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Herbo-Metallic Indian Nano-Medicine Abhrak Bhasma (MICA): A Periodical Review.

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Abstract

Abhrak Bhasma is a herbo mineral formulation which is obtained by a systematic processing of Mica. Mineral drugs (Rasa Yoga) formulated by the branch of ayurvedic medicine knows as "Rasashastra" are the base of Ayurvedic Metallurgy. The mica is basically consist of various metals in oxide form as minerals in different ratio, were the percentage of the form varies based on the origin of base. The therapeutic application varies with respect to the composition of the mineral oxide based on the origin. In the Herbo-mineral treatments of Ayurveda, the key ingredient compose of bhasma, are the natural formulation consists of Nano Herbal metals. In formulation the Bhasma is used for both the *doshas* (bodily humors) and the disease to arrest the pathogenesis. The mica has curative property in chronic ailments. The process of manufacturing and standardization of Bhasma play the crucial role in defining the potency of the medicine with reduced toxic elements.

Keywords: Abhrak Bhasma, Ayurvedic, Mica, Herbo mineral, Biotite

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Introduction

Indian Traditional Medicine:

The awareness of the herbal medicine is prolonged from ancient days to highly emerged systems of India medicine such as Ayurveda, Siddha and Unani. Ayurveda is known and carried forward as ancient Indian heritage. 1.1 Billion Indian people Population follow the traditional system of medicine. The Ayurveda literatim means science of life. Ayurveda in times of Charka and Sushruta primarily use herbal plant material as a therapeutic agent Indian alchemist Nagrjuna at 8th century AD recommended the usage of metals such as Hg, Cd, Fe, Zn and minerals such as mica to use as an therapeutic agents as they are very adequate, rapid in action, lesser in dosage, and showing prolonged shelf life, which made the bases for minerals and metals became the pillar for treating disease of Ayurveda.

The Ayurveda is the traditional system of medicine which is been used by Indian's. The science of life is the basic meaning of the word Ayurveda. The method of practicing had been a trusted and tested method in treating the illness. In Charka and Sushruta age the treatment to illness was limited to the usage of medicinal herbs, but later in the 8th centenary AD Nagrjuna, an Indian alchemist suggest the combination therapy with the heavy metals and herbs as an medicinal agent. Based on his expertise he can to know that the formulation is so quick in action and effective in small dose and showed longer stability which later became the importance of the combination therapy [4].

The percentage of patients who follows Indian system of medicine was 14% of which 7.1% of the population follows the ayurveda for acute illness and 5% for chronic illness and 18.7% for normal illness [8-10]. As per the statement given by World Health Organization (WHO) the peoples follow the traditional system of medicine in the economically progressing nation. Majority of people believe that traditional systems of medicine are secure and innocuous compared to that of the synthetic medicine. The aged and chronic ill patients will follow the herbal medicine for a prolonged period of time to achieve the desired action. Bases on the literature search it had been found that the heavy metal concentration is higher in the Indian and Chinese medicinal plant compared to that of the other places and hence need proper purification process [11].

Another study showed that one of five Ayurvedic herbal medical products, produced in South Asia contains surpassing amount of heavy metals were as heavy metals as intrinsic part of the formulations were in practice from ages. The various processes involved in the Ayurvedic formulations are detoxification; trituration and pulverization/calcination etc., the elements which is in finished products does not cause toxicity [13]. The process of detoxification of the toxicity of the heavy metals adaptable methods had been suggested in the Ayurvedic literature. The presence of impurity identified for the metals which are obtained from unrefined earth, which might cause the side effect to the therapeutic use of the drug. This presence of the trace amount of the impurities shall be removed by the process called Shodhana. The Shodhan is a process which helps in purification of the material by removing the unwanted toxins and other impurities [14-17]. In context of Bhasma, Shodhana makes the product right for the next process which is known as Marana. Ayurveda classifies the process either in as General procedure or Specific procedure.

