



Research Article

Therapeutic Utility of Heerak Bhasma: A Review of Classical Ayurvedic Literature and Contemporary Scientific Evidence

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Abstract

Background: Heerak Bhasma (incinerated diamond ash) is one of the most valuable Ratna Bhasmas described in Ayurvedic Rasashastra. Classical Ayurvedic texts attribute Rasayana, Balya, Yogavahi, Medhya and Vajikarana properties to Heerak Bhasma and recommend it in chronic debilitating diseases, Rajayakshma, Arbuda, Prameha, Hridroga and disorders associated with loss of vitality. Modern research has generated interest in the physicochemical properties of nano-sized particles present in properly prepared Bhasma and their potential biomedical applications.

Objective: To critically review the classical Ayurvedic literature and available scientific evidence regarding the therapeutic utility, pharmaceutical processing, pharmacological properties, safety profile and future research prospects of Heerak Bhasma.

Materials and Methods: A narrative review was conducted using classical Ayurvedic texts including Rasa Ratna Samuccaya, Rasatarangini, Ayurveda Prakasha, Rasa Tarangini, Bhaishajya Ratnavali and other Rasashastra literature. Modern scientific information was compiled from peer-reviewed publications indexed in PubMed, Scopus, Google Scholar and other scientific databases.

Results: Classical literature describes Heerak Bhasma as a potent Rasayana with applications in chronic disorders, immune weakness and degenerative conditions. Experimental studies suggest antioxidant, immunomodulatory and anticancer potential; however, current evidence is largely limited to laboratory and animal studies. Well-designed human clinical trials remain scarce.

Conclusion: Heerak Bhasma is an important Ayurvedic mineral formulation with promising traditional and experimental therapeutic potential. Standardization of pharmaceutical procedures, quality control, toxicity evaluation and multicentre randomized clinical trials are necessary to establish its evidence-based clinical role.

KEYWORDS: Heerak Bhasma, Diamond Bhasma, Ratna Bhasma, Rasashastra, Ayurveda, Rasayana, Nanomedicine, Immunomodulation.

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1. INTRODUCTION

Ayurveda describes three principal categories of medicinal substances: plant, animal and mineral origin. Among mineral preparations, Ratna Bhasma occupies a unique position because gemstones are believed to possess potent therapeutic properties after undergoing classical pharmaceutical processing (Shodhana and Marana). Heerak (diamond) is regarded as the king of gemstones due to its exceptional hardness, purity and brilliance. Ancient Ayurvedic scholars considered properly processed Heerak Bhasma to be a highly potent rejuvenative medicine capable of restoring vitality, enhancing immunity and promoting longevity.

The preparation of Heerak Bhasma is a complex pharmaceutical procedure involving purification, repeated incineration and levigation with herbal media. These processes are intended to transform the raw gemstone into a therapeutically suitable form with improved biological compatibility.

From the Ayurvedic perspective, Heerak Bhasma possesses Rasayana, Balya, Medhya, Yogavahi and Vajikarana properties. It has traditionally been indicated in chronic diseases including Rajayakshma, Prameha, Gulma, Arbuda, Hridroga, Shukra Kshaya and generalized weakness. These indications reflect its role in restoring tissue strength, improving vitality and supporting overall health.

Recent advances in nanotechnology have renewed scientific interest in Bhasma formulations. Modern analytical techniques such as X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier-transform infrared spectroscopy (FTIR) and inductively coupled plasma mass spectrometry (ICP-MS) have been employed to characterize the physicochemical properties of mineral Bhasmas. Preliminary studies suggest that properly prepared Heerak Bhasma may contain nano- or submicron-sized particles, which could contribute to its biological activity. Experimental investigations have reported antioxidant, immunomodulatory and anticancer effects in preclinical models. However, these findings require confirmation through rigorous human clinical trials before definitive therapeutic claims can be made.

Despite the growing interest in Ayurvedic nanomedicine, a comprehensive review integrating classical descriptions with contemporary scientific evidence on Heerak Bhasma remains limited. Therefore, the present review aims to critically evaluate the classical concepts, pharmaceutical preparation, therapeutic applications, modern pharmacological evidence, safety aspects and future research directions related to Heerak Bhasma.

