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Krishna Tila (*Sesamum indicum* Linn.): A Rasayana Dravya

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Abstract

Health and related issues have been given high values with respect to protection of one self from diseases. Health has a vital contribution to economic progress of self as well as nation. Healthy populations live longer and are more productive. One of the important methods of preservation of positive health has been described in Ayurved i.e. Rasayana. Sesame was a major oilseed in the ancient world because of its ease of extraction, its great stability, and its drought resistance. The Bhāvaprakāśa Nighantu describes only three types of Tila seeds, viz., black, white and red. Krishna Tila or Black Sesame seeds are considered to have excellent medicinal properties and are recommended in Ayurved for treatment purpose and as a Rasayana drug according to vāgbhata Samhita. Hence to understand the role of Krishna Tila as Rasayana in improving the health status an attempt was made here. Black sesame seeds are rich in calcium, iron, copper, magnesium, phosphorus.

Keywords: Health, *Sesamum indicum*, krishna tila

Introduction

The most comprehensive & basic manuscript related to the Traditional Chinese medicine explains about black sesame as – consumption of black sesame seeds can heal all the chronic illness after 100 days, improve skin tone on body and face after 1-year, reverse gray hair after 2 years, and regrow teeth after 3 years. Sesame is probably the oldest reported oil plant in the world. The phrase highlights the fact that sesame was a valuable commodity in those days. One of the first oil seeds known, sesame seeds are used in cooking as well as in traditional medicines for their nutritive, preventive, and curative properties. Today Krishna Tila (black sesame seeds) is only ‘remembered’ in religious ceremonies, neglecting the medicinal values in health promotion and preventive aspects of consuming black sesame seeds. Many Chinese references with relation to consuming of Krishna Tila (black sesame seeds) for achieving long life and health benefits even at the old age are very famous. The relationship of the Krishna Tila (black sesame) with long life is similarly seen in early Indian traditions and classical writings like Veda’s and traditional Indian medicinal references (Ayurvedic classics), where the black sesame seed is considered a symbol of immortality and having rejuvenating qualities. Sesame oil mills are reputed to be magical places.

There are archeological remnants of sesame dating to 5,500 BC in the Harappa Valley in the Indian subcontinent [1]. Sesame was a major oilseed in the ancient world because of its ease of extraction, its great stability, and its drought resistance [1]. The Bhāvaprakāśa Nighantu describes only three types of Tila seeds, viz., black, white and red. (Chunekar & Pandey) [2]. Morton (quoting Dastur 1952) informs that the leaves are mucilaginous and are poulticed on wounds [3].

Folklore beliefs suggest they are home to numerous spirits. Various studies carried on the nutritional values of the Krishna Tila (black sesame seeds) has provided encouraging evidences which are supportive to the Chinese references for the use of the Krishna Tila (black sesame) for its anti-aging property. The Krishna Tila (black sesame seeds) are rich in plenty of micro nutrients like vitamins B and iron, deficiencies of which are linked with the premature graying of hair, impairments in thinking or memorizing and hearing impairment. Krishna Tila (black sesame seeds) is also rich in other elements like calcium and zinc, which are important minerals associated with maintaining strength of the bones and thereby preventing diseases related to bones like osteoporosis etc [4]. The seed also contains substances known as sesamin and sesamol, which are found to increase vitamin E supplies (important for skin health) and lower cholesterol levels. This review deals with understanding the qualities and benefits of black sesame seeds. Black Sesame is the dried ripe seed of *Sesamum indicum* L.

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(Fam. Pedaliaceae). It spread through human intervention from East Africa to North Africa and eastwards to India and China. All cultures gave it names that sound similar to sesame; for example, in Arabic it is called *simsim*, in Aramaic *sums ma* and in Greek *sesamon*. It is likely that the name refers to sesame as an oil plant.

