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A review of literature on medicinal properties of Shilajit (*shilajatu* ; Asphaltum)

Author(s):- Mrs. Santosh Mehtani

Shilajit, as the name implies in Sanskrit means "conqueror of mountains". In the Ayurvedic texts it is called *silajatu* or *shilajatu*, but is commonly known as Shilajit. It is a blackish brown exudation found on the steep rock faces at altitudes between 1000 and 5000m in the Himalayas, from Arunachal Pradesh in the east to Kashmir in the west. It is also found in Afghanistan, Bhutan, China, Nepal, Pakistan, Tibet and some regions of the former USSR (Caucasus, Ural), as well as in Norway.

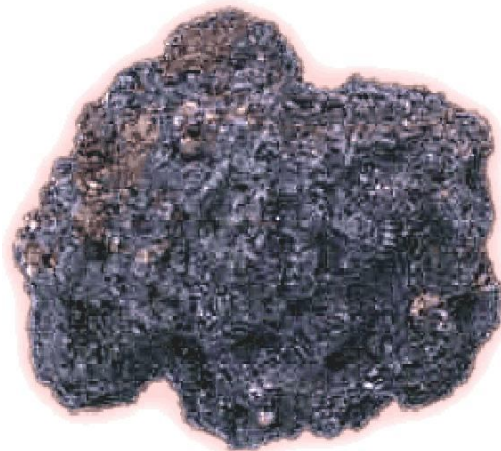


Ancient Sanskrit holy texts, over 3,000 years old, make reference to a mysterious substance called *shilajit*, which they describe as the "destroyer of weakness." The sacred substance was prescribed for thousands of years for many different health problems and became a powerful tool in Ayurvedic medicine. The rediscovery of the power of *shilajit* is said to have been made by Himalayan villagers observing large white monkeys migrate to the mountains in the warm summer months. The monkeys were seen to be chewing a semi-soft substance that flowed from between layers of rock. The villagers attributed the monkey's great strength, longevity and wisdom to the strange substance. They began to consume it themselves and reported a broad spectrum of improvements in health. It seemed to give them more energy, relieve digestive

problems, Increase sex drive, improve memory and cognition, improve diabetes, reduce allergies, improve the quality and quantity of life and it seemed to cure all diseases.

Shilajit is yet another folk medicine that has captured the attention of scientists since the latter half of the 20th century. In regional folk medicine, shilajit is a reputed rasayana (a rejuvenator and immunomodulator), claimed to arrest the process of ageing and prolong life. It is also used to treat a range of conditions from ulcers and asthma, to diabetes and rheumatism. Researchers first began to investigate the chemical composition and bioactivity of shilajit in the early 1970s. Before then, it was not clear whether shilajit was a bitumen - a plant fossil - that had been exposed due to rock weathering at high altitude, or a material formed from modern plant remains.

Early work on shilajit showed that it is mainly composed of humus - the characteristic organic constituent of soils - together with other organic components. By the late 1980s it was known that humification of resin-bearing plants was responsible for the major organic mass of shilajit - about 80 per cent of the humus component. It is now known that the composition of shilajit is influenced by factors such as the plant species involved, the geological nature of the rock, local temperature profiles, humidity and altitude. Although the composition varies from place to place, the general consistency of samples from various sources points to a common production process that results from biological and chemical action on plant remains. The amount and composition of the remaining organic mass, which is a mixture of low Mw compounds, varies depending on where the shilajit comes from. While there are several areas from which the raw material is collected, the highest levels of therapeutic ingredients come from specific areas in the Himalayan mountains in Nepal at 10,000-12,000 feet above sea level.



Shilajit is usually collected from over the ground or found flowing out from between fissures in the rocks in summer months due to strong heat of the sun. Shilajit samples from different region of the world have different physiological properties. The processing of the raw Shilajit is very important as it contains free radicals and may also contain mycotoxins and fungal toxins. The processing removes these free radicals, polymeric quinone radicals, toxins, mycotoxins, and other inactive ingredients using a patented oxygen/nitrogen displacement extraction process that ensures the proper pH and increases the active ingredients by approximately 800%.

In the Charak Samhita, Shilajit is described as a product of four minerals: gold, silver, copper and iron, whereas Susruta Samhita included two more minerals, lead and zinc in its composition. According to the predominance of the minerals of the source rock, it was classified into four categories: Sauvarna, Rajat, Tamra and Lauha. The last variety Lauha shilajit or blackish brown Shilajit is common and is supposed to be most effective.

