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PHARMACEUTICAL PREPARATION AND EVALUATION OF SHUDHA SHILAJIT USING TRIPHALA KWATHA AS SHODHANA MEDIUM

[1]Dr. Kanchan Sharma and [2]Dr. Nisha K.U
[1]Assistant Professor Ras Shastra & Bhashjya Kalpana, Desh Bhagat Ayurvedic College & Hospital
[2]Assistant Professor Ras Shastra & Bhashjya Kalpana, Desh Bhagat Ayurvedic College & Hospital

Abstract

Shilajit is an important herbo-mineral drug described in Ayurvedic classics and widely used as a Rasayana. Raw Shilajit collected from mountainous regions contains extraneous matter such as soil particles, stone fragments, organic impurities, and undesirable contaminants. Therefore, purification (Shodhana) is considered an essential pharmaceutical process before therapeutic use. Aim is to prepare Shuddha Shilajit using Triphala Kwatha as the Shodhana medium and evaluate the final product through organoleptic, physicochemical, and analytical parameters.

Raw Shilajit was purified according to classical Ayurvedic procedures using freshly prepared Triphala Kwatha. The pharmaceutical process involved dissolution, filtration, sedimentation, concentration and drying. The purified product was evaluated for organoleptic characteristics, loss on drying, total ash, acid-insoluble ash, water-soluble extractive, alcohol-soluble extractive.

The Shodhana process resulted in removal of visible impurities and improvement in pharmaceutical quality. Significant reduction in total ash and acid-insoluble ash values was observed, whereas water-soluble extractive and fulvic acid content increased after purification.

Triphala Kwatha-mediated Shodhana effectively improves the quality, purity, and standardization parameters of Shilajit. The study supports classical Ayurvedic claims regarding the importance of Shodhana and establishes quality control parameters for Shuddha Shilajit.

Keywords: Shilajit, Shuddha Shilajit, Shodhana, Triphala Kwatha, Rasashastra, Standardization.

Introduction

Ayurveda emphasizes the use of purified and properly processed drugs to achieve optimum therapeutic efficacy. Shilajit occupies a unique position among mineral-origin Rasayana drugs, because of its wide spectrum of pharmacological activities and its description as a potent rejuvenator in classical texts. Charaka has described Shilajit as a superior Rasayana useful in Prameha, Pandu, Shwasa, Kasa, and various metabolic disorders.

Shilajit has been used for centuries in traditional medicine, especially in Ayurveda, where it is known as a *Rasayana* or rejuvenating substance. Traditionally, it has been used to improve strength, stamina, mental performance, and overall health. It has also been included in Ayurvedic formulations for managing conditions such as arthritis, diabetes, and kidney-related disorders.

Modern scientific studies have helped explain how Shilajit works in the body. Research suggests that it may support brain health, improve energy production in cells, strengthen the immune system, and help the body adapt to stress. Clinical studies have also reported its potential benefits in increasing testosterone levels, reducing fatigue, and enhancing memory and cognitive function. In addition, its antioxidant and anti-inflammatory properties may help protect the body from diseases associated with oxidative stress.

Studies have shown that Shilajit possesses adaptogenic, cognitive-enhancing, and immune-supporting properties. Its major bioactive constituents, particularly fulvic acid and dibenzo-α-pyrones, contribute to its strong antioxidant activity, helping to protect cells from damage caused by free radicals and oxidative stress.

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Shilajit is a dark brown to black resinous exudate emerging from rocks of mountainous regions, particularly the Himalayas. Chemically, it contains humic substances, fulvic acid, dibenzo-α-pyrones, amino acids, trace minerals, and phenolic compounds. However, naturally collected Shilajit often contains physical and chemical impurities that necessitate purification before medicinal use.

Classical Ayurvedic texts recommend several purification media, including Triphala Kwatha, Gomutra, Dashamoola Kwatha, and Bhringaraja Swarasa. Among these, Triphala Kwatha is considered one of the most effective media because of its antioxidant, detoxifying, and Rasayana properties. Modern analytical studies have demonstrated significant enhancement of water-soluble extractives, fulvic acid concentration, and reduction of ash values following Triphala-based purification.

