	10
Mercury	1

### Microbiological evaluation

The different microbial evaluations include the total count of viable aerobic bacteria, the total count of enterobacteria and fungi, and the test for the detection of specific pathogens: *E. coli*,

because many factors influence the biological efficacy and reproducible therapeutic effect [4]. Precautions should be taken during the preparation procedure to ensure high-quality herbal products. The standardisation process includes the following methods:

#### Preliminary tests

**Floating test:** If you sprinkle a small amount of bhasma in water, it should float to the surface.

**Fineness test:** A small amount of the sample should penetrate the lines of the fingertips when rubbed between the fingers.

**Loss of metallic lustre:** No metallic lustre should be observed on ocular inspection, preferably in the presence of sunlight.

**Loss of metallic state:** This contains a very thin silver seat (600 nm thickness) heat.

The amount of hot red bus for about 5 minutes. No residue of this sample should remain on the silver sheet permanently after it has cooled to room temperature, demonstrating that no alloy formation has occurred, thus confirming that the metal has been completely converted to bhasma, its oxide form.

#### Physicochemical evaluation

**Colour:** A bhasma's colour usually indicates a certain quality of the main ingredient. The alteration in the colour of the bhasma implies improper preparation.

**Loss on Drying (LOD):** Accurately weigh out approximately 2 g of drug into a nickel or silica crucible or dry in a hot air oven at 110°C until constant weight is reached. The difference between the two weights gives the LOD and calculates the % loss during drying. This method is used to measure the amount of water and other volatiles in a sample during drying or heat treatment.

**Taste:** A special taste or lack of taste is characteristic of properly baked basma. Changes in substances. It is characteristic of bhasma that certain tastes have certain tastes. The taste of metals may change bhasma.

**Heavy/Toxic metals testing:** The permissible limits for heavy/toxic metals set by WHO are shown in Table 1.

*Salmonella* spp., *Staphylococcus aureus*, *Pseudomonas aeruginosa*. The microbial load and pathogen tolerance limits based on WHO/FDA are shown in Table 2.

**Table 2:** Permissible limits of microbial loads and pathogens.

Sr. no.	Microbial loads for contamination	Crude plant materials	Pre-treated plant materials (Topical dosage form)	Other plant materials (Internal use)
1	<i>E. coli</i>	10 <sup>4</sup> g <sup>-1</sup>	10 <sup>2</sup> g <sup>-1</sup>	10 g <sup>-1</sup>
2	Total yeast mould count	10 <sup>5</sup> g <sup>-1</sup>	10 <sup>4</sup> g <sup>-1</sup>	10 <sup>3</sup> g <sup>-1</sup>
3	Total <i>Enterobacteriaceae</i>	-	10 <sup>4</sup> g <sup>-1</sup>	10 <sup>3</sup> g <sup>-1</sup>
4	<i>Salmonella</i> spp.	-	None	None
5	<i>S. aureus</i>	Absent	Absent	Absent
6	<i>Pseudomonas aeruginosa</i>	Absent	Absent	Absent
7	Coliforms	Absent	Absent	Absent
8	Total viable aerobic count	-	<10 <sup>7</sup> cfug <sup>-1</sup>	<10 <sup>5</sup> cfug <sup>-1</sup>

## Analytical evaluation

**Atomic absorption spectrophotometry:** Quantitative analysis of metals in bhasma is carried out by atomic absorption spectroscopy. It works with the phenomenon that the falling light excites the atoms of the inorganic material in a higher migration state. In this state, the atoms release the light wavelength according to the share. These concentrations are available.

**X-ray diffraction:** Phytochemicals have a specific structural arrangement of their components. X-ray diffraction helps to detect the characteristic arrangement of the structural units of the bhasma.

**Scanning Electron Microscopy (SEM):** A focused scanning electron microbeam from the SEM is directed towards the sample to obtain topographic images of the sample. Topographical analysis of different materials reveals different prints.

