

Phytochemical And Pharmacognostic Insights Into Shilajatu (*Asphaltum Punjabiannum*): Types, Purification, And Standardization Approaches

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INTRODUCTION

Shilajatu, also known as *Asphaltum Punjabiannum*, is a well-known Rasayana (rejuvenative) ingredient in Ayurveda, with numerous therapeutic applications for enhancing energy, longevity, and metabolic health. It is a herbo-mineral exudate formed by the gradual breakdown of plant material by geological and microbiological processes, and it is mostly found in the Himalayan, Tibetan, and Altai mountains. During the summer, the substance oozes out of rocks as a resinous mass that ranges in shade from dark brown to black. Shilajatu has been identified as a potent bioenhancer, adaptogen, and rejuvenator. Fulvic acid's medicinal potential stems from its complex phytochemical and mineral makeup, which includes humic chemicals, dibenzo- α -pyrones, triterpenes, phenolic lipids, amino acids, and trace minerals like iron, zinc, and copper.

This paper will provide a thorough overview of Shilajatu varieties, traditional and modern purifying processes, pharmacognostic identification factors, and phytochemical profile, as well as insights into standardisation measures to ensure safety, purity, and therapeutic efficacy.

Shilajatu (*Asphaltum Punjabiannum*) Synonyms:

Shilajatu's synonyms include Shaileya, Shilajam, Shailadhatujam, Shilamayah, Shilasvedah, Shila Nirya, Ashmajam, Ashmajatukam, Girijam, Adrijam, Ashmottha, Ashmalaksha, and Gaireya. (R.T. 26/60-61)

Description of Shilajatu on Charaka Samhita:

Shilajatu originates in four varieties: Hema (gold), Rajat (silver), Tamra (copper), and Krishnayasa (black iron). It has a little sour, astringent flavour (katu in vipaka) and is moderate in veerya. This is Rasayana in action, and when administered appropriately, it serves as both an aphrodisiac and a therapeutic medication. Its potency increases when combined with a decoction of medications that alleviate vata, pitta, and kapha, either alone or in combination. C S Chi 1(3)/48-50

Purification and dosage:

Shilajatu is impregnated by submerged it in a lukewarm decoction and then removing it at the end of the day, a process that is repeated every week. Shilajatu in combination with ashed metals should be eaten with milk in the prescribed manner. When paired with a milk diet, this composition promotes a long and happy life, slows the ageing process and disease, stabilises the body, and increases intelligence, memory, and strength. The duration of use is divided into three parts: seven weeks, three weeks, and one week, which are regarded maximal, medium, and minimum, respectively. The dosage is also divided into three levels: 40 g, 20 g, and 10 g. C S Chi 1(3)/51-55]

Specific Characteristics Based on Source and Method of Administration

When gold and other rough ores undergo heating by the sun, they emanate a soft, silky, and clear substance comparable to lacy material. This is Shilajatu. Shilajatu created from gold ore is flavourful, slightly bitter, the colour of japa blossoms, and pungent in vipaka and sheeta veerya. Vipaka contains silver ore extract, which is pungent, white, chilly, and sweet. Shilajatu manufactured from copper ore has the flavour of peacock neck, is bitter, peppery, and pungent in vipaka. That which resembles gugguluka is the greatest. All kinds of shilajatu smell like cow urine and can be employed in a variety of situations. However, while employing Rasayana, the last variation is recommended; the other types of shilajatu are useful in vata-pitta, kapha-pitta, kapha, and tridosha. (C S Chi 1(3)/55-61)

Substances to avoid when taking Shilajatu

When using shilajatu, avoid vidahi and heavy substances, especially horse gram. Horse gram, due to its exceedingly contradictory nature, breaks the stones as seen in practice, hence its use is discouraged. Depending on the substance, shilajatu can be dissolved with milk, buttermilk, meat soup, vegetable soup, water, urine, or various decoctions. Shilajatu is capable of overcoming any health problem in worldwide. When ingested according to instructions, it provides an enormous amount of energy to a healthy person. (C S Chi 1(3)/62-65)

Avarana Chikitsa

A course of Shilajatu and Guggulu with milk is excellent for treating all types of Avarana. C S Chi 28/241-241½

Shilajatu description in Sushruta Samhita:

