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KATU TAILA IN THE MANAGEMENT OF PADADARI: AN AYURVEDIC AND ANALYTICAL REVIEW

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ABSTRACT

Taila Kalpana is a pivotal dosage form in Ayurveda, widely recognized for its unctuous, penetrative, and wound-healing properties, making it effective in managing various skin disorders. Among these, *Katu Taila* (mustard oil), derived from *Brassica campestris Linn.*, is traditionally used for treating *Padadari* (cracked heels), a common dermatological concern categorized under *Kshudra Roga*. Classical texts like *Sushruta Samhita*, *Bhava Prakasha*, and *Bhaishajya Ratnavali* emphasize its therapeutic role. *Katu Taila* possesses *Ushna*, *Snigdha*, and *Tikshna* qualities, aiding in alleviating *Vata* aggravation—the primary cause of *Padadari*. Its phytochemical profile, rich in fatty acids, sinigrin, and allyl isothiocyanate, contributes to its anti-inflammatory, antimicrobial, and antioxidant effects. *Murchita Katu Taila*, prepared with herbs like *Amalaki*, *Haridra*, and *Manjishta*, further enhances its therapeutic efficacy. Analytical studies confirm its compliance with API standards, supporting its quality and stability. Classical formulations combining *Katu Taila* with agents like *Sarjarasa*, *Saindhava Lavana*, and *Ghrita* are frequently mentioned for *Padabhyanga* and topical applications. Clinical evidence suggests promising outcomes in the management of cracked heels. This review highlights the potential of *Katu Taila* as a cost-effective and accessible remedy, warranting further clinical research to validate its efficacy and broaden its application in dermatological care.

Keywords: *Katu Taila, Padadari, Chemical Constituents, Physico-chemical study, Kshudra Roga*.

INTRODUCTION:

Taila Kalpana is a significant dosage form referenced in classical Ayurvedic literature and is practiced globally. Its unctuous nature, along with wound healing, penetrative, and emollient properties, renders it highly beneficial in managing various dermatological conditions and maintaining skin health. Among these, *Katu Taila* is a commonly employed formulation for diverse medical indications. One notable application includes the treatment of *Padadari* (cracked heels), which is regarded as one of the most prevalent cosmetic concerns classified under *Kshudra Roga* across texts such as *Sushrutha Samhitha, Bhava Prakasha, Vangasena, Gadanigraha, Bhaishajya Ratnavali, Yogaratnakara, and Chakradatta* (1). Classical texts, including *Bhava Prakasha* and *Ashtanga Hrudaya*, also describe *Katu Taila* in detail. Murchita Katu taila was first describes in *Bhaishajya Ratnavali*.

Katu Taila, also known as *Sarshapa Taila or Katu sneha*, is derived from the seeds of the plant called *Brassica Campestris Linn* (Brassicaceae) which is distributed world-wide (2). It is renowned for its anti-inflammatory, antimicrobial, and antioxidant activities, and is rich in phytochemicals such as fatty acids, phenols, flavonoids, saponins, and terpenoids (3). Building on these properties, this review explores the therapeutic potential *of Katu Taila* in the treatment of *Padadari* and emphasizes its physicochemical characteristics, which may pave the way for future clinical investigations.

MATERIALS AND METHODS:

Classical references of *Padadari* and *Katu taila* were collected from *Sushrutha Samhitha, Bhava Prakasha, Vangasena, Gadanigraha, Bhaishajya Ratnavali, Yogaratnakara, Ashtanga Hrudaya and Chakradatta.*

Drug Procurement: *Katu taila* was procured from KLE Khasbhag Pharmacy, Belagavi, Karnataka, and tested for its Organoleptic and Physico-chemical analysis in Central Research Faculty, KLE Shri BMKankanwadi Ayurveda Mahavidyalaya, Shahapur, Belagavi, Karnataka.