**Transmission Electron Microscopy (TEM):** In this process, the specimen is analysed by the transmission of the electrons through the specimen of material, and there is the formation of an image by the interaction of electrons. This image is magnified, focused, and captured on photographic film of an imaging device.

**Thermogravimetric Analysis (TGA):** The TGA method determines the purity of a sample. In this method, the rate of heating or cooling of a substance is controlled, and the weight is marked on the function time axis. Function temperature axis. The thermogravimetric curve of weight changes with temperature and time. The observation results are shown below.

## RESULTS AND DISCUSSION

### Current studies on bhasma

Bhasmas produced according to ayurveda are said to be more effective than any other healing preparations as they don't interact with the body's tissues. The following study used *in vivo*

Micronucleus (MN) assay and comet assay in Wistar rats of both sexes to generate and assess genotoxic information for chasma, namely mandura bhasma and abhrak bhasma. A rat MN test was used to measure the induction of MN in Polychromatic Erythrocytes (PCE) in bone marrow cells to examine the genotoxic and cytotoxic potential of the previously indicated basis in an *in vivo* mouse MN assay. An effective short-term genotoxicity test for quickly identifying DNA damage in practically any kind of cell is the alkaline comet assay. The results of mammalian erythrocytes MN tests (% PCE) in Wistar rats of both sexes were found to be, vehicle control (corn oil) 1.70 (M) 1.94 (F), abhrak bhasma 1.76 (M) 1.90 (F), mandura bhasma 1.36 (M) 1.84 (F), swas kuthar ras 1.68 (M) 1.88 (F), smrit sagar ras 1.61 (M) 1.51 (F), cyclophosphamide 23.52 (M) 24.22 (F). The results of comet assay (% damage) in Wistar rats of both sexes were as follows: Vehicle control (corn oil) 7.8 (M) 8.8 (F), abhrak bhasma 4.4 (M) 6.4 (F), mandura bhasma 6.6 (M) 7 (F), swas kutar ras 4 (M) 5.2 (F), smrit sagar ras 6.4 (M) 5.2 (F), cyclophosphamide 74.8 (M) 75.6 (SD). Under the experimental conditions and test system used, there was no significant increase in MN frequency or DNA damage percentage in animals administered bhasma compared to a vehicle control group of both sexes. This means that the tested bhasmas were not genotoxic [5]. Metals bhasma (Au, Ag, Fe, Cu, etc.) are used for medicinal purposes in ayurveda. According to ayurvedic literature, burnt gold particles, also known as golden bhasmas, act as drug delivery vehicles or have synergistic effects with drugs. Gold (Au) nanoformulations are a proven and reliable method of drug delivery. Gold bhasma has a higher ratio of trapping and encapsulation than gold nanoparticles. Rifamycin (RF) and Isonia (INH) loaded to AUNP and INGP regardless of the presence or absence of nanocarrier, these encapsulation and release patterns. The medicine was studied. The supported InGPs (InGP+Cs) showed higher retention capacity than supported AuNPs (AuNP+Cs). Compared with InGP+Cs, the cumulative release pattern of RF/INH 2 by AuNP +Cs was faster, indicating the higher drug storage capacity of InGP. The capture and retention capacities of InGP were good, regardless of the presence of polymer supports. The resulting