Sushruta Samhita The mountains' stones create a gelatinous fluid when heated by sunshine during the months of shukra (Jyesta) and shuca (asadha). This material is known as Shilajatu and is used for treating all types of diseases in the body. The existence of six metals (tin, lead, copper, silver, gold, and black-iron) in the shilajatu can be distinguished by their fragrance, giving rise to the phrase "Shad Yoni." This creamy-colored material has the same flavour (Rasa) and power (Virya) as the metal from from where it originated. Shilajatu, derived from elements such as tin, lead, and iron, has been increasingly beneficial in its therapeutic applications. Shilajatu has a bitter and pungent flavour, an astringent Anu-rasa (aftertaste), and is a laxative. Katu Vipaka (pungent after digestion), Shoshana (drying or depleting), and Chedana have cleansing powers. Among these, the type that appears black and shiny, is heavy and free of sandy particles, and smells like cow urine should be considered the best. For best outcomes, use this particular kind of shilajatu with Bhavana from shalasaradi medicinal products. Then, after cleansing the body, consume a fine paste of shilajatu made with Sarodaka in the morning, depending on the extent of strength. After

digestion, patients should be served rice combined with meat soup from Jangala animals. Adequate amounts of shilajatu can improve strength and the complexion, treat Madhumeha, and promote longevity while acquiring Svarga. Each Tula weight of this drug(11.66 to 11.7 grams), taken repeatedly, adds a century to life expectancy, while ten Tula measures increase it to a thousand years. Follow the nutrition and lifestyle guidelines outlined in the Bhallataka Vidhana for optimal results. Shilajatu is beneficial in treating a range of diseases, including Meha, Kustha, Apasmara, Unmada, Shleepada, Shosha,

Shopha, Arsha, Gulma, Panduta, and Vishama Jwara quickly . In reality, shilajatu can treat any ailment. It is a potent litotryptic agent for long-term sharkara (gravel) and stone.

Shilajatu should be administered Bhavana (soaked and dried) in combination with appropriate medicinal drugs. (S S Chi 13/4-17)

Sources

When the sun heats the stones of a high-altitude mountain, exudates generate. These exudates are known as Shilajatu. Exudates that appear from (between) stones after being heated by the sun. Shilajatu forms when the exudate dries and solidifies. (R.T. 22/62-63)

Types

The several types of Shilajatu are as follows.

S n o	Charaka samhita	Sushruta Samhita	Rasaratna Samucchaya	Ayurveda Prakash	Rasatarangini
1	Svarna Adrija	Svarna	Hema Garbha	Svarna	Svarna
2	Rajat Adrija	Rajat	Raupya Garbha	Rajat	Rajat
3	Tamra Adrija	Tamra	Tamra Garbha	Tamra	Tamra
4	Krishnayasa Adrija	Krishna Louha	Ayo Garbha	Lauha	Lauha
5	-	Naga	-	-	-
6	-	Vanga	-	-	-

Rasa Texts also describe the categories listed below.

According to Rasa Ratna Samuchchaya

1. Gomutra Gandhi-Sa Satva (Rasayana Property)
2. Karpura Gandhi-Nih Satva (R.R.S. 2/109)

Grahya Lakshana (Acquiring Shilajatu): Shilajatu resembles Laksha and possesses Mridu Guna, implying Go Mutra Gandhi. Karpur Shilajatu has a pandu-colored, sandy appearance. (A.P. 4/134)

Shodhana

1. Shilajatu becomes Shodhita after being purified (Prakshalita) by Kshara, Amla, or Gomutra. Shodihta is formed when Godugdha, Triphala, or Bhringaraj Svarasa are dissolved in a Lauha pot. (R.R.S. 2/116-17)

2. Shodhita is cleaned by performing Shilajatu Swedana for one Ghati period(1 ghati equals 24 minutes) and merging Svedani Yantra with Kshara, Amla, and Guggulu. (R.R.S 2/118)