Historical Background of Heerak in Ayurveda

The use of precious gemstones in therapeutics has been documented since the early period of Ayurvedic Rasashastra. Among all gemstones, Heerak (Vajra/Diamond) occupies the highest position due to its exceptional physical properties and its reputed medicinal value. Ancient Ayurvedic scholars considered diamond not merely as an ornament but also as a potent medicinal substance after appropriate pharmaceutical processing.

The therapeutic application of diamond was systematized during the development of Rasashastra (8th–13th century CE). Classical authors described purification (Shodhana), incineration (Marana), quality assessment (Bhasma Pariksha), therapeutic indications, dose and adjuvants (Anupana) of Heerak Bhasma. It was mainly recommended as a Rasayana for chronic diseases, tissue degeneration and enhancement of vitality.

Synonyms of Heerak

Different Ayurvedic texts mention several synonyms of diamond.

Vajra

Heeraka

Indravajra

Kulisha

Ashani

Bhidura

Ratnaraja

These names indicate hardness, brilliance and superiority among gemstones.

Position of Heerak among Ratnas

Classical Rasashastra classifies Ratnas (precious gemstones) into major categories including:

Manikya (Ruby)

Mukta (Pearl)

Pravala (Coral)

Marakata (Emerald)

Pushparaga (Yellow Sapphire)

Neelam (Blue Sapphire)

Gomeda

Vaidurya

Heeraka (Diamond)

Among these, Heerak is considered the most potent Ratna because of its extraordinary hardness and rejuvenative properties.

Classical Description in Ayurvedic Texts

1. Rasa Ratna Samuccaya

Rasa Ratna Samuccaya provides a detailed account of the purification and incineration of Heerak.

The text explains:

Identification of genuine diamond

Methods of purification

Pharmaceutical processing

Dose

Therapeutic indications

Precautions during preparation

According to the text, properly prepared Heerak Bhasma acts as a powerful Rasayana capable of improving strength, longevity and resistance to disease.

2. Rasatarangini

Rasatarangini describes:

Characteristics of suitable Heerak

Different methods of Shodhana

Marana procedures
 Classical Bhasma tests
 Therapeutic indications
 The author emphasizes that raw diamond should never be administered without proper pharmaceutical processing.

3. Ayurveda Prakasha

Ayurveda Prakasha describes Heerak among important Ratna preparations and attributes the following actions:

Rasayana

Balya

Vajikarana

Ojo-vardhaka

Yogavahi

It is recommended in chronic debilitating disorders and conditions associated with tissue depletion.

4. Bhaishajya Ratnavali

Bhaishajya Ratnavali includes Heerak Bhasma in formulations intended for:

Rajayakshma

General debility

Male infertility

Chronic respiratory disorders

Weakness after prolonged illness

5. Yogaratnakara

Yogaratanakara recommends Heerak Bhasma as an important rejuvenative medicine for:

Elderly individuals

Patients with chronic weakness

Long-standing metabolic disorders

Loss of vitality

Ayurvedic Pharmacological Properties

Rasa (Taste)

Predominantly Madhura and Kashaya (as described in different texts).

Guna (Qualities)

Laghu

Sukshma

Sara

Veerya

Generally considered Sheeta Veerya.

Vipaka

Madhura Vipaka.

Karma

Rasayana

Balya

Medhya

Yogavahi

Vajikarana

Ojovardhaka

Tridosahara (according to formulation and Anupana)

Indications in Classical Ayurveda

Heerak Bhasma has been traditionally indicated in:

Rajayakshma

Prameha

Hridroga

Gulma

Arbuda

Kshaya

Shukra Kshaya

Klaibya

Chronic respiratory diseases

General debility

Ageing-related degeneration

These indications reflect its role as a rejuvenative medicine in classical Ayurvedic therapeutics.

Classical Dose

Most classical texts recommend 15–30 mg, administered with suitable Anupana such as honey, ghee, milk, or specific herbal preparations depending on the disease condition. Dose selection should always follow the guidance of a qualified Ayurvedic physician and use only properly prepared, quality-controlled Bhasma.