result indicates that INGP is more valuable and convenient. It also suggests that it is necessary to properly solve antibacterial problems when loading and distributing antibiotics. Especially about the stability of drugs. The obtained data has confirmed the mechanism of the delivery of drugs from gold. BHASMA emphasises that this is a useful way to serve antibiotics, both inside and outside the carrier system. You can fix antibiotics equipped with bhasma and stimulate new strategies to strengthen antibiotic delivery. For the standardisation of processes to create metal baska to meet the requirements for supporting it. When used, in addition to drug chemicals, you need a pre-biological estimation of drugs. Characteristics. The subsequent investigation assessed the physicochemical characterisation of two sets of gold bhasma preparations in addition to their blood compatibility, protein adsorption and complement potential of activation. First, the *in vitro* cytotoxicity, elemental analysis, particle size, and shape were assessed. Investigations included platelet activation, complement C3 adsorption, protein adsorption, hemolysis of red blood cells, aggregation tests using blood cells, and tight junction permeability in the Caco-2 cell line. No protein adsorption or blood cell aggregation was observed with gold bhasma preparations with crystallite sizes between 28 and 35 nm. These drugs had very low potential for activation of the platelets or complement system. Moreover, these particles did not cause cell death. In a study of Caco-2 cells, swarna bhasma particles released strong binding. Considering that the size of the gold contained in swarna bhasma is only about 28-35 nm when ingested, it could be absorbed through the digestive tract and reach the affected area, where the required gold(I) ions could be released over time for therapeutic activity. This finding supports the use of swarna bhasma as a therapeutic agent in clinical medicine from a safety point of view. An ayurvedic remedy recommended for the treatment of diabetes is zinc bhasma. The studies on the physicochemical characterisation of zinc bhasma included X-Ray Diffraction (XRD), High-Resolution Transmission Electron Microscopy (HRTEM), Scanning Electron Microscopy (SEM) and Diffuse Reflectance Spectroscopy (DRS). Using DRS, the maximum absorption was measured at 320 nm. This is typical for zinc oxide nanoparticles. According to the AAS, the zinc concentration in the sample was 70.7%. Particles The dimensions of 200 to 500 nm were found using SEM and HRTEM. Additional information on HRTEM has shown that The particles were a spherical and crystalline form (RESHET motif). The antidiabetic effects of bhasma zinc were estimated in induced rats of diabetes rats after four weeks of oral treatment. A strong hypoglycemic effect was observed at 3 mg/kg. Acute toxicity studies were performed at 300 mg/kg, 100 times the effective dose. No clinical symptoms, obvious behavioural changes, or adverse effects on mortality were observed. In the *in vitro* toxicity test, no discernible cytotoxicity was observed at all of the dose levels looked at analytical investigations are useful in understanding the function of media in pharmaceutical processing as well as the effects of various processing techniques. Naga bhasma made using two distinct techniques, one that involved the use of sulphur and mercury and the other that involved Vasa (*Adhatodia vasica* Niss.) was analysed. As the analytical profiles of the preparations made from each of these media vary, the analytical studies may provide

plausible explanations for the differences in the therapeutic activities. The average values obtained in NBP for acid-insoluble ash, total ash and loss on drying are 79.47, 98.85 and 0.07, respectively, whereas NBH displayed the corresponding parameters up to 0.16, 97.67 and 65.78 percent. NBP shows an average of 22.83% free sulfur. FTIR examination of the two bhasma samples revealed 18 peaks. Many functional groups such as alkyl, tri alkenes, monoalkenes, carboxylic acids/derivatives, secondary amines and alkyls are identified by these peaks. The lead contents of NBP and NBH were determined by FEG-SEM analysis and found to be 48.405 and 72.692, respectively. The decrease in the percentage of lead is likely due to the sulfide nature of NBP. In both samples, XRD analysis revealed numerous distinct peaks suggesting a crystalline structure. However, NBH is in oxide form with PbO, Pb<sub>3</sub>O<sub>4</sub> as the main phase, while NBP is in sulfide form with Pb(SO<sub>4</sub>)(CO<sub>3</sub>)<sub>2</sub>(OH)<sub>2</sub> as the main phase. The chemical composition of these samples was complex. The processing method has a significant effect on the physicochemical properties of bhasma, as evidenced by the wide range of values observed for all parameters. Therefore, the preliminary method must be taken into consideration in the light of these results. One type of bhasma is tamra (copper) bhasma. Copper bhasma is a traditional Indian medicine made from copper, which has been used for many years to treat various ailments. Various characterisation techniques, including BET, SEM-EDX, XRD, and XPS surface area measurements, were used to determine the tamra-bhasma content. The results of these methods were compared with those of a typical copper oxide sample. XRD and XPS phase tests were used to confirm the presence of cupric oxide, *i.e.*, copper in the +2-oxidation state, in the preparation. The interesting surface adsorption of dioxygen species on the drug samples was confirmed by XPS and other characterisation procedures. Also, its manufacture involved repeated calculations, which caused the small CuO particles to agglomerate, resulting in a larger particle size than the control sample. These results confirm compliance. The gold-based ayurvedic medicine suvarna bhasma has many therapeutic applications, including the treatment of rheumatoid arthritis, diabetes, tuberculosis, and neurological disorders. The following studies report evidence-based research on the physicochemical properties, toxicity, and efficacy of swarna bhasma: Swarna bhasma characterized using physicochemical techniques such as X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), atomic emission spectroscopy, and Transmission Electron Microscopy (TEM). A 90-day study of daily use doses of swarna bhasma for toxicity studies ranged from 3 mg/kg (therapeutic dose) to 30 mg/kg body weight. The drug was administered to Holtzman rats. Actions, including exercise and ground behaviour, The Danio fish model searches for all signs of neurophousons or changes in behaviour caused by the referral suvarna bhasma. Two different gold particles are in suvarna bhasma: Big asymmetric particles, approximately 60 microns, SI, O, FE, P, and about 10 nm nano party measurements On top. X-ray shooting indicates that all the peaks of the busma match well [6]. A cube centred on the cube at the centre of 45 (± 2.8) NM. In rats, biochemical markers like urea, alanine, creatinine, and amino trans fettas have changed with a higher treatment. These parameters, however, continued to be within acceptable

