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A LITERATURE REVIEW OF KRISHNA TILL (*SESAMUM INDICUM* L.) AN IMPORTANT RASAYAN DRAVYA IN AYURVEDA

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Abstract

Sesamum indicum L., often known as sesame or tila, is an ancient oilseed that is utilized in Ayurvedic medicine, food, and rituals. The black type is called Krishna Tila. According to traditional literature, Krishna Tila is a rasāyana (rejuvenative) with qualities that enhance vitality, foster longevity, and encourage nourishing dhātus. Numerous traditional claims, such as antioxidant, anti-inflammatory, hypolipidemic, hepatoprotective, and neuroprotective effects, can be plausibly explained by the rich profile of fatty acids, tocopherols, phytosterols, and lignans (e.g., sesamin, sesamolin, and sesamol) that have been discovered by contemporary phytochemical, pharmacological, and clinical research. This review bridges the gap between traditional knowledge and contemporary research by synthesizing Ayurvedic textual claims, pharmacognostic features, phytochemistry, biological activity, safety data, and clinical evidence. Recent clinical investigations and thorough current reviews are important sources of evidence.

Keywords: *Sesamum indicum*, Krishna Tila, sesame, rasāyana, sesamin, lignans, antioxidant, Ayurveda.

Introduction

Rasāyana treatments are positioned by Ayurveda as interventions that promote resilience, slow down degeneration, restore vitality, and enhance ojas. Black sesame, or Krishna Tila, is a distinctive place among herbal/mineral rasāyanas according to classical authorities (such

as Vāgbhaṭa and Nighantu traditions) for fostering strength, hair color, and general sustenance. Reexamining black sesame via contemporary scientific perspectives is motivated by the current interest in integrative geroprotection, nutraceuticals, and functional foods.[1]

One of the first domesticated oilseed crops, sesame (Sesamum indicum) holds a special position in many civilizations for its usage in ceremonial, medicine, and cooking. Sesame, particularly the black seed (Krishna Tila), has long been known in Ayurveda as a rasāyana and a strengthening agent for degenerative illnesses and vāta disorders. It is also considered an anupan (vehicle) that improves medicine delivery.[2] It is timely and significant to compile traditional claims with current scientific data on Krishna Tila, given the widespread interest in nutraceuticals and evidence-based support for traditional remedies. Numerous bioactive components are identified in contemporary literature, and a growing corpus of pharmacological and clinical studies supports a number of traditional applications.

A popular and old Ayurvedic dravya, Krishna Til (black sesame; Sesamum indicum L.) is said to be nutritious, snigdha (unctuous), and rasāyana (rejuvenative). Tila and tila-taila are listed in classical writings (Charaka, Sushruta, Vagbhata, and later Nighantus) as remedies for vata diseases, balya and medhya effects, and for enhancing longevity, skin, and hair. These traditional applications are echoed in contemporary Ayurvedic reviews, which also highlight black sesame's unique rasāyana status..[3]

Methods - Literature Search Strategy

The following terms were searched for in order to conduct a narrative literature review: "Sesamum indicum," "black sesame," "Krishna Tila," "sesame lignans," "sesamin," and combinations of these terms with "Ayurveda," "rasāyana," "phytochemistry," "antioxidant," "anti-inflammatory," and "clinical trial." Priority was given to in vivo/in vitro pharmacology reports, pharmacognostic studies, primary contemporary review articles, and clinical trials. Through secondary sources detailing traditional qualities, traditional Ayurvedic references on tila (such as the Vāgbhaṭa, Caraka, and Nighantu traditions) were consulted. The main sources for the synthesis were recent thorough reviews and systematic reviews..

Scientific Classification: [4]

Kingdom- Plantae

Division-Tracheophytes

Clade- Angiosperms

Clade- Asterids

Order- Lamiales

Family- Pedaliaceae

Genus- Sesamum

Species- *S. indicum*

English Name: *Sesamum oil*

Sanskrit/ Hindi Name: Till

Conceptual review

The literature of Krushna tila was reviewed using all of the Samhita and Nighantu Grantha from the Vedic period to the present. The chemical makeup of Krushna tila was gathered from a variety of periodicals and the internet, along with an update evaluation of the work done on phytochemical ingredients and pharmacological action. A thorough analysis of hair disorders (Khalitya, Palitya, and Darunaka) using both modern and Ayurvedic methods was conducted, and comprehensive data was collected..

