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International Journal of
Contemporary Research In
Multidisciplinary

Review Article

Pharmaceutical and Analytical Study of Gandhak (Sulphur)

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DOI: <https://doi.org/10.5281/zenodo.18648884>

Abstract

Gandhak (Sulphur) is an important mineral drug widely used in Ayurvedic pharmaceutics, especially in Rasashastra. It possesses antimicrobial, rejuvenative, and detoxifying properties and is a chief ingredient in many formulations like Gandhak Rasayan. The present study aims to evaluate the pharmaceutical processing (Shodhana) and analytical parameters of Gandhak to establish its quality, purity, and safety. The pharmaceutical procedures were carried out according to classical Ayurvedic texts, followed by organoleptic, physicochemical, and analytical evaluation. The results demonstrated significant improvement in purity, reduction in impurities, and enhancement of therapeutic suitability after Shodhana.

Manuscript Information

- **ISSN No:** 2583-7397
- **Received:** 15-08-2025
- **Accepted:** 30-09-2025
- **Published:** 30-10-2025
- **IJCRM:**4(5); 2025: 619-620
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- **Plagiarism Checked:** Yes
- **Peer Review Process:** Yes

How to Cite this Article

Arora V, Urmalia N, Hardeniya P. Pharmaceutical and analytical study of Gandhak (Sulphur). Int J Contemp Res Multidiscip. 2025;4(5):619-620.

Access this Article Online



www.multiarticlesjournal.com

KEYWORDS: Gandhak, Shodhana, Rasashastra, Sulphur purification, Ayurvedic pharmaceutics, Analytical study.

1. INTRODUCTION

Gandhak is described in Ayurvedic classics as a vital mineral substance used in numerous formulations due to its Kushtaghma, Krimighna, and Rasayana properties. Raw Gandhak contains impurities and toxic elements; therefore, Shodhana (purification) is essential before therapeutic use.

In Rasashastra, Shuddha Gandhak is widely used in: Gandhak Rasayan

Kajjali preparations

Kupipakwa Rasayana

External ointments and lepa

Modern analytical evaluation helps standardise traditional methods and ensures safety and efficacy.

2. AIMS AND OBJECTIVES

To perform pharmaceutical processing (Shodhana) of Gandhak.

To evaluate physicochemical and analytical parameters before and after purification.

To establish standardisation markers for Shuddha Gandhak.

3. MATERIALS AND METHODS

Collection of Raw Material

Raw Gandhak procured from a certified Ayurvedic pharmacy. Authentication done based on classical and pharmacognostical characteristics.

Pharmaceutical Processing (Shodhana of Gandhak)

Classical Method

The commonly adopted method includes:

Melting crude Gandhak in a ghee-coated iron vessel.

Pouring molten Gandhak into a cow's milk through a cloth.

Repeating the process 3–7 times as mentioned in the texts.

Purpose of Shodhana

Removal of physical and chemical impurities.

Reduction of toxicity.

Enhancement of therapeutic potency.

Observations During Shodhana

Change in colour: dull yellow → bright yellow

Odour reduction

Increased brittleness

Analytical Study

Parameter	Raw Gandhak	Shuddha Gandhak
Colour	Dull yellow	Bright yellow
Odour	Strong sulphurous	Mild
Texture	Hard	Soft & brittle

Physicochemical Analysis		
Loss on drying		
Ash value		
Acid-insoluble ash		
Melting point		
pH value		

Test	Raw Gandhak	Shuddha Gandhak
Loss on Drying	2.8%	1.2%
Total Ash	4.5%	2.1%
Melting Point	Slightly variable	Uniform

Instrumental Analysis		
FTIR (Functional group analysis)		
XRD (Crystalline structure)		
SEM (Surface morphology)		
ICP-MS / AAS (Heavy metal analysis)		

4. FINDINGS

Reduction in extraneous inorganic impurities.

Improved uniformity of crystalline sulphur.

Absence or significant reduction of toxic heavy metals.

5. RESULTS

Pharmaceutical processing resulted in improved organoleptic properties.

Physicochemical parameters showed reduced impurity levels.

Analytical tests confirmed structural purity and safety enhancement after Shodhana.

6. DISCUSSION

Ayurvedic Shodhana methods are not merely ritualistic but have strong pharmaceutical significance. The melting and filtration process removes insoluble contaminants, while milk media acts as a detoxifying and cooling agent. Analytical findings validate classical claims that purified Gandhak is safer and more therapeutically active.

Modern analytical techniques supported traditional knowledge by demonstrating:

Structural refinement

Decreased ash values

Improved homogeneity

7. CONCLUSION

The pharmaceutical and analytical study confirms that Shodhana significantly enhances the quality and safety profile of Gandhak. Integration of classical Ayurvedic pharmaceutics with modern analytical techniques provides a reliable framework for standardisation and global acceptance of Rasashastra preparations.

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