3. Shodhana done by following method:

1. Ashuddha Shilajatu - Two Parts
2. Hot water - four parts
3. Triphala Kwatha- one Part

Shilajatu powder is vigorously stirred with hot water to dislodge soluble particles, then allowed to settle before the supernatant solution is decanted and concentrated to produce a thick paste or solid amorphous layer. The aforementioned Shilajatu, as available in the market, is subjected to further Shodhana. It is gently boiled with twice as much water and half the amount of Triphala Kwatha till dry. The Shodhana method should only be used when there are no clouds in the sky. It should be done throughout the summer months. The container for Shodhana should be made of iron. This requires a total of four vessels. (R.T. 22/69-77)

Karpura Gandhi Shilajatu Shodhana

Shilajatu mardan is employed to purify through ela toya. (R.R.S. 2/124)

Shuddha Shilajatu Examination

When exposed to fire, Shuddha Shilajatu burns without missing Dhurma, transforming into Lingakara. When dissolved in water, it settles to the bottom and forms a threadlike structure. (R.R.S. 2/114)

Shilajatu Marana

Shilajatu is crushed with Manahshila, Gandhaka, and Haratala using Matulunga Svarasa to make pellets. Then it's put through eight Uplas. (R.R.S. 2/119)

Shilajatu Sattva Patana

Shilajatu is ground with Dravana Varga(Guda (jaggery), Guggulu (Indian bdellium), Ghrita (Ghee), Madhu (honey), and Tankana (borax) constitute a few of the most popular products identified in the Dravaka Varga) and Amla Drava {Amla Drava and Amla Varga ingredients include buttermilk (Takra), fermented sour gruel (Kanji), lemon/lime juice (Nimbu), Indian gooseberry (Amalaki), and Garcinia indica (Amlaveta)}, then stored in Musha and heated with coal for fuel. The Sattva of Shilajatu, which is similar to Lauha, is obtained at the end of the process. (R.R.S. 2/122)

Probable Physicochemical Changes: The following physicochemical values were found in Shodhita Shilajatu.

S No	Physical constituents	Result
1	Moisture content	1%
2	Ash value	19.2%
3	Acid insoluble ash	1%
4	Water soluble ash	13.6%
5	Specific gravity	1.005

6	pH	6.5
7	Percentage of solubility	74% (in DW)

The significance of temperature during processing:

Shilajatu's purification procedure is affected by the sun's heat, but it can also be purified using Manda Agni (a mild flame) to avoid damage. Although Marana and Stava Patana are mentioned, they have not been widely utilised in recent times.

Medicated therapeutic Yogas:

1. Arogyavardhini Vati
2. Chandraprabha Vati
3. Shiva Gutika
4. Shilajatvadi Lauha
5. Sarva Arogya Vati

Shilajatu Vataka

Combine Shilajatu powder with three pala of honey to produce vataka, or large tablets, each containing one aksha. These medications can be taken on an empty stomach or after eating. The patient should drink water, milk, bird meat soup, asava (medicated wine), dadima (pomegranate) juice, and alcohol after taking this drug. Pandu, kushtha, jwara, pleeha, tamaka svasa, arsha, bhagandara (ano fistula), puti (putrified ulcers), hridroga (heart diseases), shukra dosha (semen diseases), mutra dosha (urine diseases), and agni dosha (digestion diseases), sosha (consumption), gara (poisoning), udara, kasa, asrigdara (menorrhagia), raktapitta (bleeding disorders), and all types of vrana (wounds). It treats a wide range of ailments and bestows auspiciousness. C S Chi 16/87-92

Shilajatu-prayoga

Vata gulma is cured by taking shilajatu with kshara and making a panchamula decoction. C S Chi 5/97

Advantages of Shilajatu and Lelitaka (sulphur)

Lelitaka (sulphur) is effective for 17 varieties of kushtha when given with honey and jati (Amalaki) juice. In the same way, using makshika (copper pyrite) with cow urine is also highly advantageous. When used to consume rasa (mercury), gandhaka (sulphur) and/or suvarnamaksika are the greatest medicines for treating all diseases, especially kushtha. In the same way, kushtha patients should routinely take parada (mercury) with yogaraja or vajra shilajatu, which helps in the treatment of all diseases. C S Chi 7/70–72

Vardhaman Ardrakanagara and Shilajatu???