Historical review

One of the earliest plants to be cultivated worldwide is Sesamum indicum. Hippocrates gave the plant the name Sesamum, which is derived from the Arabic word Sossamon, which means herb. The burnt lump of sesame seeds found in the Mohenjo-Daro Harappa excavations indicates that the crop was long grown in the Indus Valley, dating to around 2000 B.C. Sesame seeds, known as "se-gis-i" in the clay tablets of the Sumerian culture from around 3000 B.C., left India long ago and spread throughout the Middle East. Hindu legend states that Vishnu's sweatdrops that fell to Earth are the source of Tila.[5]

Krishna tila in vedic era

Sesame was described in the Atharvaveda as a field manure crop and tree. As early as 3000 B.C., the Tila seeds were being used. The plant was an important source of both oil and food. The Aryans only exploited the seed to obtain oil during the Vedic era. The plant Tila was identified as the sesame plant and its grains, from which a rich oil was produced, in the Atharvaveda and later in the Taittariya Samhita, Satapatha Brahmana. Tila is mentioned in relation to Masha (Kidney bean) in the 8 Bruhadaranyaka Upanishad and Chhandogya Upanishad.[6]

Review from samhitas

During Samhita Kala, drugs were categorized into different ganas based on their characteristics and modes of action. During the Samhita period, numerous yogas and multi-drug therapy were also explained.

Charaka Samhita- Tila is mentioned in Purishavirajaniya mahakashaya (C.Su.4/32) and Swedopaga (C.Su.4/22) as well as in Shamidhanya Varga (C.Su.27/30) in the Charaka Samhita. In daily life, it is utilized as food. It is utilized as balya, keshya, vataghna, and so on. The best Snehana is said to be found in Snehnadhyaya (C.Su13/10) seeds, which are used to prepare tails that are frequently used as bases in other taila formulations.[7]

Sushruta Samhita- In Mudgadi Varga, Acharya Sushruta made reference to Tila. Dhanya Varga (S.Su.45/38) and Artavajanak Dravyas are included in Tila. Varga Tila is referred to in Dhanya as Keshya, Medhajanana, Pathya, Balistha, and so on (S.Su.46/39-40).[8]

Krushna tila in nighantu

Nighantu are collections of data about all aspects of medicines, including their genesis, identification, pharmacological activity, nomenclature, kinds, properties, and action. Disease management makes use of this knowledge. From the Nighantus, a detailed review of Krushna Tila has been extracted. During this time, the plants were divided into many Vargas..

Dhanvantri nighantu- All herbs are categorized under the seven Vargas in this nighantu. This Nighantu Krushna Tila falls under the dhanya category's description of the "Suvarnadi Varga." Its usage in Homadi karma is indicated by the numerous synonyms for it.

Siddhamantra nighantu - Tila has been mentioned under in under Mishrak varga, Vataghana varga, Doshal varga, in Nighantu.

Madanpala nighantu - In this Nighantu, Tila is described in ‘Dhanyaguna varga’. Along with various synonyms the specific attributes of Vanya Tila have been given.

Bhavaprakasha Nighantu-

Reference of Krushna Tila from Bhavaprakasha Nighantu are mentioned in the ‘Shimbi dhanya varga’ of dhanya varga. Varieties are also mentioned in details which are discussed further. Bhavmishra described Tila with its Matiprada, Tvachya, Balya, Keshya actions.[9]

Habit- It is an annual Herbs up to 3-4 fit high.

Habitat- Native to India, this little bush is widely grown in the warmer climate. Sesame is grown at elevations of up to 1,200 meters and in the plains at temperatures of 21 degrees and higher. It needs a warm climate and cannot tolerate extended drought, strong rain, or frost.