Ayurvedic Review^[5]

The classical texts of Ayurved have described medicinal properties of tila. It is known as 'tila' in Sanskrit, 'tila' in hindi. Ayurved classics describe three varieties of sesame based on colour of seeds. They are 'Raktha (red), Krishna (black) and shweta (white)'. Krishna Tila or black sesame seeds are considered to have excellent medicinal properties and are recommended in Ayurved for treatment purpose and as a rejuvenating drug.

Properties

Acharya Charak has mentioned properties of Tila as which promotes longevity and preserves youth; strengthens the body and boosts it^[6]. Acharya Sushruta has highlighted Tila taila (sesame oil) as one of the best amongst all herbal oils and described it as Brmhana – bulk promoting, Suksma (subtle), Prinana (endows satiety), Vrishya (aphrodisiac), Tvakprasadana (skin tonic), Medhya (enhances retention power)^[7]. As per Bhavaprakash Nighantu the chief properties of tila oil are a hair tonic, galactagogue, an appetizer general tonic, digestant and it is used in skin diseases, wounds, anorexia and dental diseases^[8]. In Vagbhata Samhita (Ashtanga Samgraha & Ashtanga hridaya), use of Krishna Tila (black sesame seeds) has been indicated for the purpose of Rasayana. Under the description of various Rasayana dravyas (drugs), Acharya Vagbhata mentions about the use of Krishna Tila i.e. black sesame seeds as rejuvenating drug, regular use of which along with water helps in nourishing the body and thereby strengthening the teeth's^[9].

Pharmacognosy^[5]

a) Macroscopic

Seed white, brown, grey or black, flattened ovate in shape, smooth or reticulate, 2.5 to 3 mm long and 1.5 mm broad, one side slightly concave with faint marginal lines and an equally faint central line; taste, pleasant and oily.

b) Microscopic

Test of seed shows single layered palisade-like, thin-walled, yellowish coloured cells, and the rest of the testa composed of collapsed cells; endosperm 3 layered, rarely 2 layered, consisting of cellulosic polygonal cells of parenchyma containing fixed oils and small aleurone grains; cotyledons two, externally covered with thin cuticle; single layered epidermal cell, followed by a single row of palisade-like cells; rest of the tissues consist of polygonal, parenchyma cells containing fixed oil and aleurone grains. Powder - Blackish coloured; shows palisade-like cells in surface view, parenchyma cells, aleurone grains and oil globules.

Identity, Purity and Strength

Foreign matter Not more than 2 per cent, Total Ash Not more than 9 per cent, Acid-insoluble ash Not more than 1.5 per cent, Alcohol- Not less than 20 per cent, soluble extractive, Water- Not less than 4 per cent, soluble extractive Fixed Oil Not less than 35 per cent.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene: Ethylacetate (9:1) shows under UV (366 nm) three fluorescent zones at Rf. 0.57, 0.64 (both light blue) and 0.72 (blue). On exposure to Iodine vapour five spots appear at Rf. 0.08, 0.57, 0.64, 0.72 and 0.94 (all yellow). on spraying with Vanillin-Sulphuric acid reagent and heating the plate for ten minutes at 110 o C seven spots appear at Rf. 0.08, 0.57, 0.64, 0.72 (all violet), 0.76, 0.84 (both light violet) and 0.94 (violet).

Constituents

Mainly Fixed Oil

Properties and Action

Rasa: Madhura, Tikta, Kashaya, Katu

Guna: Guru, Snigdha, Sukshma, Vyavaya

Virya: Ushna

Vipaka: Madhura

Karma

Snehana, Svarya, Snehopaga, Balya, Vṛtaghna, Kushtakara, Pittala, Vibandhaka, Mutrabandhaka, Medhavardhaka, Agnivardhaka, Samgrahi, Kesya, Avasadakara, Kesa krsnakara, Kesa Vardhaka, Karnapalivardhaka, Kaphakopaka, Mrudurecaka, Vrana Samsodhaka, Vrana Pachaka, Vrana Dahanasaka, Bhagna Prasadaka, Rasayana, Vishaghna, Vajikara, Varnya, Agnibala Vardhaka