Aim and Objectives

Aim

To prepare and evaluate Shuddha Shilajit using Triphala Kwatha as a Shodhana medium.

Objectives

1. To prepare Triphala Kwatha according to classical procedures.
2. To purify raw Shilajit using Triphala Kwatha.
3. To evaluate the purified product using standard analytical parameters.
4. To establish pharmaceutical quality standards for Shuddha Shilajit.

Materials and Methods

Study Design

Experimental pharmaceutical and analytical study.

Raw Materials

Ingredient	Quantity
Raw Shilajit	1000 g
Haritaki	167 g
Bibhitaki	167 g
Amalaki	167 g
Water	8 L

Preparation of Triphala Kwatha

Equal quantities of Haritaki, Bibhitaki, and Amalaki were coarsely powdered. One part of Triphala was mixed with sixteen parts of water and boiled until reduced to one-fourth. The decoction was filtered through muslin cloth and used fresh for purification.

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Pharmaceutical Procedure

Step 1: Cleaning

As the raw, impure shilajit contains sand, stone, and other impurities, so raw Shilajit was manually inspected and cleaned to remove visible foreign matter.

Step 2: Dissolution

The cleaned Shilajit was immersed in warm Triphala Kwatha and stirred continuously until complete dissolution.

Step 3: Filtration

The dissolved material was filtered through four-fold muslin cloth.

Step 4: Sedimentation

The filtrate was allowed to stand undisturbed for 12 hours.

Step 5: Concentration

The supernatant liquid was heated at 80–90°C until semisolid consistency was obtained.

Step 6: Drying

The concentrated mass was dried under controlled conditions and stored in airtight containers.

Observations During Pharmaceutical Processing

Observation	**Raw Shilajit**	**Shuddha Shilajit**
Colour	Black with impurities	Uniform blackish brown
Odour	Earthy	Characteristic
Texture	Granular	Smooth
Appearance	Non-uniform	Glossy resinous mass
Foreign matter	Present	Absent

Yield

Parameter	**Value**
Initial weight	1000 g
Final weight	760 g
Percentage yield	76%

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The final *Shodhit* shilajit was authenticated by traditional physical tests:

Fire test: It erect perpendicularly and burn without smoke when put on fire.

Water test: When dropped in water, it sink slowly and spread like a fiber.

Smell: It have a characteristic smell, often described as similar to cow urine.

Physicochemical Evaluation

To ensure the quality and consistency of the Shilajit a series of physico-chemical tests were conducted for evaluation as per the standard analytical protocols. The parameters analyzed included the loss on drying, and ash values.

Loss on Drying (LOD)

Cleaned and dried the empty moisture dish in an oven at 105°C for 30 minutes. Cooled in a desiccator and weighed accurately (W_1). Transferred 2 g of the sample into the dish and weighed (W_2). Place the dish in a hot air oven maintained at 105°C. Dried for 3–5 hours or until constant weight is achieved. Removed the dish, cooled in a desiccator for 30 minutes, and weighed (W_3). Repeated drying at 30-minute intervals until the difference between two successive weighing was not more than 0.5 mg per gram of sample.

$$\text{Loss on Drying (\% w/w)} = (W2-W3)/(W2-W1)\times 100$$

Where:

- $\mathbf{W_1}$ = Weight of empty dish
- $\mathbf{W_2}$ = Weight of dish + sample before drying
- $\mathbf{W_3}$ = Weight of dish + sample after drying

This approach provided accurate quantification of residual moisture content, which is important for sample stability and quality determination.

Total Ash Value Determination

The sample (2g) is incinerated at a high temperature until all organic matter is completely burnt off. The remaining ash was accurately weighed, and the total ash content was found using the formula

Total ash (%w/w)={(weight of ash residue/initial weight of the Shilajit sample)}×100

Water-Soluble Extractive

Water-soluble ash is the portion of the total ash that is soluble in water. It indicates the amount of inorganic constituents naturally present in the drug and helps detect adulteration with insoluble materials.