Botanical characteristic features-

Roots: Tap root systems and branching roots are common. Stem: upright, herbaceous, branching, and covered in glandular hairs and mucilage. Leaves: Simple, lobed or opposite, exstipulate with mucilaginous glandular hairs, incised or petrified, occasionally alternating. The inflorescence consists of a pedicellate or hermaphrodite flower that is zygomorphic, irregular, complete, and hypogynous. It may or may not have bracts and has a gamopetalous calyx with four to five connate sepals. Bilabiate, gamopetalous, five-lobed corollas typically have a large tube. Androecium has a dithtecous anther and four to five stamens. Typically, the syncarps gynoecium has two carple, two locules, superior ovary, and axial placentation. Fruit: Hard, typically thorny, winged, hooked, and with a loculicidal capsule or nut. Seed: Wingless Indian species have aluminous seeds with small, straight embryos and thin endosperm.[10]

Flowering and fruiting – August to November

Substitutes and Adulterants: Sesamum oil used as substitutes and adulterant Olive oil and Almond oil.

Ayurvedic Properties[11,12]

Rasa	Madhura (sweet), Tikta (bitter)
Guna	Guru (heavy), Snigdha (unctuous)
Veerya	Ushna (hot)
Vipaka	Madhura
Dosha effect	Pacifies *Vāta*, increases *Kapha* mildly, and supports *Pitta* when used moderately.

Major Constituents[13]

Modern phytochemical investigations identify sesame seeds/oil as chemically complex; major classes include:

Lipids: High oil content (40–60% depending on variety), dominated by unsaturated fatty acids oleic and linoleic acids with palmitic and stearic as minor saturated fatty acids.

Lignans: Sesamin, sesamolin, sesamol- key phenolic lignans implicated in many bioactivities (antioxidant, anti-inflammatory, CYP modulation).

Tocopherols: Vitamin E isoforms (α-tocopherol etc.), contributing to antioxidant capacity.

Phytosterols & Other: β-sitosterol and related sterols, proteins (rich in methionine), minerals (calcium, iron, magnesium, zinc), B-vitamins collectively contributing nutritional and functional properties. Black sesame often shows higher iron and certain lignan contents relative to white varieties.

Karma- Snehana, Svarya, Snehopaga, Balya, V¡taghna, Kushtakara, Pittala, Vibandhaka, Mutrabandhaka, Medhavardhaka, Agnivardhaka, Samgrahi, Kesya, Avasadakara, Kesa krsnakara, Kesa Vardhaka, Karnapalivardhaka, Kaphakopaka, Mrudurecaka, Vrana Samsodhaka, Vrara Pachaka, Vrana Dahanasaka, Bhagna Prasadaka, Rasayana, Vishaghna, Vajikara, Varnya, Agnibala Vardhaka .[14]

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, Pratishyaya, sankhaka, shakuni Graha, Kumara, Kshaya, Krumi, Mutraghata, Dantaroga, Dantaharsha, Vatika Mukharoga, Atidagdha, Trusna, Pliharoga, Galaganda, Karnapali shotha.[15]

Medicinal uses-

External Applications (*Bāhya Prayoga*)[16]

a. **Abhyanga (Oil Massage)**

Sesame oil (*Tila Taila*) is the most recommended base oil for *Abhyanga* (daily massage).

- Strengthens muscles, joints, and bones.
- Reduces *Vāta* and stiffness.
- Improves sleep and relieves fatigue.
- Nourishes the skin and delays wrinkling.

b. **Nasya (Nasal Therapy)**

Tila Taila is used for nasal instillation in *Vāta* disorders of the head, promoting mental clarity and lubricating nasal passages.

c. **Karna Purana (Ear Drops)**

Warm sesame oil instilled in the ears helps relieve *Vātika* ear pain and tinnitus.

d. **Murdhni Taila (Head Oil Application)**

Applied to scalp for promoting hair growth, preventing dandruff, and maintaining black, strong hair.

e. **Wound Healing**

Sesame oil, due to its *vrana-ropaka* (wound healing) property, is applied externally in chronic ulcers and wounds, often as part of medicated oil formulations like *Jatyadi Taila*.