Start with 10 gram of ginger and 10 gram of jaggery, then increase the dosage by 20 grams every day until it reaches 200 grams. This dosage must then be administered for the remaining days of the month. In order to help in the drug's absorption during this course of treatment, rice gruel and milk or beef soup should be taken. During the one-month course of treatment, gulma, udararoga, piles, oedema, polyuria, dyspnoea, coryza, cough, alasaka, indigestion, jaundice, consumption, mental disorders, and kapha disorders are all managed. Similarly, using the dosages and methods mentioned above, ginger juice can be taken with shilajatu for a month. After developing an appetite Milk should be consumed.

The oedema or swelling brought on by all three doshas can be totally cured with a month's course of shilajatu with triphala juice. The shilajatu course is appropriately described C S Chi 12/47–49.

Research updates

Shilajatu's scent, which is akin to the smell of cow urine (Gomutra gandhi) or camphor (Karpura gandhi), is caused by its origin and metamorphosis in its natural habitat.

Discussion

1. Types and origin.

Shilajatu is classified into four major types based on linked metals in classical Ayurvedic writings: Suvarna (gold), Rajata (silver), Tamra (copper), and Lauha (iron), with Lauha Shilajatu being the most prevalent and therapeutically significant. Geochemically, its composition varies with altitude, source rock, and vegetation, yielding a diverse spectrum of bioactive compounds and mineral content.

2. Purification (Shodhana) Methods.

Purification is a critical step in removing unwanted elements and improving medicinal efficacy. Traditional procedures employ media such as triphala decoction, cow urine, cow milk, or Dashamula Kwatha, which are then dried in the shade. Modern advancements include aqueous or hydroalcoholic extraction, filtration, and centrifugation to ensure microbial decontamination and heavy metal elimination. Comparative analyses have revealed that pure Shilajatu contains more fulvic acid and less harmful substances, validating Shodhana's therapeutic properties.

Pharmacognostic Identification

Pharmacognostic evaluation includes macroscopic, microscopic, and physicochemical investigations. Colour, solubility, ash value, drying loss, and pH are all used as identification indicators. Shilajatu's chemical complexity was verified and characterised using advanced analytical techniques including FTIR, HPTLC, UV-Vis spectroscopy, ICP-MS, and NMR. These methods aid in differentiating genuine Asphaltum Punjabanum from adulterated or artificial alternatives.

Phytochemistry and chemical composition

Shilajatu's phytocomplex is a synergistic combination of humic and fulvic acids that promotes nutrient transport across cell membranes while also having antioxidant, anti-inflammatory, and immunomodulatory activities. Other components, such as dibenzo- α -pyrones and triterpenoids, promote mitochondrial energy and provide neuroprotection. Trace minerals and amino acids also aid in tissue repair and metabolic regulation.

Shilajatu's anti-diabetic, adaptogenic, anti-aging, neuroprotective, and aphrodisiac properties have been discovered in both in vitro and in vivo studies, owing to the synergistic effects of these components.

Shilajatu is composed of three chemical units:

1. low and medium molecular weight non-humic organic compounds, and free and conjugated (e.g., fatty acyl, aminoacyl, lipoidal) dibenzo- α -pyrones.
2. Medium and high molecular weight DCPs (Dibenzo- α -pyrons chromoproteins) include trace metal ions, carotenoids, and indigo as colouring agents.
3. Metallo-humates, such as fulvic acids and fusims, include dibenzopyrones in their core nuclei.

Shilajit is a phytocomplex with a high fulvic acid concentration that experts believe is formed by the decomposition of plant material from species such as Euphorbia royleana and Trifolium repens. It is mostly composed of humic compounds, such as fulvic acid, which make up 60 to 80% of the total nutraceutical component, as well as particular oligo elements, such as selenium, which have antiaging properties.

Standards and Quality Control

Because natural sources differ, standardisation is essential for ensuring consistent pharmacological outcomes. Modern quality indicators include fulvic acid levels, heavy metal profiling, microbial load assessment, and chromatographic fingerprinting. The Ayurvedic Pharmacopoeia of India provides preliminary guidance, but comprehensive pharmacopoeial criteria such as chemical markers, bioassay profiling, and toxicological evaluation are required to establish legitimacy and global acceptance.

