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Literature review on the efficacy of selected herbal oil from *Vaidhyaka Sārasankshēpaya* in the management of *Dārunaka* (dandruff)

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Abstract

The shedding of dead skin cells from the scalp is known as dandruff. It is a common scalp condition that affects half of the world's population and is related to *Dārunaka* in Ayurveda. Dandruff is more of a social issue and detracts from aesthetic value because a person with it is more likely to feel self-conscious in social situations. The purpose of this study was to determine the efficacy of particular herbal oil in treating *Dārunaka* based on the pharmacological characteristics of its constituent parts. The pharmacological characteristics of the components of particular herbal oil were discovered and examined. This investigation showed that *Madhura* (sweet), *Tikta* (bitter), *Kashāya* (astringent), *Katu* (pungent) *Rasa* (taste) and *Snigdha* (slimy), *Guru* (heavy), *Laghu* (light) *Guna* (qualities) are the main possessors of the chosen herbal oil. The distribution of *Ushna* (hot) and *Sheeta* (cold) *Veerya* (potency) is comparable in this particular herbal oil. The percentages of *Katu* and *Madhura Vipāka* (last taste) are likewise comparable. According to earlier studies, the ingredients of the chosen herbal oil contain alkaloids, flavonoids, saponin, tannin, phenolic compounds, and carbohydrates. This chemical composition aids in anti-fungal, antibacterial, anti-helminthic, and anti-inflammatory actions, which reduces the symptoms of dandruff. It is evident that the chosen herbal oil can be utilized to treat *Dārunaka* with *Nidāna Parivarjana* (preventing causes) as well as after *Pathya Apathya* (wholesomeness and unwholesomeness).

Keywords: *Dārunaka*; *Guna*; *Rasa*; *Veerya*

1. Introduction

Nearly half of the population has dandruff, a common scalp ailment that can afflict people of any gender or ethnicity at the pre-pubertal stage [1]. No population would have freely traveled across any area without experiencing dandruff at any point in their lives [2]. The word "dandruff" has Anglo Saxon roots and is a mixture of the words "tan," which means "tetter," and "drof," which means "dirty." [3]. The regular growth process of the skin cells on the scalp leads to dandruff, which is the excessive shedding of dead skin cells. It is a frequent disorder that results in skin flaking. The cells in our skin constantly renew themselves. Old skin cells on our scalp are pushed to the surface and out of the scalp as new skin cells are created. The renewal process moves more quickly for someone with dandruff, which results in more dead skin being shed and increased dandruff visibility [4]. Yeast the dandruff-causing bacterium is *Pityrosporum ovale*. *Pityrosporum ovale* feeds on the lipids and proteins of the dermis and promotes lipase activity, which releases pro-

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inflammatory free fatty acids that cause tissue damage and dermal inflammation. The lipase activity shows that *Pityrosporum ovale* release poisonous compounds in addition to hypersensitivity, which aids in the growth of a fungal infection.

Dandruff is caused by a variety of factors, including genetic predisposition, hormone imbalances, infections, changing lifestyle, irregular daily routine, inadequate immune system, mental stress, perspiration, bad food and environmental toxins in the air and water. Dandruff is made worse by overusing hairsprays, hair gels, incorrect hair coloring techniques, electric hair curlers, dry indoor heating, tight-fitting headwear or scarves, infrequent shampooing, insufficient rinsing, stress, anxiety and tension. Scaling of the scalp is the most typical sign of dandruff and itching and pain of the scalp are commonly present. Scaling can happen anywhere on the scalp, although dandruff scales typically appear as small, spherical and white to grey spots on the top of the head.
Clinically, the white or greyish skin flakes are frequently seen on the shoulders and hair. Typically, the scalp has unsightly flakes or scales that get caught in the hair. The underlying source of the dandruff may be indicated by the "oily" or "dry" nature of these flakes. From mild dandruff to exfoliative erthroderma, dandruff can range in severity. The skin around the eyebrows, nose, ears, face and forehead is affected by seborrheic eczema, a more severe form of dandruff. Typical scales are yellowish, greasy and have inflamed skin [5]. The same illness, though frequently in a more severe form, is most frequently referred to as seborrheic dermatitis in the medical literature. Other descriptive names representing the fungus that causes this ailment have included *Pityriasis simplex*, *Pityriasis capitis* and *Furfuracea* throughout history. We only need to keep in mind that, as long as all of these titles are still in use, they all refer to a continuum of symptoms that share the same origins and treatments