Internal Uses (*Antar Prayoga*)[17]

As Food and Medicine

- Used as an essential oil in cooking and medicinal preparations.
- Taken with jaggery or milk for nourishment and as a general tonic.
- Seeds are roasted or ground into paste for internal use.

b. **In Digestive Disorders**

- Acts as a mild laxative and digestive stimulant.
- Helps balance *Vāta* in intestines.

c. **In Bone and Joint Disorders**

- Useful in *Vāta-vyadhi* (degenerative and neurological conditions) such as arthritis, sciatica, and joint stiffness.

d. **In Reproductive and Sexual Health**

- Acts as an aphrodisiac (*Vṛṣya*).
- Enhances semen quality and libido.
- Used in formulations for male and female infertility.

e. **In Dental and Oral Care**

- *Gandusha* (oil pulling) with sesame oil strengthens gums, prevents dental caries, and maintains oral hygiene.

f. **In Skin and Hair Care**

- Regular use of sesame oil improves skin luster, prevents dryness, and delays aging.

- Internally, black sesame supports pigmentation and prevents premature graying of hair.

Modern Correlation

Scientific studies correlate traditional uses with antioxidant, anti-inflammatory, and rejuvenative properties attributed to lignans (sesamin, sesamol) and essential fatty acids. These compounds contribute to cellular protection, lipid regulation, and skin-nervous system support, paralleling the classical *rasāyana* and *Vātahara* actions of *Tila*.[18]

Formulations- Tila Taila, Jatyadi Taila, Mahanarayana Taila, Ksheerabala Taila, Bhringaraja Taila

Pharmacological activities [19.20,21,22,23]

A growing body of preclinical and clinical literature reports multiple effects relevant to both Ayurveda and modern medicine:

- **Antioxidant & anti-inflammatory:** In vitro and in vivo, lignans (sesamol, sesamin) exhibit potent free-radical scavenging and inflammatory mediator suppression. Sesame extracts and oils exhibit strong antioxidant properties in a number of in vitro and in vivo investigations, which are mostly ascribed to lignans (sesamol, sesamin) and tocopherols. In liver and brain tissues, antioxidant assays and animal research consistently demonstrate a decrease in lipid peroxidation, scavenging of free radicals, and defense against oxidative stress. Antioxidant potential in seed, oil, and roasted preparations is confirmed by systematic reviews.
- **Anti-inflammatory effects-** According to preclinical models, sesame oil and extracted lignans lower inflammatory indicators (such as COX-2 regulation and cytokine suppression); mechanistic and molecular docking investigations show a direct contact with inflammatory pathways. Small clinical trials and human supplementation studies that demonstrate reductions in systemic inflammatory markers provide credence to the clinical significance.
- **Cardiometabolic benefits:** Sesame seed/oil or lignan supplementation has been shown to reduce cholesterol, improve dyslipidemia, and have mild glycemic advantages; these effects are probably mediated by lignans, unsaturated fats, and antioxidant activity. Numerous studies on humans and animals are synthesized in thorough and methodical evaluations.

- **Hepatoprotective & nephroprotective:** Hepatoprotective and nephroprotective effects are demonstrated by preclinical animals through anti-inflammatory and antioxidant pathways. Positive lipid modulation, endothelial enhancement, and anti-oxidative stabilization of LDL are the sources of cardiovascular protection. Improvements in surrogate cardiovascular risk indicators are supported by human interventional trials.
- **Neuroprotective & anti-aging claims:** Although human research is still in its infancy, antioxidant and micronutrient content are in line with neuroprotection theories. Antioxidant and neuroprotective evidence provide a partial molecular basis for traditional rasāyana applications (rejuvenation, hair, and cognitive support); animal studies demonstrate improved memory and protection against neurotoxicity. Strong human clinical trials that particularly address cognitive aging are still scarce, nevertheless.
- **Wound-healing and topical uses:** Sesame oil has both traditional and contemporary support for topical applications. Its lubricating, anti-inflammatory, and mildly antimicrobial qualities make it a valuable ingredient for dermal formulations, massage oil (abhyanga), and adjuncts for wound dressings. Larger studies are required to examine clinical outcomes in trauma or topical diseases.

