

A Review on the Ayurveda Medicine of Lauha Bhasma

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Abstract

In Ayurveda, 'Lauha' (Iron) Bhasma is primarily used to cure infections related to iron deficiency in people. It is created from purified raw metallic iron using a combination of multi-step traditional preparation processes described in the Ayurveda writing. Here, we present the results of basic investigation performed on the medicinal review 'Lauha' Bhasma utilizing various X-ray based techniques. Our results indicate that after a few rounds of warming and cooling in specific conditions taking after the Ayurvedic preparation method, metallic iron eventually converts to a common iron-oxide mineral belonging to the magnetite group. Scanning electron microscopy (SEM) and X-ray standing wave assisted fluorescence measurements carried out on powdered Bhasma specimen reveal that the magnetite micro-particles in the Bhasma specimen are usually displayed in the form of agglomerates of nano-particles. We expect that the Ayurvedic Lauha Bhasma has great potential for non-invasive localized target killing of cancer cells, particularly in sensitive parts of the human body such as the brain, spinal line, and lungs, through rot by application of an alternating external magnetic field or photo electron generation through X-rays.

Keywords: Ayurvedic Bhasma; Nanomaterials; X-ray fluorescence

Introduction

Ayurveda is a conventional medicinal system of India that has evolved after generating comprehensive understanding almost the anatomy of a human body over centuries of experience within the antiquated past. This system was quite popular and was practiced routinely in India by certified Ayurveda practitioners for a long period of time until the nineteenth century, whilst modern Allopathic system medicine had not completely advanced. Ayurvedic medicines are commonly thought to be those that are derived or synthesized from specific plants that have therapeutic properties [1-3]. There are hundreds of such plants that are especially utilized to extract compounds from their different parts (e.g. root, stalk, leaf, flower, and nut), which offer various medicinal properties.

Ayurvedic Bhasma is herbo-metallic ashes which are arranged through calcination prepared by blending specific combination of metal complexes along with different plants and biogenic-based fixings. It is expected that these metal complexes ought to not contain any free components of the first base metal or natural constituents utilized amid the different processes of their blend. The nearness of any essential substance in their crude form in a Bhasma example is considered as improper calcination process in Ayurveda and is subjected for dismissal [4]. A medicinal-grade Ayurveda Bhasma must qualify certain particular criteria, which are detailed somewhere else. Iron is an essential element for nearly all living species on our planet, from microscopic organisms to mammals. It effectively controls a wide range of metabolic capacities in our body, counting oxygen transport and the synthesis of deoxyribonucleic acid. The significance of the Fe element resides in its capacity to control electron transport phenomena. In the ferrous state (Fe²⁺), it carries on as an electron donor, whereas in the ferric state (Fe³⁺) it acts as an electron acceptor. As a result, it plays a crucial part as a catalyst in a variety of enzymatic responses involving electron transport phenomena. It is known that our bodies routinely lose iron in little amounts through urination, defecation, sweating, sloughing-off skin cells, and particularly menstrual bleeding in women.

Material and Methods

In early days, according to Rasa Ratna Samuchchaya, a normally happening magnetite iron metal (Kanta Lauha) was considered the

material of choice for the arrangement of Lauha Bhasma. Presently days, turnings of wrought iron (Teekshna Lauha) are extensively utilized for the preparation of Lauha Bhasma in the Ayurveda pharmaceutical industry. An expounded preparation has already been reported within the writing for the preparation of Lauha Bhasma, considering clax of Fe turnings, as a starting fabric. It may be important to mention that the careful arrangement method plays an important part in choosing the therapeutic efficacy of the Lauha Bhasma. In the display study, medicinal grade Lauha Bhasma was synthesized from Teekshna Lauha (clax of Fe turnings) after employing different preparation steps as described within the Ayurveda model such as samanya shodhan (normal filtration), vishesha sodhan (uncommon refinement), Bhanupaka (exposure to sun light) and putapaka (calumination) [5-7]. At the conclusion of Bhasma preparation strategy, various physico-chemical analysis's such as colour, texture, and coating test on the water surface was carried out to assess its properties agreeing to the Ayurveda model sometime recently creature trials.