Due to the similarity of the two diseases' pathophysiologies and existing descriptions of the diseases, Dandruff and *Dārunaka* can be compared. The most frequent cause of hair loss is a condition called *Dārunaka* that affects the hair roots. It is more of a social issue that detracts from aesthetic value because a person with dandruff is prone to feel self-conscious in social situations [6]. According to *Vāgbhata* and *Sārangadhara* (teachers) the *Dārunaka* is a *Kapālagata Rōga* (pertaining to scalp) but *Susruta* and other *Āchāryās* (teachers) explained this disease under *Kshudra Rōgās* (minor disease) [7] [8]. An irritating condition of the scalp known as dandruff is characterized by the loss of dead skin cells from the scalp and a burning or itchy feeling. According to *Ayurvedic* literature, *Dārunaka*, characterized by symptoms such as *Kandu* (itching) *, Rūkshata* (dry)*, Twak Sphūtana* (cracking of skin)*, Kēsha Chyuti* (disorder of hair) and others, is caused by the rejection of *Kēsha Taila* (oil), incorrect cleaning, resting during the day, night vigil, exposure to dust, and hot weather [9].

Herbs were selected from authentic text; *Vaidhyaka Sārasankshēpaya* has the following ingredients: *Cassia fistula, Pongamia pinnata, Jasminium grandiflorum* and *Cocus nucifera*. The current study based on an *Ayurvedic* medicinal formula that used in dandruff that written over *Vaidhyaka Sārasankshēpaya*. The study critically analyzed the pharmacological activities of the ingredients in selected formula in the management of dandruff.

Aims & objectives

The study was created to determine the anti-fungal activity of the ingredients in selected herbal oil in the management of dandruff.

2. Research methodology

The literary review was referred through authentic Ayurveda classics such as *Caraka Samhitā, Susruta Samhitā*, *Ashtānga Hrdaya Samhitā, Ashtānga Samgraha, Sāranghadara Samhitā, Yoga Rathnākaraya, Vaidhyaka Sārasankshēpaya, Rasarathna Samuchchya , Bhāvaprakāshaya*, Ayurveda Pharmacopiea and modern text books. The review on dandruff was conducted through recent scientific explanations and findings which published in official websites and indexed journals, articles, books, reports of WHO and encyclopedias. The gathered information was compared with traditional and modern scientific explanations based on pharmacological characteristics, *Rasa* (taste), *Guna* (quality), *Veerya* (potency), *Vipāka* (last taste) and *Prabhāva* (specific action).

2.1. Review

Herbal oil chosen from an authentic book, *Vaidhyaka Sārasankshēpaya* has four ingredients: (Table 1).

Table 1 Review of selected herbal oil

	Cassia fistula	***Pongamia pinnata***	***Jasminium grandiflorum***	***Cocus nucifera***
Family	Fabaceae	Fabaceae	Oleaceae	Palmaceae
Sanskrit name	*Āragvada*	*Karanja*	*Jāthi*	*Nārikēla*
Part used	Leaves	Seeds	Leaves	Fruits

2.2. *Cassia fistula* (*Āragvada*)

The tree is between 3.7 and 4.8 meters tall. Bark can be brick red or greenish-grey. 5.16–12.2 cm long paripinnate leaves with 8.16 acuminate, ovate–lanceolate leaflets. Yellow, fragrant flowers are borne on loose, pendulous racemes. Pods, 25–35 cm long and 1.5–3.0 cm in diameter, are cylindrical, pendulous, and indehiscent. When ripe, the seeds are many, small, flat, smooth, and yellowish-grey. The flowers bloom from March to May and the fruits appear in May. Grows or is farmed throughout India. Chemical constituents are sugars, galactomannan Fistulin, leucopelarargonidin, tetramer, kaempferol, Fistulic acid, Rhein, sennosides A and B. *Cassia fistula* has *Madhura* (sweet) *Rasa, Mrudu* (soft), *Guru* (heavy to digest), *Snigdha* (unctuous, oily) *Guna, Sheeta Veerya*, *Madhura Vipāka* and *Kapha Pitta Hara Karma*.

In an animal model, extracts of *Cassia fistula* leaves with acetone, diethyl ether, and methanol shown antifungal efficacy against *Candida albicans* [10]. Using solvents such petroleum ether, chloroform, ethanol, methanol and water, *Cassia fistula* leaves were extracted. The plant's leaves were examined for potential antibacterial properties. This investigation found that every extract exhibited effective inhibitory efficacy against the gram-positive test pathogens [11]. An albino rat model was used to test the antibacterial activity of an alcoholic extract of *Cassia fistula* leaves against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Rats given *Cassia fistula* demonstrated enhanced tissue regeneration at the site of the wound, better wound closure and histological characteristics that favor wound healing [12].