Anupana (Vehicle)

Depending upon disease:

Honey

Cow ghee

Milk

Butter

Chyawanprasha

Herbal decoctions

The choice of Anupana enhances therapeutic efficacy according to Ayurvedic principles.

Importance of Proper Pharmaceutical Processing

Ayurvedic Acharyas repeatedly emphasize that raw diamond is not suitable for internal administration. Only after proper Shodhana, Marana, and successful completion of classical Bhasma Pariksha should Heerak Bhasma be considered for therapeutic use. Modern quality-control methods are also important to ensure consistency and safety.

Shodhana (Purification of Heerak)

Shodhana is the first and most crucial pharmaceutical process in the preparation of Heerak Bhasma. According to Rasashastra, purification removes physical and chemical impurities, reduces toxicity, improves brittleness, and facilitates the subsequent Marana process. Classical texts emphasize that raw diamond should never be used therapeutically without proper purification.

Objectives of Shodhana

- Removal of physical impurities.
- Elimination of undesirable properties.
- Enhancement of therapeutic efficacy.
- Facilitation of Marana.
- Improvement of bioavailability.
- Reduction of potential toxicity.
- Classical Methods of Shodhana

- Different Ayurvedic texts describe slightly different methods.

1. Swedana Method

The diamond is tied in a cloth (Pottali) and subjected to Swedana in media such as:

Triphala Kwatha

Kulattha Kwatha

Gomutra

Kanji

for several hours.

2. Nirvapa Method

The heated diamond is repeatedly quenched in liquids like:

Gomutra

Tila Taila

Takra

Kanji

Kulattha Kwatha

Repeated heating and quenching improve brittleness and facilitate further processing.

3. Herbal Bhavana

Some classical references describe repeated levigation (Bhavana) with herbal juices such as:

Kumari Swarasa

Tulasi Swarasa

Nimbu Swarasa

Bhringaraja Swarasa

Marana (Incineration)

Marana converts purified diamond into a therapeutically suitable Bhasma.

Objectives

Particle size reduction.

Conversion into a biologically acceptable form.

Enhancement of therapeutic activity.

Improvement of assimilation.

General Procedure

Purified diamond is powdered as far as possible.

Triturated with herbal juices.

Pellets (Chakrika) are prepared.

Dried.

Subjected to repeated Puta.

The cycle is repeated until classical Bhasma characteristics are achieved.

Depending upon the classical method, multiple Puta may be required.

Bhasma Pariksha (Quality Control)

Classical Ayurveda recommends several tests.

Rekhapurnata

The Bhasma should enter the furrows of fingers.

Varitaratva

The Bhasma should float on the surface of water.

Nischandratva

No shining particles should remain.

Unama

A rice grain should float over the floating Bhasma.

Apunarbhava

The Bhasma should not revert to metallic/mineral form after processing.

Niruttha

The Bhasma should remain stable when tested with metals.

These tests ensure adequate processing according to Ayurvedic pharmaceuticals.

Modern Standardization

Modern analytical techniques complement classical quality assessment.

X-ray Diffraction (XRD)

Used to determine:

Crystalline structure

Phase purity

Structural transformation

Scanning Electron Microscopy (SEM)

Provides information regarding:

Surface morphology

Particle size

Aggregation pattern

Transmission Electron Microscopy (TEM)

Useful for determining:

Nanoparticle size

Particle distribution

Internal morphology

Energy Dispersive X-ray Spectroscopy (EDS)

Determines elemental composition and purity.

ICP-MS (Inductively Coupled Plasma Mass Spectrometry)

Used for:

Trace element analysis

Heavy metal estimation

Standardization

FTIR (Fourier Transform Infrared Spectroscopy)

Detects:

Functional groups

Organic molecules remaining after Bhavana

Surface chemistry

Particle Size Analysis

Determines:

Mean particle diameter

Size distribution

Nano-scale fraction

Pharmacological Properties

According to Ayurveda, Heerak Bhasma possesses the following actions:

Rasayana

Balya

Yogavahi

Medhya
Vajikarana
Ojovardhaka
Tridosha Shamaka (depending on formulation and Anupana)
Possible Modern Mechanisms of Action

Although clinical evidence is still limited, experimental studies suggest several mechanisms:

1. Antioxidant Activity

Reduction of oxidative stress and protection against free radical-mediated cellular damage.