Results

X-ray diffraction (XRD, D8 Advance, BRUKER) measurements were carried out on the restorative review Lauha Bhasma to get its point by point auxiliary properties and mineralogical data. The XRD pattern was recorded using a laboratory-based instrument at Cu-K α X-ray energy ($\lambda = 1.54 \text{ \AA}$). The XRD pattern of Lauha Bhasma powder was recorded by changing the diffraction point (2θ) in the run of 10° – 90° . During the measurement, the sample was ceaselessly rotated within the horizontal plane to gather information around all possible crystalline planes that exist in the powdered Bhasma specimen. This suggests that in addition to the Fe₃O₄ compound, the Fe Bhasma may

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too contain a few other blended compound stages in follow amounts, which are anticipated to create due to contamination with low atomic number impurity elements or different bio-herbal ingredients (carbon-based compounds), utilized during the Bhasma preparation method [8]. Shows the crystal structure of magnetite Fe₃O₄ compound derived from the Rietveld analysis.

To obtain a better; a much better; a higher; a stronger; an improved" > an improved understanding of the essential composition and valence states of different constituent components that co-exist in the Lauha Bhasma test, X-ray photoelectron spectroscopy (XPS) measurements were carried out utilizing synchrotron X-rays at BL-14 beamline of the Indus-2 facility. The occurrence X-ray energy of 4.196 keV, monochromatized employing a Si (111) double crystal monochromator, was utilized for sample excitation during the XPS measurements. The X-ray induced photo-electrons radiated from the Fe-Bhasma test were collected and analyzed employing a hemispherical analyzer equipped with an ultra-low vitality electron discovery system. During the measurements, the normal pressure within the beamline exploratory station was maintained $\sim 5 \times 10^{-9}$ mbar. The study XPS spectrum of the Fe Bhasma test determines the presence of Na, O, and C elements. The transformation of bulk metallic iron into the Lauha Bhasma powder comprising of a nano particulate matter takes place through different oxidation and reduction forms that happen amid different steps of the Ayurveda Bhasma preparation procedure.

Discussion

The Iron metabolism of nearly all living beings, including people, is known to be exceedingly complex. Its legitimate understanding is vital for treating disorders caused for the most part by press overload or deficiency in people. Iron is a basic element of the heme gather which allows official of the oxygen (O₂) in the lungs and its transport through the blood to distinctive cells in our body. Except for press within the heme group, there's no location for the transport and persistent supply of oxygen from the surrounding discuss environment to a cell structure. Ferritina is key protein found in our body that stores and regulates the accessibility of iron within the circulatory system [9]. The press in ferritin is primarily stored in the Fe³⁺ oxidation state. Thus, it is expected that Lauha Bhasma may appear way better efficiency in treating anemia in humans as compared to that of the commonly utilized ferrous-based compounds in present day allopathy medicines. It has already been shown that magnetite nanoparticles are less toxic when their surface is modified or secured with a protective layer. In this setting, Lauha Bhasma particles may be of particular pertinence for therapeutic applications due to the nearness of an additional FeO covering layer on top of the magnetite particle.

Conclusion

To summarize, we have shown that modern synchrotron- based

estimations are amazingly profitable for investigating different Ayurveda drugs in order to set up their micro-structural properties, metallic nature, composition and chemical states of different components present in them. The potential advantage of SR-assisted total reflection X-ray fluorescence spectroscopy is that it licenses precise quantitative determination of different impurity components display in a metal based Ayurveda sedate in case somehow they are presented amid the different preparation stages [10]. Such analyses are amazingly beneficial in picking up an exhaustive understanding of the physicochemical forms that evolved during old times for the preparation of different Ayurvedic medicines. It is also conceivable to relate the need and viability of these forms on human health in terms of right now accessible logical information. It has been watched that the medicinal grade Lauha Bhasma comprises of a slightly altered magnetite structure with a fragmentary percentage ratio. The normal molecule measure of Lauha Bhasma was estimated to be 100 nm, with a standard deviation of 40 nm.

Declaration of competing Interest

The authors declare that there is no conflict of interest.

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