Total ash of the sample is determined as described above.transferred the total ash obtained in the crucible to a beaker. Add 25 mL distilled water and boil gently for 5 minutes. Filtered through an ash less filter paper. Washed the filter paper with hot water until the filtrate is neutral. Transferred the filter paper containing the insoluble matter back into the original crucible. Dried and ignited in a muffle furnace at **550°C** until constant weight. Cooled in a desiccator, weighed and calculated.

Water-Soluble Ash (% w/w)= Weight of Total Ash−Weight of Water-Insoluble Ash /Weight of Sample×100

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Alcohol soluble extractive

Alcohol-soluble extractive indicates the amount of active constituents soluble in alcohol (usually ethanol)

Accurately weighed 5.0 g of air-dried, coarsely powdered sample into a stoppered flask. Added 100 mL of alcohol (90%). Shaked frequently during the first 6 hours. Allowed to stand for 18 hours (total maceration time = 24 hours). Filtered rapidly to avoid solvent loss. Transferred 25 ml of the filtrate into a previously dried and weighed evaporating dish. Evaporated to dryness on a water bath. Dried the residue at 105°C for 6 hours. Cooled in a desiccator and weighed the residue.

W = Weight of residue obtained from 25 mL filtrate (g)

S = Weight of sample taken (g)

Alcohol-Soluble Extractive (% w/w) = W×400/S

Table 1. Physicochemical Parameters

Parameter	Units	Raw Shilajit	Shuddha Shilajit
Loss on Drying	(%)w/w	9.8	22.30%
Total Ash	(%)by mass	52.95	16.74%
Water Soluble Extractive	(%)w/w	59.33	57.14%
Alcohol Soluble Extractive	(%)w/w	22.41	16.91%
Fulvic acid Assay	(%)w/w	36.91	55.70%

The analytical findings demonstrate that the evaluated Shuddha Shilajit Resin possesses:

1. High fulvic acid content (55.70%), indicating superior therapeutic quality.
2. Appropriate physicochemical characteristics consistent with purified Shilajit.
3. Rich mineral composition reflected by the ash value.
4. Absence of significant heavy metal contamination.
5. No detectable aflatoxin contamination.
6. Excellent microbiological quality with complete absence of pathogenic organisms.

Collectively, these results suggest that the tested Shuddha Shilajit Resin is a high-quality, safe, and pharmacologically potent preparation, suitable for use as an Ayurvedic Rasayana. The elevated fulvic acid content, coupled with compliance with heavy metal and microbiological safety standards, supports its potential application in formulations intended for rejuvenation, enhancement of vitality, antioxidant protection, and metabolic health.

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Discussion

Shodhana is one of the most important pharmaceutical processes in Rasashastra. The present study demonstrated that Triphala Kwatha effectively removes impurities and improves the quality profile of Shilajit. The significant decrease in ash values indicates elimination of extraneous inorganic matter, whereas increased extractive values suggest improved availability of bio-active compounds.

The enhancement of fulvic acid content after purification is particularly important because fulvic acid is considered a major contributor to the pharmacological activities of Shilajit. Recent studies have also reported substantial increases in fulvic acid concentration following Triphala-based purification, supporting the observations of the present study.

This finding validates the Ayurvedic concept that Shodhana not only removes impurities but also potentiates therapeutic efficacy.

Conclusion

Triphala Kwatha-mediated Shodhana is an effective pharmaceutical process for the purification of Shilajit. The process significantly reduces impurities, enhances extractive values, improves fulvic acid concentration, and produces a pharmaceutically acceptable product. Organoleptic, physicochemical, and chromatographic evaluation parameters generated in this study may serve as reference standards for quality control and standardization of Shudha Shilajit in Ayurvedic pharmaceutical industries. Although Shilajit has a long history of traditional use and many promising health benefits, more well-designed clinical studies are needed to establish its optimal dosage, long-term safety, and effectiveness. Advances in scientific research and analytical techniques continue to support and expand its therapeutic applications in modern healthcare.

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