Other Practical Applications of sesamum oil[24]

Recommended pragmatic uses aligned with classical rasāyana practice and modern evidence:

1. A daily small-dose of black sesame seeds (e.g., 5–15 g, depending on digestive capacity and individual constitution) as a nutritional rasāyana.
2. Preparations of medicated sesame oil (such as tila taila, specific kashayas, or herbalized oils) for external abhyanga, nasya, and keshya treatments to promote local nourishment and hair health.
3. Adjunct dietary substitution: to maximize metabolic advantages while keeping calorie intake under control, replace less healthful fats in the diet with sesame oil.
4. Standardization: Practitioners should refrain from endorsing high-dose purified extracts in the absence of safety data and instead favor products that are well-characterized, indicating seed color, cultivar, roasting, and extraction method.

Rasāyana (Rejuvenative and Nutritional) Use[25]

As a rasāyana Dravya, Krishna Tila is regarded as a revitalizing and tissue-nourishing agent. strengthens and prolongs life (Bala vardhaka). improved fertility and reproductive health (Vṛṣya). nourishes all of the body's tissues, or Dhātus, but particularly the bones (Asthi) and reproductive tissue (Shukra). improves vigor, voice, and complexion. prevents hair graying and premature aging. used in formulations of Rasāyana to encourage vitality in general.

Clinical evidence & human studies

Although impact sizes and quality vary, and some trials are small or heterogeneous, recent meta-analyses/reviews and clinical trials suggest positive effects of sesame supplementation on lipid profiles, inflammatory markers, and glycemic indices in adults. Sesame supplementation improves glycemic management and inflammatory indicators, according to a 2025 clinical-evidence summary, but it also urges larger, better RCTs. Overall: encouraging clinical signs that require additional testing using standardized dosages and formulations.

Gaps, limitations & future research directions

1. **Standardization:** need standardized extracts (sesamin/sesamolin content) and clear reporting of seed type (black vs white), processing (roasted/raw), and oil extraction method.
2. **High-quality RCTs:** larger, placebo-controlled RCTs with clinically relevant endpoints (cardiometabolic outcomes, bone density, cognitive function) and longer follow-up.
3. **Mechanistic human studies:** pharmacokinetics of lignans in diverse populations, interaction with gut microbiota (conversion to enterolignans), and gene–nutrient interactions.
4. **Safety & population studies:** evaluation in vulnerable groups (pregnancy, children, severe hepatic/renal disease) and allergy surveillance (sesame is a recognized food allergen in many countries).

Discussion-

Krishna Tila, also known as black sesame (Sesamum indicum L.), is a scientifically promising rasāyana with a solid phytochemical foundation (lignans, tocopherols, unsaturated fatty acids, minerals) and proven anti-inflammatory, antioxidant, metabolic, and organ-protective properties in preclinical and early clinical research. Many contemporary findings are

consistent with the traditional applications of Ayurveda; however, long-term safety evidence, standardized formulations, and high-quality clinical trials continue to be priorities. The most effective way to clarify Krishna Tila's therapeutic potential for illness adjunctive care and health promotion is through integrative research that adheres to Ayurvedic conceptual frameworks while using rigorous clinical science.

However, there are a number of drawbacks, including variations in the phytochemical content, processing variations (raw versus roasted), botanical variety heterogeneity (black versus white), and human trial design variability. Ayurvedic rasāyana is a multifaceted notion that includes medicine, nutrition, and lifestyle; hence, reductionist clinical outcomes might not fully convey the traditional purpose. Future studies should quantify important lignans, employ standardized botanical sourcing, and employ extended follow-up with clinically relevant endpoints (e.g., metabolic syndrome components, cognitive scales, and sarcopenia indicators).

Conclusion-

Ayurvedic rasāyana principles are in line with Krishna Tila (Sesamum indicum L., black sesame) because of its high nutritional content and bioactive lignans, which provide metabolic, anti-inflammatory, and antioxidant benefits. Many traditional claims are supported by mechanistic and translational data from recent preclinical and clinical studies, especially those pertaining to cardiometabolic and antioxidant properties. It has a strong history as a rasāyana in traditional Ayurvedic sources, and a growing body of contemporary research demonstrates its hepatoprotective, cardiometabolic, and antioxidant properties. Although preclinical and early clinical studies offer biologically plausible processes (such as lignans, tocopherols, and healthful fatty acids), many traditional claims are still only partially verified due to preparation heterogeneity and a lack of high-quality RCTs. Standardized, focused clinical trials and pharmacokinetic research will connect rigorous, contemporary data with traditional wisdom.

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