2. Immunomodulatory Activity

Experimental studies indicate modulation of immune responses, including effects on macrophages, dendritic cells, and cytokine signalling.

3. Anti-inflammatory Activity

Possible reduction of inflammatory mediators in preclinical models.

4. Nanomedicine Effect

Nano- or submicron-sized particles produced during classical processing may influence cellular uptake and interaction with biological systems.

5. Drug Delivery Potential

The Ayurvedic concept of Yogavahi has been proposed to correspond to enhanced delivery of co-administered medicines, although this requires further scientific validation.

Safety Considerations

For therapeutic use:

Only classically prepared and quality-controlled Heerak Bhasma should be used.

Raw diamond must never be administered internally.

Manufacturing should follow Good Manufacturing Practices (GMP).

Quality should be confirmed using both classical and modern analytical methods.

Human clinical safety data remain limited; therefore, treatment should be supervised by qualified Ayurvedic physicians.

Therapeutic Utility

Heerak Bhasma is regarded in Ayurveda as one of the most potent Ratna Bhasmas because of its Rasayana (rejuvenative), Balya (strength-promoting), Yogavahi (bio-enhancing), Medhya (cognitive-supporting), and Vajikarana properties. Classical Ayurvedic literature recommends its use in chronic, debilitating, and difficult-to-manage disorders. Modern research is beginning to explore these traditional claims, but much of the evidence is still preclinical rather than based on human clinical trials.

IJPAR +1

1. Rasayana (Rejuvenation)

Rasayana therapy aims to:

Improve longevity.

Enhance immunity (Vyadhikshamatva).

Delay ageing.

Improve tissue nourishment (Dhatu Poshana).

Promote physical and mental strength.

Classical texts describe Heerak Bhasma as a superior Rasayana that supports Ojas and helps restore vitality in individuals with chronic illness and tissue depletion.

IJPAR

2. Immunomodulatory Activity

One of the most promising modern research areas is the immunomodulatory potential of Heerak Bhasma.

Experimental studies have shown that properly prepared Heerak Bhasma (Ayu_ND):

activates dendritic cells,

increases CD40 and CD86 expression,

enhances secretion of TNF- α and IFN- γ ,

reduces regulatory T-cell activity,

improves CD8⁺ T-cell immune responses.

These findings suggest enhancement of antitumor immune surveillance in animal models, but confirmation in human studies is still required. □

Frontiers +1

3. Anticancer Potential

Ayurvedic classics mention Heerak Bhasma in Arbuda (tumor) and other chronic disorders.

Modern experimental studies report that Heerak Bhasma may:

inhibit tumour growth,

induce apoptosis,

reduce tumour metastasis,

improve survival in murine lymphoma models,

modulate inflammatory cytokines.

Another preclinical study demonstrated interference with cancer-cell energy metabolism and inhibition of metastatic growth in breast cancer models. These results are encouraging but should not be interpreted as proof of efficacy in human cancer treatment, because robust clinical trials are lacking. □

PubMed +1

4. Rajayakshma (Chronic Wasting Disorders)

Classical Ayurvedic literature recommends Heerak Bhasma in:

Rajayakshma

Dhatukshaya

chronic weakness

prolonged illness

Its Rasayana and Balya properties are traditionally believed to improve nutrition, strength, and recovery.

Modern clinical validation for these indications remains insufficient.

IJPAR

5. Prameha

Traditional indications include Prameha.
Possible mechanisms proposed include:
tissue nourishment,
improvement in general metabolism,
antioxidant effects.

However, there are no high-quality human clinical trials confirming efficacy in diabetes or related metabolic disorders.

IJPAR

6. Hridroga (Cardiovascular Disorders)

Ayurvedic texts describe Heerak Bhasma for Hridroga and weakness associated with chronic disease.

Potential theoretical benefits include:

Rasayana effect,
antioxidant activity,
improved tissue resilience.