Therapeutic Uses

Udavarta, Yonishula, Gulma, Udara, Anaha, Shira shula, Parasava shula, Amashula, Raktarsha, Gudabhrmsha, Kasa, swasa, Pravahika, Visarpa, Hikka, Pinasa, Vatarakta, Pradara, Ashmari, Nadi Vrana, Kushtha, svitra, Granthi, Upadamsha, Vidaraka, Alasa, Khalitya, Palitya, Akshiroga, Pratishtaya, sankhaka, shakuni Graha, Kumara, Kshaya, Krumi, Mutraghata, Dantaroga, Dantaharsha, Vatika Mukharoga, Atidagdha, Trusna, Pliharoga, Galaganda, Karnapali shotha

Habitat

Probably originating in Asia, the Chinese used it 5,000 years ago, to make soot for the finest Chinese ink blocks. Records suggest cultivation of sesame in parts of India around 1600 BC. From there it was brought to Europe, grown in Egypt, and its value both medicinally and for cooking gradually spread throughout Europe. Tila consists of dried seeds of *Sesamum indicum* Linn. (Fam, Pedaliaceae), a herb extensively cultivated throughout the plains of India upto 1200 m for its seeds.

Habit

Sesame grows best in sandy well-drained soil and a hot climate with moderate rainfall. Sesame is an erect annual plant that can grow to a height of two meters. It bears elongated oval leaves on a stem which can be branched or unbranched, depending on the variety. Approximately six weeks after sowing, the sesame plant develops furry, tubular flowers reminiscent of a cornucopia in shape. The flowers can be white, yellow, pink or violet. They may be speckled and grow in groups of three in the leaf axils. The flowers are usually self-pollinated and, in most cases, only the middle fruit of the group fully ripens. The long taproot has many lateral roots. The plant is native to tropical and subtropical

regions and needs much warmth and moisture for its growth and dry weather for the seed to ripen. When the seed capsules have turned brownish black they burst and release the ripe seeds, which may be white, light brown or black, again depending on the variety. The fruit, about 2.5 cm long, is an oblong capsule with small seeds. Each plant may grow 15-20 fruits, which contain 70-100 seeds each. Plants and fruits will reach maturity in 80-100 days after sowing. The seeds of Krishna Tila (black sesame) are flat ovular in shape, measuring approximately 3mm in length and around 2mm width. Surface of Krishna Tila (black sesame) is dusky and smooth. The tip of the seeds has punctate hilum. Coating of the seeds is thin consisting of two cotyledons, which are white, and rich with oils in it. It has sweet taste, and aroma similar to oils.

Varieties

Tila (sesame seeds) has commonly found two varieties used in different parts of the world i.e. black sesame seeds and white sesame seeds. Both of them having almost similar chemical composition. White sesame seeds are supposed to be better for edible purpose and the black sesame seeds are preferable for use of medical conditions.

Culinary uses

In Manipur (India) black sesame is used in the preparation of *Thoiding* and in *Singju* (a kind of salad). Thoiding is prepared with ginger and chili and vegetables are used in the spicy Singju dish. In Assam, black sesame seeds are used to make *Tila -Pitha* and *Tilaorlaru* (sesame seed balls) during bihu. In Japan whole seeds are found in many salads and baked snacks and tan and black sesame seed varieties are roasted and used to make the flavouring gomashio. *Gomashio* is also a part of the macrobiotic diet, where it is used as a healthier alternative to ordinary salt.