2.3. *Pongamia pinnata* (*Karanda*)

It is a glabrous, medium-sized tree with a smooth, grayish-green bark. Compound, imparipinnate and alternative leaves flowers in axillary racemes, fragrant, irregular, bisexual, lilac or white, tinted with pink or violet; leaves 5-9, elliptic or ovate, glabrous and shiny on both sides; elliptic to obliquely oblong, compressed, woody, glabrous and indehiscent fruitpods;1-2 wrinkled, elliptic or reniform, reddish-brown seeds. The root, fruit, and bark all have an alkaloid in them. Fatty acids and essential oil are produced from the seeds. A greenish brown acid resin can also be found in the bark. *Pongamia pinnata* has *Tikta, Katu, Kashāya Rasa, Laghu, Thikshana* (penetrating) *Guna , Ushna Veerya, Katu Vipāka, Kapha Vāta Hara Dōshagnatā* (body humor condition).

Pongamia pinnata seeds are employed in the treatment of leprosy, bronchitis and chronic skin conditions because, according to a few studies, they exhibit antibacterial characteristics [13]. An earlier study on the phytochemistry of *Pongamia pinnata* revealed that the seeds contain a Pongal-derived flavone. Additionally, the structures of *Pongamia pinnata*'s Karangin and Pongal, which have antibacterial activity were clarified [14]. Leukoderma, leprosy, lumbago and muscular rheumatism are just a few of the inflammatory and infectious conditions that the seed and seed oil have been used to treat [15]. Another study discovered that while seed extracts had strong antibacterial activity, flower extracts had good antioxidant activity. It was also shown that kernel is less harmful to hemoglobin-producing cells than blossom. *Pongamia pinnata* can be added to creams and lotions to boost their antibacterial and antioxidant properties [16]. The samples were tested quantitatively using Lowry's method and the protein concentration was recorded (Flax seeds: 460 g, soapnut: 520 g, Pierre seeds: 470 g). The protein was extracted and purified using salt precipitation. The antibacterial efficacy of pierre, soapnut and flax seed protein extracts was assessed. The growth of 45 organisms that cause acne, such as *Staphylococcus epidermidis* and *Propionibacterium acnes*, was inhibited by the *Pongamia pinnata* seed extract at 8 mm and 10 mm, respectively. The Propionic bacterium acnes-causing organism was inhibited by the flax seed extract by 9 mm, while the dandruff-producing *Malassezia furfur* was inhibited by the soapnut extract by 5 mm. With a maximum zone of inhibition of 12 mm for *Staphylococcus epidermidis* and 21 mm for *Propionibacterium acnes*, respectively, *Pongamia pinnata* seed protein extract was found to be more effective. And research showed that extracts of seed proteins are substantially effective against organisms that cause acne. An anti-dandruff protein was discovered to be isolated from soapnut seeds. These days, microorganisms that cause acne and dandruff are the main dermatological issues affecting young people and the proteinaceous substance isolated from these seeds has demonstrated anti-microbial capabilities like anti-acne and anti-dandruff activities [17].

2.4. *Jasminum grandiflorum* (*Jāthi*)

A large, nearly glabrous, suberect, twining evergreen shrub with imparipinnately compound, opposite, terminal leaflets larger than the laterals, ovatelanceolate, acute or acuminate and lateral leaflets ovate leaves; fragrant white flowers in lax terminal and axillary cymes, long, linear calyx lobes and elliptic, globose berries that turn black when ripe fruits are produced. Benzyl acetate, benzyl benzoate, phytol, linalool, isophytol, geranyl linalool, methyl linoleate, and eugenol are among its chemical components. Whole plant is used and *Jasminum grandiflorum* has *Tikta, Kashāya Rasa, Laghu, Snigdha , Mrudu* (soft) *Guna, Ushan Veerya Katu Vipāka* and *Tridōsha Hara Karma*