limits. There were no significant treatment-related macroscopic or microscopic changes in any organ or tissue evaluated. In the behavioural research of fish, the fish that have received suvarna bhasma have shown typical behaviour similar in terms of motor measures. Suvarna has shown no toxicity in the levels studied [7-9].

### Metallic bhasmas's part in disease management

The various metal bases and their indications, side effects and treatment are listed in Table 3 below.

**Table 3:** Metallic bhasmas's and disease management.

Sr. no.	Metallic bhasma	Indications	Adverse effects	Management
1	Swarna bhasma (gold)	Emaciation, cough, dyspnea, cardiac tonic, immunomodulator, etc.	Weakening of defense mechanism, creates many other diseases, even death	<i>Terminalia chebula</i> powder +sugar candy
2	Rajata bhasma (silver)	Alcohol poisoning, emaciation, epilepsy, etc.	Fever, constipation, body ache, etc.	Honey+sugar
3	Tamra bhasma (copper)	Anaemia, obesity, skin disorder, etc.	Vomiting, skin disorders, even death	<i>Coriandrum sativum</i> +sugar
4	Lauha bhasma (iron)	Anaemia, skin disorders, tuberculosis, immunomodulator, etc.	Angina, epilepsy, abdominal colic, oedema, etc.	<i>Embelia ribes</i> + juice of <i>Sesbania grandiflora</i>
5	Vanga bhasma (tin)	Vomiting, cough, anaemia, diabetes mellitus, etc.	Cough, diabetes mellitus, anaemia, oedema, etc.	<i>Gymnema sylvestre</i> powder +sugar candy
6	Naga bhasma (lead)	Diabetes mellitus, piles, ulcer, etc.	Diabetes mellitus, fainting, paralysis, etc.	Swarna bhasma+ sugar
7	Yashada Bhasma (zinc)	Diabetes mellitus, anemia, eye diseases, ulcer, etc.	Diabetes mellitus, skin disorder, vomiting, emaciation, etc.	<i>Sida cordifolia</i> powder+ <i>Terminalia chebula</i> powder
8	Parada bhasma (mercury)	In all diseases with specific adjuvant	Fainting, vomiting, diarrhea, dyspnea, even death	Sour gruel+KNO <sub>3</sub> +co w's urine+rock salt

### Effect of bhasma on ponderal parameters

The effect of tamra bhasma, rauha bhasma and yashad bhasma on various weight parameters like body weight, liver, heart, uterus, etc. It is given in Table 4 below.