Chemical Composition

Chemical constituents in Krishna Tila (black sesame seeds) is – around 55% oils, sesamin, sesamol, sesamol (3,4-methylenedioxy-phenol), Fatty oils are mainly composed of 48% of oleic acid, 37% linoleic acid, palmitic acid, stearic acid, arachidonic acid, and glycerol etc. which are supposed to pose antioxidant effects on the body. Krishna Tila (black sesame) also contains vitamin E, B-complex vitamins (especially niacin), phytosterols, proteins, sucrose, saccharides, sesamose, and trace amount of phosphorus, potassium and cytochrome C. Krishna Tila (black sesame) contains folic acid, nicotinic acid, pantoic acid, pentosan and rich source of calcium. Around 100gm Krishna Tila (black sesame seeds) provides approximately 1.5 mg. or 74% of the DV, for copper, and 2.8 mg i.e. 19 percent of the DV for zinc. Krishna Tila (black sesame) is supposed to have highest phytosterol content i.e. around 400 to 412 mg per 100 grams of seeds. Krishna Tila (black sesame seeds) are very good source of calcium, which has been proved through various studies across the globe. One gram of Krishna Tila (black sesame) seeds contains approximately 85 mg. of calcium in it.

Dose: Powder 5-10 gm/day.

Important Formulations

Jatiphaladi Churna, Narasimha Churna, Haridradi Lepa, Vrusingha Pupalika Yoga, Nagaradi Yoga, Tiladi Upanaha, Tiladi Yoga, Priyaladi Yoga, Mustadi Upanaha, shunthyadi

Churna, Pathyadi Gutika, Hingvadi Yoga, Paniya Kshra and Bhallatakadi Modaka.

Pharmacological Activities

Based upon *Materia Medica* of Chinese medicine, it is said that, 'Krishna Tila is sweet in flavor and neutral in properties'. It covers three meridians of liver, spleen, and kidney. Based on theories in Traditional Chinese Medicine (TCM), it is believed that aging, the toils of life and worrying could bring about deficiencies in bodily functions. In particular, the 'Liver' and 'Kidney' come to be deficient in 'Jing' and 'Blood'. This deficiency in turn brings about aging-related symptoms like blurry vision, graying of hair, ringing in the ears, as well as weakness in the bones and joints. Black sesame gives nutrients required to correct such a 'Liver-Kidney' deficiency, helping the body to delay the onset of aging-related symptoms, also reversing the symptoms after they arise. The content of vitamin E contained in this black sesame is the highest in all foods of plant origin. Vitamin E can promote cell division and delay cell senescence which is well understood. Long-term use can counteract or neutralize the accumulation of cell senescence substance of 'radicals' and then delay aging and extend life expectancy. Vitamin E is also associated with healthy skin^[10]. The Chinese believe that the nutrients in black sesame seeds can help to correct a deficiency (in *Ying* and *Xue* of the *Gan* and *Shen*) brought about by aging, worrying and the toils of life, which in turn bring about aging-related symptoms like graying hair, blurry vision and ringing in the ears.

Sesame seeds are rich in substances known as sesamin and sesamol, which can help lower cholesterol levels. The black sesame seeds also contain magnesium, which help to reduce blood pressure. Black sesame seeds are rich source of phytosterols which are the plant compounds similar to chemically the structure of cholesterol. Intake of phytosterols in routine diet helps reduce cholesterol levels in the blood and also decrease the risk of development of cancers. The fatty oils present in the Krishna Tila (black sesame) helps lubrication of intestines which in turn is beneficial in relieving signs of constipation. These substances are from group of fibres called lignans, which are rich in dietary fibre and have a property of lowering cholesterol. The fibres, lignans and other nutritional contents (e.g. phytosterol, calcium etc.) present in the Krishna Tila (black sesame seeds) poses protective effects against the cancers, specifically colon cancer. The sesamin present in Krishna Tila (black sesame seeds) is supposed to have protective action on the liver against the damages caused by the free radicals^[11]. Magnesium (Mg) and calcium (Ca) are essential minerals which help in regulation of blood pressure, reduce the chances of developing stress and migraine (triggered by spasms in blood vessels), reduce the spasms in asthma patients and regularize sleep patterns, especially menopause induced sleep disturbances. Calcium and zinc present in black sesame seeds can help nourish the bones thereby preventing osteoporosis. The black sesame seeds are rich in B vitamins and iron, deficiencies of which can lead to the premature graying of hair, loss of memory and hearing impairment.