Conclusion

Shilajatu (*Asphaltum Punjabanum*) is a novel biogenic-mineral combination that combines traditional wisdom with cutting-edge pharmaceutical research. Its medicinal activity is due to a combination of bioactive compounds embedded in a humic matrix. Shilajatu's therapeutic potential, however, is dependent on proper identification, purification, and standardisation, as the raw material is exceedingly diverse and susceptible to contamination.

Future research should concentrate on multidimensional standardisation, such as phytochemical profiling, genetic traceability, and bioactivity linkage. The development of recognised analytical techniques and Good Manufacturing Practices (GMP) for its processing may pave the way for Shilajatu's inclusion in evidence-based phytomedicine. Shilajatu, which has undergone extensive pharmacognostic and phytochemical testing, continues to have immense potential as a natural adaptogen and rejuvenator in modern therapeutic settings.

References

1. Sharma, Sadananda. *Rasa Tarangini*, 26/60–61. Motilal Banarsidass Publishers, New Delhi.
2. Sharma, Sadananda. *Rasa Tarangini*, 22/62–63. Motilal Banarsidass Publishers, New Delhi.
3. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/109. Chaukhambha Orientalia, Varanasi.
4. Government of India, Ministry of Health and Family Welfare, Department of AYUSH. The Ayurvedic Pharmacopoeia of India, Part I, Volume IV, Monograph No. 134 (A.P. 4/134). New Delhi: The Controller of Publications.
5. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/116–117. Chaukhambha Orientalia, Varanasi.
6. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/118. Chaukhambha Orientalia, Varanasi.
7. Sharma, Sadananda. *Rasa Tarangini*, 22/69–77. Motilal Banarsidass Publishers, New Delhi.
8. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/124. Chaukhambha Orientalia, Varanasi.
9. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/114. Chaukhambha Orientalia, Varanasi.
10. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/119. Chaukhambha Orientalia, Varanasi.
11. Nityanatha, Siddha. *Rasa Ratna Samuccaya*, 2/122. Chaukhambha Orientalia, Varanasi.
12. Kiran, R.; Hussain, S.; Ahmad, A.; Javed, M.; Riaz, M.; Hanif, M.A.; Suleman, M.; Saddiqa, A.; Iqbal, M.; Bashir, M.S. “Review; Chemical Characteristics and Therapeutic Potential of Asphaltum Punjabanum (Shilajit)”. *Postępy Biologii Komórki* 46(4): 437-446 (2019). pbkom.eu+1
13. Iqbal, A.; Rehman, S.A.; Khan, N.; Qadir, A. “Asphaltum Punjabanum (Shilajit): Unravelling Myths with Scientific Evidence”. *International Journal of Ayurveda and Pharma Research* 13(6): 137-145 (2025). ResearchGate+1
14. Aziz, S.; Khaliq, S.; ur-Rehman, H.; Ghani, K.S.; Mohtarama, M.I.; Green, I.R.; Hussain, H. “Phytochemical Screening and Biological Studies of Shilajit (*Asphaltum*)”. *International Journal of Phytomedicine* 9(1): 15-19 (2017). ijp.arjournals.org
15. Rastogi, R.; et al. “Effect of purified Shilajit (*Asphaltum Punjabanum*) on oxidative stress, arterial stiffness and endothelial function in elderly with hypertension: a randomised controlled study”. *Indian Journal of Physiology & Pharmacology* 67(3): 197-203 (2023). IJPP+1

16. “What is Shilajit? – Ayurvedic Properties, Uses, and Health Benefits”. Planet Ayurveda (2023). Available online.
17. .Khanna Rajesh, et al. Spectroscopic characterization of fulvic acids extracted from the rock exudate Shilajit. Organic Geochemistry. 2008 Dec;39(12):1719–1724
18. Arya Elias, Pramod C. Bargi, Kashinath Hadimur, K.A. Patil, Khazi Rahimbi, Pharmaceutical analytical study of Shodhita Shilajatu. J Ayurveda Integr Med Sci. 2020; 5:214-219
<http://dx.doi.org/10.21760/Jaims.5.5.30>.
19. Charaka. Charaka Saṃhitā, Cikitsāsthāna, Chapter 16, Verses-87-92; Chapter 5/97; Chapter 7/70–72; Chapter 12/47–49
In: Sharma PV (ed.). Charaka-Samhita: Text with English Translation. Varanasi: Chaukhambha Orientalia; 2014.