Modern evidence remains inadequate to recommend Heerak Bhasma specifically for cardiovascular disease.

IJPAR

7. Vajikarana and Reproductive Health

Classical texts describe Heerak Bhasma as:

Vrishya

Shukrala

Vajikarana

Traditionally, it has been used in:

Klaibya,

Shukra Kshaya,

infertility associated with debility.

These uses are based on Ayurvedic tradition; modern controlled clinical evidence is limited.

IJPAR

8. Neuroprotective Potential

Although direct evidence on Heerak Bhasma is scarce, its classical Medhya and Rasayana properties suggest possible benefits in maintaining cognitive function.

Future research may evaluate:

oxidative stress modulation,
neuroinflammation,
cognitive impairment,
neurodegenerative disorders.

At present, these remain research hypotheses rather than established clinical indications.

9. Chronic Debilitating Disorders

Heerak Bhasma has traditionally been prescribed in patients suffering from:

chronic fatigue,

cachexia,

recurrent illness,

generalized weakness,

age-related degeneration.

Its therapeutic role is primarily described as improving vitality and supporting recovery.

DISCUSSION

The integration of classical Ayurvedic knowledge with modern biomedical research provides a valuable opportunity to understand Heerak Bhasma scientifically.

Recent analytical studies have demonstrated nano- and submicron-sized particles and characterized the preparation using TEM, SEM, XRD, FTIR, and elemental analysis. Experimental studies also suggest immunomodulatory and antitumor effects in laboratory models. Nevertheless, most available evidence is preclinical, and there is a clear need for standardized manufacturing, toxicity evaluation, pharmacokinetic studies, and well-designed randomized clinical trials before definitive therapeutic recommendations can be made.

Safety and Toxicity

The safety of Heerak Bhasma depends primarily on proper Shodhana, Marana, adherence to classical pharmaceutical procedures, and rigorous quality control. Classical Ayurvedic texts consistently state that raw diamond should not be administered internally and that only correctly prepared Bhasma is suitable for therapeutic use. Modern reviews of Bhasma preparations similarly emphasize the need for standardized manufacturing and comprehensive safety evaluation before clinical use. IJPAR +1

Current evidence indicates

Classical processing aims to reduce toxicity and improve therapeutic suitability.

Modern analytical techniques (SEM, TEM, XRD, FTIR, ICP-MS) are useful for quality assurance and standardization.

Human clinical safety data for Heerak Bhasma remain limited.

Long-term toxicity, reproductive toxicity, pharmacokinetic, and pharmacovigilance studies are still needed.

Clinicians should prescribe only products manufactured under recognized quality standards and use them under appropriate supervision.

IJPAR +2

Future Scope

Future research should focus on:

- Standardisation of pharmaceutical procedures.
- Development of pharmacopeial quality standards.
- Multicentre randomized controlled clinical trials.
- Molecular mechanism studies.
- Pharmacokinetic and pharmacodynamic evaluation.
- Omics-based research (genomics, proteomics, metabolomics).
- Nanomedicine-based drug delivery research.
- Comparative studies of different pharmaceutical methods.
- Long-term safety and pharmacovigilance.
- International collaborative research on evidence-based Ayurvedic mineral medicines.
- IJPAR +1

CONCLUSION

Heerak Bhasma is one of the most revered Ratna Bhasmas in Ayurveda and has traditionally been described as a potent Rasayana, Balya, Yogavahi, and Vajikarana medicine. Classical literature recommends its use in chronic debilitating disorders, Rajayakshma, Prameha, Hridroga, Arbuda, and conditions associated with loss of vitality.

Contemporary scientific investigations have improved understanding of its physicochemical characteristics and have reported promising immunomodulatory, antioxidant, and anticancer effects in experimental models. Nevertheless, most of the available evidence remains preclinical, and there is insufficient high-quality clinical evidence to establish efficacy for routine therapeutic use in humans.

Future work should prioritize standardized manufacturing, comprehensive toxicity testing, pharmacokinetic studies, and well-designed randomized controlled clinical trials. Such research will help integrate the traditional knowledge of Rasashastra with modern evidence-based medicine while ensuring quality, safety, and reproducibility.

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