The odour of shilajit varies with the place of collection, ranging from resembling that of cow's urine to camphor-like. It has a slightly bitter, pungent, salty taste. Shilajit has been reported to contain mainly benzoic acid, hippuric acid, and their salts, gums, albuminoids, fatty acids and traces of resin. The most common low Mw compounds present are oxygenated dibenzo- α -pyrones. Researchers propose that the physiological properties of shilajit are due to compounds such as the dibenzo- α -pyrones, along with triterpenes and phenolic lipids. Fulvic acids may also have a physiological role, acting as carrier molecules for the more bioactive smaller compounds.

Several medicinal properties have been attributed to shilajit in ancient texts as well as in tribal and folk medicine such as analgesic, aphrodisiac, anti-inflammatory, antioxidant, and antidiabetic, besides increasing longevity, improving memory, reducing allergies and respiratory problems, and giving relief in ulcers and other digestive troubles. To ascertain the above, studies have been conducted on experimental animals, models, as also some clinical trials; these studies have substantiated several of the claims.

Shilajit has been found to have significant analgesic activity. Shilajit can maintain the analgesic response of morphine for a longer period. Effect of processed shilajit on the development of tolerance to morphine indicates its potential as a prospective modifier of analgesic tolerance to morphine.

The effect of shilajit on the formation of new sperms and eggs was studied using male and female rats. It was estimated that Shilajit had both a spermiogenic and ovogenic effect in mature rats.

Antiulcerogenic and antiinflammatory studies were carried out with shilajit obtained from the rocky mountains of Zarlek, Badekshan, Afghanistan. Shilajit was found to have significant antiinflammatory effect in carrageenan-induced acute pedal oedema, granuloma pouch and adjuvant-induced arthritis in rats. Aqueous suspension of shilajit from Afghanistan (100mg/kg twice daily given for three days) exhibited antiulcerogenic effect in pylorus ligated ulcers, aspirin (200mg/kg per day for four days) induced gastric ulcers and immobility induced gastric ulcers and cystamine (300 mg/kg s.c.) and histamine induced duodenal ulcers in rats. It also reduced ulcer index and protein concentrations along with increase in total carbohydrate/ protein ratio indicating good index of mucous barrier defence mechanisms. The results thus substantiate its potent anti-inflammatory activity and the use of shilajit in peptic ulcers.

Water-soluble shilajit inhibited both enzymatic as well as non-enzymatic lipid peroxidation, which may be of special therapeutic value as compared to existing antioxidants. The concept of oxidant and antioxidant balance instead of a zero free radical systemic state, is currently gaining ground as a means of slowing down aging and related geriatric complaints. In this regard Shilajit being an adaptogenic rasayan as well as redox regulating agent (hydrogen donor and a need based acceptor), fulfills the requirement.

Shilajit was shown to produce a significant decrease in blood sugar levels along with decrease in vitality and anti-fatigue with its 500mg BD dose given for 15 days. Further, decreased fasting blood sugar levels were more effective than post prandial levels indicating its effect on synthesis and release of insulin and not merely on the food induced release of insulin in NIDDM patients. It had no hypoglycaemic activity in normal subjects. Recently, its anti-oxidative activity in such diabetic subjects has also been reported which may be useful in reducing diabetic complications. Besides, experimental studies have also shown that the antidiabetic activity of shilajit appears to be immunomodulatory by protecting insulin producing β cells in the pancreas.

Shilajit was found effective in decreasing renal stones and their recurrence. It is likely that fulvic acid content of Shilajit chelates the divalent calcium ions and helps in elimination of polar oxalic acid in the urine thereby helping the patients having stones consisting of calcium oxalate.

Experimentally, Shilajit (50-100mg/kg i.v) produces a non significant and transient fall in blood pressure without any change in heart rate and respiration.

Processed Asphaltum or shilajit has been found to be a very effective CNS active agent as compared to the ethyl extract or its active constituent fulvic acid whereas the naturally occurring unprocessed native shilajit was not effective due to its contamination with free radical forming polymeric quinones and mycotoxins

Thus, over sixty years of clinical research has shown that *shilajit* has positive effects on humans; it lives up to its ancient reputation as the "destroyer of weakness". by increasing immunity, strength, and endurance. In addition shilajit was found to accelerate processes of protein and nucleic acid metabolism and stimulate energy providing reactions. It promotes the movement of minerals, especially calcium, phosphorous, and magnesium into muscle tissue and bone. Purifies blood, improves functioning of pancreas and strengthens digestion; reduces fat, dissolves tumours, and counteracts thirst. Shilajit also stimulates the immune system and improves restoration (recovery) after exercise, reducing stress and cognitive ability.

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