Two species of Jasmines had their ethanol callus extracts tested for their antibacterial properties. Initial phytochemical study of the callus extracts revealed the presence of salicylic acid, alkaloids, glycosides, flavonoids, terpenes and glycosides. At dosages of 500 mg/ml and 250 mg/ml, the extracts were tested for their in vitro antimicrobial activity against a number of disease-causing bacteria, including *Salmonella typhi, Proteus mirabilis and Staphylococcus albus*. Antimicrobial activity testing results showed that all of the extracts had strong antibacterial activity [18]. To determine the effectiveness of *Jātyādi Taila*, which included *Jasminum grandiflorum* as one of its key constituents, a clinical trial was carried out. *Jātyādi Taila* appears to have been more successful in treating eczema in those 62.5% of patients [19]. The several *Jasminum grandiflorum* leaf extracts shown strong antibacterial activity. The ethanol extract of leaves showed a considerable zone of inhibition against *Escherichia coli* (21 mm) while the chloroform extract of leaves showed a remarkable zone of inhibition against *Bacillus subtilis* (25 mm). Diethyl ether extract showed a poor zone of clearance (8 mm) against Streptococcus species, while ethanol extract had a high zone of clearance against *Pseudomonas aeruginosa* and *Klebsiella pneumonia* [20]. The hot ethanol extract of *Jasminum grandiflorum* leaves, was found to have statistically significant antibacterial action against *Streptococcus mutans* and *Lactobacillus acidophilus* at lower doses. *Xanthomonas campestris*, a plant pathogen, and *Aeromonas hydrophila*, an animal pathogen, were both significantly inhibited by the fruit methanolic extract as compared to the standard used, with zones of inhibition of 18.33 mm and 13.66 mm at 100 g/ml, respectively [21]. The plant's extracts demonstrated medium to high action against the gram-positive *Enterococcus faecalis*, the gram-negative *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and Salmonella species, as well as the yeast *Candida albicans*. The absolute also displayed a little amount of action against Collectotrichum gloeosporioides' mycelial development. *Staphylococcus aureus* and *Escherichia coli* resistance to a polyherbal formulation created from the aqueous distillates of a combination of herbs including *Jasminum grandiflorum* was evaluated [22].

2.5. *Cocos nucifera* (*Nārikēla*)

A straight, unbranched, majestic palm with a crown of enormous leaves, growing up to 25 cm tall and usually with no branches. The inflorescence spadix has a hard, oblong, longitudinally splitting spathe that encloses numerous yellow or orange male flowers and few female flowers. The fruits are trigonously obovoid or subglobose green or yellowish fibrous drupes and the seed is one that is oval or spherical with a hard endocarp and an oily white endosperm as well as sweet milky or watery fluid in the large cavity. The oil is used as a carrier for numerous therapeutic oils and ointments and is sweet, aphrodisiac, digestive, insecticidal, trichogenous, aphrodisiac, appetizing and tonic. It is also helpful in strep throat, diabetes, bronchitis, cough consumption and hair graying. *Cocos nucifera* has *Madhura Rasa Guru, Snigdha Guna, Sheeta Veerya* and *Madhura Viapāka*.

3. Results and discussion

Dārunka is not a life-threatening illness, but it has great cosmetic value and can cause social problems in both sexes with an untidy appearance by causing irritation, itching, scale shedding and hair loss. As a result, many techniques and drugs were used to treat the ailment *Dārunaka* in the *Ayurvedic* classics. *Shirōabhyanga* (head massage), a straightforward and trouble-free process, is one of these treatments. *Madhura Rasa* accounts for 37% of the plants in Selected Herbal Formula, along with *Tikta* 25%, *Kashāya* 25%, and *Katu* 13%.*Madhura, Tikta*, and *Kashāya* stand out from that. It mostly possesses *Snigdha* (37%), *Guru* (18%), *Laghu* (18%), *Mrudu* (18%) and *Tikshana* (9%), according to *Guna*. *Ushna Veerya* and *Sheeta Veerya* both have a 50% share. Additionally, it primarily possesses 50% each of *Katu* and *Madhura Vipāka*. These elements in the chosen herbal remedy exhibit *Kapha Vāta Hara* when *Dōsha Karma* is taken into account. Actions of the *Kapha Pitta Hara* led to *Dārunakā's Samprapti Vighātana* (breaking of pathogenesis). *Vāta and Kapha Dōsha* vitiation is the primary cause of *Dārunaka. Rakta* (blood) and *Pitta* that have been poisoned might be of aid. One of the symptoms of *Dārunaka* is *Kandu*, which is brought on by things like the buildup of mala on the scalp. The final step in the removal of *Dosha, Abhishyandha* (sticky), *Swēda* (sweat), *Klēda* (moisture) and *Vriddha* (elevated) *Mala* from the body is *Katu Rasa. Swēdōvaha, Rasavaha*, and *Srōtasāvarōdha* (blocking channels) are eliminated. As *Āma Dōsha* (undigested food) is eliminated, *Klēda, Kandu* and *Krimi* (microorganisms) also vanish. Therefore, because of its *Kandūgna* and *Krimigna* (reduce worms) qualities, it relieves *Dārunaka* by removing *Kandu* and eliminating *Krimi. Katu Rasa* provides overall relaxation by calming vitiated *Kapha*.