In general process, Shodhana were collected mica is allowed to heat at higher temperature until it becomes red hot and followed by fusion of herbal plant extracts along with the cow's excreta and oils followed by 7times repetition of the procedure. Based on the metal present the procedure varies in the practice of Shodhana, for instance the purification of the liquefied mass of Jasada carried out by spurting for twenty one times with pure cow milk [11]. For the proper functioning of the human body specific amount of the heavy metals which plays a critical role as per the veda. In Rasashastra, the mineralogy which is termed as "dhatus" and "Updhatus" places a crucial role in the maintenance of the biological system. The lack of essential heavy metals on specific tissue on long term basis will cause undesirable problem or diseases to the body. The need for the required amount of the heavy metals in specific concentration is so essential to maintain the metabolic activity of the human system eg. Hg, Au, Ag, Fe, Zn, Cu, Pb etc. Deficiency or excess amount of intake leads to imbalance in the biological system causes catabolic and anabolic grievance. The states of an Equilibrium level of metals contribute the stronger immunity. The change in the balance of these metals could lead to fatal disease and affect the normal immune system [18-21].

Bhasma- Ayurvedic Nano medicine:

The substance obtained by calcination in known as Bhasma in Ayurvedic medicine (Dilipkumar Pal *et al*., 2014). The process of calcination after residue is known as Bhasma were as pulverization is known as pishti(Gems or metals) along with appropriate medicinal agents used to treat life-threatening diseases (Mishra Amrita *et al*., 2011). *Bhasmikaran*is, the process of making the bio-incompatible substance to bio-compatible substances by the process of Samskaras, were the process involved in the conversion is tedious and time-consuming. (Santosh S Kulkarni., 2013). The current trends works in finding out the quality, safety, purity acceptability and effectiveness of the bhasma which is the critical challenge faced due to lack of evidence. In Ayurvedic treatment the Bhasma had been used for various chronic diseases such as cancer and Diabetes. Hence the untreated mica minerals may be not safe and may case undesirable effect in human body due to the presence of undesirable trace elements [3]. Hence in order to remove the toxin by distinct thermic and chemical regimen such as regeneration, detoxification, incineration and pulverization had been implemented in Rasa Shastra. The use of heavy metals in the formulation of Ayurvedic medicine is in practice for ages with potent efficacy and safety, nevertheless there are concerns over the toxicity of the heavy metals used in it [11].

The process of calcination is called PUTA in Ayurvedic treatment. Based on the number of PUTA applied to the bhasma the quality of the medicine will vary. Basically it will be applied from 7 PUTA to 1000PUTA, were the number shows the repetition of process of calcination which is carried out after collaborating with the medical extracts and dried in direct sunlight. The above procedure will take a year to manufacture the bhasma by following the ideal process. Experts says calcination and micronization of the minerals in replicated process produce “potency” as well as significant modification in the molecular structure which enables the therapeutic potential and its usage for treatment. Bhasma stimulates the metabolic reaction of tissue cell (aphrodisiac).

For ages the safety of the Ayurveda preparation was is question, which is due to the lack of proper screening and evaluation methods to express the metal toxicity of the traditional medicines. Ayurveda fraternity claims that these medicines, if appropriately prepared and it plays a crucial role in the Indian system of medicine because it has been in practice from ages and used only for oral purpose of mica in the form of bhasma as mentioned in traditional vidyas and current practice [25].

Abhrak Bhasma- Traditional Indian medicine

The treatment of mica(Biotite) with that of medicinal agents is the basic method of preparing the Bhasma. It used for the treatment of chronic diseases including hepatitis (hepato-protective) [2]. It is also in the treatment of RT Infections and also used as nervine toxic and is widely used in the treatment of RT infections and megaloblastic anemia. The nature of abhrak Bhasma is a fine powder[7]. Abhrak Bhasma is like heavenly medicine and it destroys *vata* (air), *pitta* (fire), and disease *ksaya* (phthisis). The Bhasma is defined as calcination of substance with the suitable amount of plant extract in treating acute and chronic ailments as per the Ayurveda [5]. Since ancient times Abhrak bhasma were used as an Ayurvedic medicine to cure various disease such as asthma, Tuberculosis, cancer, Hepatic dysfunction, Diabetic and so on. The toxicity of the minerals has been shown only when excess dose of material is given. Abhrak bhasma the oxide form of the minerals are poorly soluble and hence not in free form which has been shown by acute toxicity study 5000mg/kg BW is safe in the wister rats of both sex [27]. Abhrak Bhasma is an Ayurvedic medicine, prepared from Mica [6]. This medicine should only be taken strictly under medical supervision [1].