Discussion

Mode of Action as Rasayana

The word Rasayana refers to acquisition & circulation of nutrition needed to provide nourishment to the body tissues and tissue perfusion. Hence it may be presumed that a

Rasayana agent acts at any of the following three levels, viz. Rasa, Agni, and Srotas.

Rasa

Rasayana agents might enrich the nutritional quality of poshaka rasa as most of them physically contain high quality of nutrients in their bulk and when administered; it is added to the nutrients present in the Poshaka rasa and in turn help in improving in Dhatu Poshana. Eg: Ghrita, Ksheera, Shatavari, etc.

Agni

Rasayana agents improve the Agni Vyapara and thus promote Dhatu Poshana. Several Rasayana drugs are known to have Deepana and Pachana properties by the virtue of their qualities like Laghu, Ushna or by Prabhava, thereby promote the functions of Koshatagni for the digestion of food and of Dhatvagni to vitalize the metabolic activity, resulting in turn to improved nutritional status at the level of Dhatus. Ex: Pippali, Bhallataka, etc. By their virtue of Deepana and Pachana action they digest and destroy the specific Ama present in the Srotas and also help in removing the obstruction in the Srotas. By this the Naimittika Rasayana act as adjuvant to the specific Vyadhihara medicines prescribed for the disease and enhance their effect. By this action they facilitate the adequate movement of Dhatus relative to the Srotas and also the rasa which is carrying the doshas thus the mala sanchaya roopi ama is removed. This helps in the scavenging of the Srotas.

Srotas

Some of the Rasayana drugs promote the functions of Srotas which helps in supply of nutrients to the cells & tissues improving cellular perfusion. This is one of the mode through which a Rasayana treatment may work in promotion of nutritional status. Ex: Guggulu.

Mechanism of Action (Probable)

The black sesame seeds are rich in B vitamins and iron, and deficiencies in these nutrients have been linked to hair fall, premature graying of hair, memory impairments and hearing loss.

- It is also rich in calcium and zinc, important minerals for maintaining strong bones and preventing osteoporosis.
- The seed also contains substances known as sesamin and sesamol, which are found to increase vitamin E supplies (important for skin health) and lower cholesterol levels.
- The Madhura, Snigdha and guru guna of Krishna Tila help in nourishment of the dosha.
- Ushna virya and snigdha guna of Krishna Tila helps in pacifying vitiated Vata dosha which is predominant factor in causation of symptoms of ageing.
- Katu, Tikta Rasa and Ushna Virya of Krishna Tila may have helped in improving the Agni, improving the metabolic activities of the body, thereby enhancing the nourishment of the body.
- Krishna Tila has properties of 'Yogavahi' & sukshma which helps in cleansing srotas, thereby improving functions of srotas, which in turn helps in nourishment and formation of good quality tissues.



Fig 1: Krishna tila (black Sesame)



Fig 2: Krishna tila (black Sesame)



Fig 3: Krishna tila (black Sesame)



Fig 4: Krishna tila (black Sesame)

Conclusion

- Krishna Tila or black sesame seeds have excellent medicinal properties and are recommended in Ayurveda for treatment purpose and as a Rasayana dravya i.e. rejuvenating drug in Vagbhata Samhita's.
- Black sesame seeds are rich in calcium, iron, copper, magnesium and phosphorus. These minerals help to support healthy bones, muscles, blood, and nervous system. Copper strengthens blood vessels, joints, and bones, and is helpful in relieving arthritis. Magnesium supports vascular and respiratory health.
- The Rasayana effect of Krishna tila may be at the agni level i.e. katu, tikta rasa and ushna virya helps in improvement of agni (digestion & metabolism), sukshma and yogvahi gunas of Krishna tila helps supply of various micro nutrients like zinc, calcium, magnesium, vitamin E, lignans (antioxidants) etc. to each and every cell of the body, justifying the mode of action of Rasayana dravyas.
- Similarly, Snigdha guna and Ushna virya helps in pacifying Vata doṣa which is predominant in matured age groups.

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