Tikta Rasa functions similarly to *Krimigna, Vishāpaha* (reduce toxins), which calms vitiated *Kapha* and *Laghu* in nature. As a result *Katu, Tikta Rasa Ushna Veerya* and *Taila's Kaphahara* property serve to calm *Kapha* and lessen the *Kandu* symptom in *Dārunaka*. *Abhyangadvēshsa* (not massaging) and other *Vāta*-vitiating *Nidāna* (causes), which results in roughness of the scalp, are the cause of *Rūkshata* in *Dārunaka*. By using the oil's *Snigdha Guna, Rūkshata* is calmed. The vitiated *Vāta Dōsha* in *Dārunaka* is what causes *Tvak Sphūtana*. The drug's *Ushna Virya* aids in calming vitiated *Vāta Dōsha. Tvak* and tissue stability provided by *Tikta Rasa* may aid in lowering the incidence of *Tvak Sphūtana* in *Dārunaka. Tikta Rasa* calms and dries *Pitta* since it has *Rūksha* qualities. As a result, the related *Dāha* (burning), *Rāga* (redness) calms down.

Another symptom of *Dārunaka* is shedding of hair in *Dārunaka*. The lack of *Snigdhatā* brought on by vitiated *Vāta* in *Dārunka* may be the cause of hair loss. Due to their extreme dryness, the hair becomes short, thin, and prone to falling out, making them dull and coarse. By virtue of its *Snigdha Guna, Tikta Rasa* and *Vāta Kaphahara* properties, this *Taila* decreases hair loss. *Pitta Dōsha* is calmed by the *Rūksha* quality of *Tikta Rasa*, which also dries out vitiated *Pitta Dōsha*. The drug's *Ushna Veerya* is in charge of calming vitiated *Vāta Dōsha*, which lessens hair loss. Another manifestation of *Dārunaka* is *Dāruna* (difficulty in tolerating).This is brought on by vitiated *Vāta,* which lacks *Snigdha Guna*. In order to balance *Vāta* and *Kapha Dōsha, Katu Rasa Snigdha Ushna Veerya* is used. Additionally, vitiated *Vāta* and *Kapha Dōsha* are the cause of *Svāpa* (sleepiness). Due to its *Snigdha Guna Tikta Rasa* and *Vāta Kaphahara* properties, this lowers *Svāpa.*

The medications included in the chosen herbal formula are readily and affordably available and they offer properties such as *Kaphavatāhara, Kushtagna* (reduce skin diseases), *Krimigna, Kanduhara* (reduce itching) and *Kēshya* (grow hair) that are useful for treating *Dārunaka*. Due to *Taila's* mode of action as *Shirōabhyanga,* the scalp's blood circulation is increased, exchanging dirty blood for fresh blood. So it is abundantly obvious that the plants in the selected Herbal Formula include *Panchapadārta* (five elements), which is more efficient in the management of *Dārunka*. Additionally, the component of the chosen herbal mixture has an equal level of antifungal, antibacterial and antihelmintic activity. Recent studies have also demonstrated that all of these medications have anti-inflammatory, antifungal, antibacterial and anthelmintic properties

In addition to these effects, its chemical composition is crucial for managing *Dārunaka*. The chosen herbal formula contains plants that are rich in flavonoids, saponins, tannins, phenols and glycosides. Salicylic acid and sulfur are examples of keratolytic drugs that soften, dissolve and release adherent scale that is found in dandruff as well as loosen adhesion between corneocytes. Because there is a high concentration of oleic acid in the oil, water loss from the hair is prevented, leaving it smooth and malleable. It is also known to shield hair from fading in color and being damaged by the sun. This is a result of the oil's pongamol and Karanjin components, which function as UVA and UVB sunscreens.

Additionally, it guards against scalp-related issues like dandruff, itching and eczema. Ascorbic acid, which is present in *Jasminum grandiflorum* leaves, aids in the fight against scalp bacteria. It prevents dandruff, aids in clearing out follicular debris and promotes the development of new hair. Because of its antiviral qualities, it also relieves dryness and itchiness in the scalp.
Therefore, it has been demonstrated that the plants in a particular herbal combination are appropriate for the management of *Dārunka* using both modern and *Ayurvedic* principles.

4. Conclusion

According to literature review and data analysis the Plants in the selected herbal formulation is effective in the management of *Dārunaka.*

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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