The combination of the heavy metals which are formulated along with the herbal plants extracts and other materials which are rich in minerals to remove the toxic substance and adjust the required concentration as per the biological need. The use of various herbal plant extract in each step of burning the bhasma will lead to neutralization of the toxins in the metals. Hence based on the amount of toxins presence the process of purification eg.10 times to 100 times and time of exposure will vary to get a neutralized toxin free substance. After the process of purification is completed it had then put under test to ensure it is free from toxicity know as "Varitar" which shows that the bhasma can be intended for internal use and it is free from heavy metals. Once the above process is completed the bhasma along with various herbo-metallic substance it had been formulated to obtain a complete formulation [22].

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Based on the above claims, it states that the detoxification of the heavy metals is carried out before it is intended for human use without making any harm to the therapeutic use. Bhasmas are metal preparations which is treated with Physical and chemical condition called Samskaras, which is known as the process of purification followed by detoxification and finally to recover the therapeutic value of the medicine. Ayurvedic experts have estimated that 35-40% have the heavy metal in there formulation due to their effectiveness and rapid action in treating the illness. Other than the Mica as a source for the heavy metals there are some plants species which have the tendency to take the metals and minerals for the soil and such plants species can be incorporated as an alternate as they are free from toxins. Here, trace of metal and herbal extract combines to work as an active ingredient [23].

The basic processes followed in the manufacturing of Bhasma are tedious and arduous. The different steps followed as shown in Fig 2. Based on the source of the materials the adapted procedure will vary. The word bhasma is derived from the sanskirt word "Bhas" means shine or luster and the suffix "sma" indicates pasterns. So the entire bhasma means shining in the part or one which has loosen the luster. The properties of bhasma have the tendency of easy for absorption and assimilation followed by quick onset of action and effective in minute dose. Mica is the comprehensive phrase which specifies the class of silicate minerals. They are thin opaque and plane in nature with varying distribution of physical and chemical ownership. It show excellent Physio-chemical, Magnetic and mechanical properties which are specific with respect to the origin of the mica. It consists of hydrous silicate of Iron, potassium, aluminum, sodium fluride and traces of other metals. The Bhasma is stable and inert in nature towards aqueous and non-aqueous solvents [24].

Abhrak bhasma-Types and Physio-chemical character:

Based on the Ayurvedic classification and system of mineralogy by Dana the mica has been divided in to several types as shown in the fig:1[26].