**Table 4:** Effect of bhasma on ponderal parameters.

Sr. no.	Parameter	Tamra nhasma	Lauha nhasma	Yashada nhasma
1	Thymus	Non-significant decrease	Significant increase	Non-significant decrease
2	Kidney	Nil effect	Non-significant increase	Non-significant decrease
3	Prostate	Non-significant increase	Significant increase	Non-significant decrease
4	Liver	Nil effect	Non-significant decrease	Non-significant increase
5	Body weight	Nil effect	Non-significant increase	Significant increase
6	Spleen	Non-significant increase	Non-significant decrease	Non-significant increase
7	Uterus	Nil effect	Non-significant decrease	Non-significant increase
8	Heart	Nil effect	Non-significant decrease	Non-significant decrease

9	Testes	Significant decrease	Non-significant increase	Non-significant decrease
10	Seminal vesicle	Nil effect	Non-significant increase	Non-significant decrease

### Effect of bhasma on biochemical parameters

The impact of blood on various biochemical parameters of tamara bhasma, lauha bhasma, yashada bhasma glucose level,

serum cholesterol level, urea level in serum, etc. Table 5 is shown below.

**Table 5:** Effect of bhasma on biochemical parameters.

Sr. no.	Parameter	Tamra bhasma	Lauha bhasma	Yashada bhasma
1	Serum alkaline phosphatase	Significant increase	Significant decrease	Nil effect
2	Blood glucose	Significant increase	Non-significant increase	Non-significant increase
3	Serum creatinine	Significant decrease	Non-significant increase	Significant decrease
4	S.G.O.T.	Nil effect	Non-significant decrease	Nil effect
5	Serum triglyceride	Significant decrease	Non-significant increase	Non-significant increase
6	Serum bilirubin	Nil effect	Non-significant decrease	Non-significant decrease
7	Serum cholesterol	Significant decrease	Non-significant decrease	Nil effect
8	Serum urea	Nil effect	Non-significant decrease	Non-significant increase
9	S.G.P.T.	Nil effect	Non-significant increase	Non-significant increase
10	Serum total protein	Nil effect	Non-significant increase	Nil effect

### Effect of bhasma on hematological parameters

The effect of tamra bhasma, rauha bhasma and yashad bhasma on various haematological parameters like total red blood cell

count, MCV, RDW, platelet count, etc., are given in Table 6 below.

**Table 6:** Effect of bhasma on haematological parameters.

Sr. no.	Parameter	Tamra bhasma	Lauha bhasma	Yashada bhasma
1	Plateletcrit	Nil effect	Non-significant decrease	Non-significant decrease
2	Haemoglobin %	Significant increase	Non-significant increase	Non-significant decrease
3	Total RBC count	Nil effect	Non-significant increase	Nil effect
4	MCV	Nil effect	Non-significant decrease	Nil effect
5	RDW	Nil effect	Non-significant increase	Nil effect
6	MPV	Nil effect	Non-significant decrease	Significant decrease

7	Polymorph %	Non-significant decrease	Non-significant increase	Non-significant increase
8	Haematocrit	Nil effect	Non-significant increase	Nil effect
9	Total WBC count	Non-significant decrease	Non-significant increase	Non-significant increase
10	MCH	Nil effect	Non-significant decrease	Nil effect
11	Platelet count	Nil effect	Non-significant decrease	Non-significant decrease
12	PDW	Nil effect	Non-significant decrease	Nil effect
13	MCHC	Nil effect	Non-significant decrease	Nil effect
14	Lymphocyte %	Non-significant increase	Non-significant decrease	Non-significant increase
15	Eosinophil %	Non-significant decrease	Non-significant decrease	Non-significant decrease

## CONCLUSION

To determine bhasma's potential as a nanomedicine, we gave a summary of the plant in this article. Bhasma standardisation, encompassing analytical, microbiological, and physicochemical assessments. This page also includes many investigations that different scientists have done on bhasma. The effects of various metals bhasmas on the treatment of illness are being researched. The impact of bhasma on different biochemical, ponderal, and haematological markers is investigated to assess the drug's safety.

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