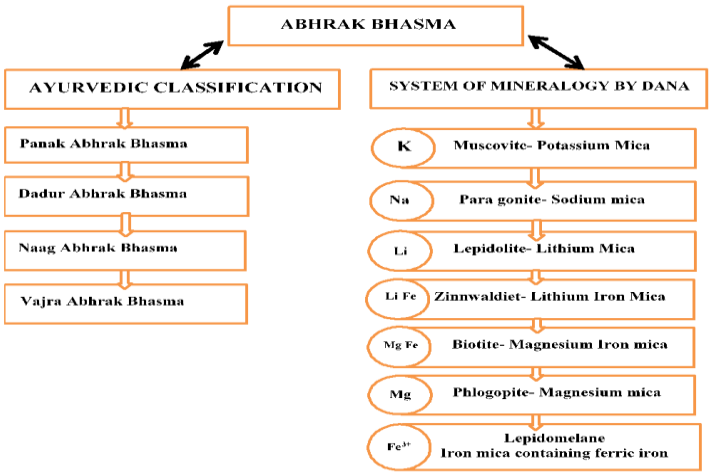

Fig 1: Types of Abhrak Bhasma

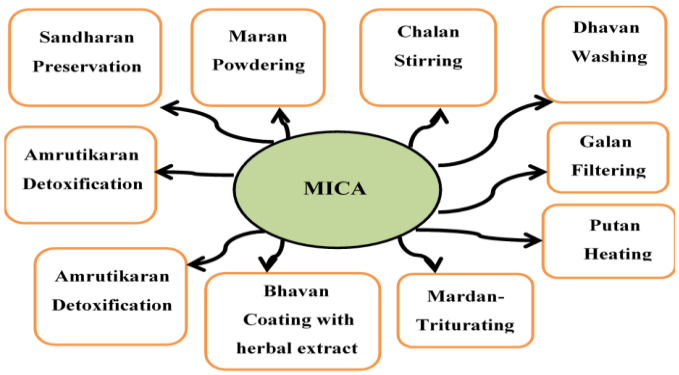

Fig 2: Step involved in the preparation of Bhasma

Important application aspects of Abhrak Bhasma

The Abhrak bhasma had been used for various acute and chronic illness as given below.

- Induces the secretion of insulin from pancreas, hence used in the treatment of Type I Diabetes mellitus
- Used in the treatment of cancer such as breast cancer and leukemia. [31-32]
- It has the rejuvenating effect used for the treatment of psychiatric illness.
- Treatment of Helminthiasis against the worm infection.
- Antiviral, antibacterial components which shall help in improving the immune system and body growth.
- Stimulating the Thymus gland upturn the release of T cell phagocytes.
- Enhancement of circulation of blood flow to the vital organ.
- Act as a nervine tonic which strength and rehabilitate the tissue precisely and commit to the healing of impaired nervous tissue.
- It is a well-known hematinic which has the tendency to increasing the red blood cells count which enhances the oxygen caring capacity. [30]
- Used in the treatment of jaundice
- Used in the treatment of Stoke, chronic diarrhea, paralysis of the one side of facial muscle.
- In the treatment of hepatic dysfunction, bone marrow depletion.
- Used for the treatment of Tuberculosis, myocardial ischemia
- Benefits in sexual impotency, erectile dysfunction, Increases the Sperm count, Splenic disorders, Urinary Disorder and bleeding disorder.
- Used in the treatment of Impotency.
- Used in the treatment of syphilis and cystic fibrosis.
- Used in the treatment of immunodeficiency diseases such as human herpesvirus 4 (HHV-4) and HIV.
- Used in the treatment of skin diseases[33]
- In the treatment of malabsorption, Asthma, Bronchitis, UTI and digestive impairment. [34-35,45]
- Used in the treatment of Malabsorption syndrome, digestive impairment.

Dosage range for effective treatment of Abhrak bhasma

- The daily dose of the medicine is preferably 125 mg to 375 mg once or two times a day earlier or later food as prescribed by the Practitioner.
- It is traditionally administered along with jaggery, honey, ghee, Triphala Kashaya, Freshly prepared ginger extract, Guduchi (Indian Tinospora) decoction, etc.[29]
- Take 125mg of ophthalmic diseases and chronic Fever along with Honey.
- Take 250mg in the treatment of Polyurea, internal bleeding, IBS, Vaginal Discharge, Acidity, ulcer and heart burns along with palm sugar and honey.

Instruction need to be followed in Abraka Bhasma

- The dose and medication of the bhasma should be followed under medical observation; improper dose administration will cause drastic effect.

- Side effect had been show in cases of over dosing.
- Self-panacea may cause drastic side effect and prone to death.
- During pregnancy and lactation it should be used carefully, and in children based on the need and requirement the dose should be fixed as there organ are not fully developed.
- Dose should be followed only for prescribed period of time. No long term therapy without the knowledge of physician.
- The medication should be taken as per the physician advice and incase of any side effect should consult his before continuation of the course of medicine.
- Store in an air tight container away from reach of children's [27].

Adjuvant/ Additional combination:

- In the Arthritis it can be used along tender coconut water or boiled cow milk.
- In the treatment of diabetes it can be given along with turmeric juice/Decoction
- In the treatment of other disease it can be given with Honey, Jaggry and Palm Sugar.

List of Research work in Abhrak Bhasma:

- Amita tripathi *et al*., studied on FTIR studies on abhrak bhasma [36].
- Babita S Bhatia *et al*., studied on spermatogenic enhancing property on heat damaged organ in rats of Abhrak bhasma [37].
- Prakash Paranjpe *et al*., studied on effect of Abhrak bhasma (4mg in formulation) for oral treatment of acne vulgaris [38].
- Babita S Bhatia *et al*., studied on the quality control by rasa shastra and by moden technique such as EDXRF, FEG-SEM and EDS [2].
- Rao A *et al*., studies on the particle size and size distribution of mica by Atomic Force Microscope [23].
- Parashuram Teli *et al*., studied on the effect of Abhrak bhasma on *invivo* CCl4 induced hepatotoxicity and renal toxicity [22].
- Teli Parashuram *et al*., studied on the effect of abhrak bhasma in lipid profile in rats[39].
- Gajendra Kumar *et al*., studied on the neurobehavioral activity and oxidative stress in rats of Basanta Kusumakara Rasa (BKR) which contains Abhrak bhasma [11].
- Savitha Buwa *et al* studies on Abhrak bhasma on albino rats against hepatitis induced by CCl_4
- Amrita Mishra *et al*., studied on to develop HPLC-UV method of analysis for Brahmi vatie which contain Abhrak Bhasma [41].
- Sundaram R *et al.,* studied on D-400 which is a herbo-mineral preparation contain Abhrak Bhasma for Alloxan induced diabetes in rats.
- Tamhankar Yogesh Laxman *et al*., studies on *Invitro* Immunomodulatory activity of Shataputi Abhrak Bhasma on Nitroblue Tetrazolium Test (NBT)
- Babita bhatia et *al*., studies on the testicular oxidative stress protective effect and Abhrak bhasma showed has a defensive effect in heat-induced oxidative stress in rat testicular cells [3].
- Srinivas A et al., studied on Toxicity profile of Abhrak Bhasma on different vehicles such as distilled water, Honey: distilled water (1:1) showed no toxicity by higher rate of obsorption for later vehicle [27].
- Jayakara S studied and thesis on the anti-helminthic effect of Abraka Bhasma prepared with kumaraswarasaan experimental study [13].
- Jayakara S studied on the anti-helminthic effect of Abhrak Bhasma prepared with kumaraswarasaan experimental study [13].
- Raghava Rao Gundimeda studied on *invivo* hypoglycemic activity of Abhrak bhasma by alloxan induced method [44].

Table 1: Physico-chemical characters of Abhrak Bhasma

Physical Composition		Chemical Composition	
Specific Gravity	-2.82 gm/cm^3	Silica (Sio_2)	20 to 30 %
Refractive Index	-1.55-1.66	Alumina (Al_2O_3)	33 to 37 %
Apparent Density	-9-12 ibs/Cu.ft or 2.77gm/cm^3	Potash (K_2O)	08 to 12 %
Hardness	-2 to 5 Moh's scale	Ferric Oxide (Fe_2O_3)	30 to 35 %
		Calcium Oxide (CaO)	10 to 15 %
		Magnesia (MgO)	5 to 6%
		Titanium dioxide (TiO_2)	2 to 2.5 %
		Manganese (MnO_2)	NLT 0.5%
		Sodium Oxide (Na_2O)	NLT 0.5%
		Phosphate (P)	NLT 0.5%
		Sulphur (S)	NLT 0.5%

CONCLUSION

The need for the targeted medicine with reduced toxicity and enhanced rate of penetration can be made possible by the ancient system of medicine to treat the chronic illness such as diabetics, hence the Bhasma the herbo-metalic medicine is manufactured in such a way to reduce the toxic elements and the end product of it which remains in the Nano range will ensures the penetration rate and therapeutic efficiency by improves the immune system of the human being, adjusting the mineral composition of the individual who have irregular rate in diseased condition. The standardization of the manufacturing process of Bhasma play the crucial role in determining its therapeutic effectiveness which has to be optimized and standardized to improve the potency, reducing the toxic elements which will crucially enhance the usage of it as an medicinal agents against the broad spectrum of diseases.

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