DRUG REVIEW

SARSHAPA

SYNONYMS - *Tantubha, Siddhartha, Gourasarshapa, Tikshnagandha, Dumbara, Bhogi, Rakshoghna, Vijayapaha, katukah, Katusneha, Bhutaghna, Rakshitaphala, Kandughna, Rajikaphala, Citrala, Krishnika & Asuri*.

TYPES – *Goura Sarshapa* or *Siddhartha* or *Sweta Sarshapa* (4), *Krishna Sarshapa or Rajika* (5), *Rakta Sarshapa (6).*

It belongs to the family Cruciferae and the genus Brassica.

There are mainly three species of mustard (7)

Table 1: Botanical names of mustard species

S.NO	SPECIES	LATIN NAME
1	Yellow/white mustard	*Sinapis alba*
2	Oriental mustard	*Brassica juncea*
3	Black mustard	*Brassica nigra*

VERNACULAR NAMES:

English – Mustard

Hindi – Sarson or Rai

Kannada – Sasive

Telugu – Avaalu

Tamil – Kadugu

Marati - Shirashi, Salagam, Rayi, Mohari

Bengali – Sarisha

Punjabi – Sareya

TIME OF COLLECTION:

Leaves & Stem – Collected in the Vasanta Rtu.

Oil- Collected in the Hemanta Rtu

Table 2: *Rasapanchaka* of *Sarshapa* according to various classic texts

Rasapanchaka	***K. Ni***	***Bh. Ni***		***Dh. Ni***	
	Sarshapa	*Goura Sarshapa*	*Krishna Rajika*	*Goura Sarshapa*	*Krishna Sarshapa*
Rasa	*Katu, Tikta*	*Katu, Tikta*	-	*Katu*	*Katu, Tikta*
Guna	*Tikshna, ruksha, ushna*	*Ushna, Snigdha, Tikshna*	*Ruksha, Tikshna*	*Snigdha*,	-
Virya	*Ushna*	*Ushna*	*Ushna*	*Ushna*	*Ushna*
Vipaka	*Katu*	*Katu*	-		-
Karma	*Rakta pitta agni vardhaka.*	*Rakta pitta agni vardhaka*	*Rakta pitta agni vardhaka*	*Rakshogna*	*Ruchya, Harmful to drushti and Basti regions*.

- In *K. Ni Sarshapa* is mentioned under *Aushadi varga* and *Dhanya varga.* And the *Sarshapa Shaaka* possess *Vidahi, Ruksha, Madhura, Katu, Kshara*, and *Grahi* which is same as *Rakta Sarshapa*.
- In *Bh. Ni* the reference is mentioned under *Dhanya varga. Sarshapa Naala* is mentioned under *Saaka varga.*
- In *Dh. Ni*, *Rajika* is termed as *Rajakshavakaha,* also opined that the *Goura Sarshapa* is similar to *Rakta sarshapa.*

K. Ni – *Kaiyadeva Nighantu*, Dh. Ni – *Dhanwantara Nighantu*, Bh. Ni – *Bhavaprakasha Nighantu*

INDICATION (8, 9, 10)

Sweta Sarshapa – Kushta, Kandu, Kantaroga, Graharoga, Krumi, Ama, Shruthi, Shirshaanilarti, Pleeharoga, Shoola

Krishna Sarshapa – Kaphaja Gulma, Sopha, Kushta

Rakta Sarshapa - According to *Bhava Prakasha, Sweta Sarshapa* is similar to *Rakta Sarshapa,* however*, sweta sarshapa* is termed as superior in quality.

PHARMACOLOGICAL ACTIONS: Anti-inflammatory, antioxidant, anti-cancerous, anti-obesity, anti-bacterial, anti-viral, anti-fungal, anti-hyperglycaemia, and anti-depressant. (11)

Table 3**:** Classical categorization of *Sarshapa* **(12, 13, 14, 15, 16, 17, 18)**

Classical Texts	***Varga***
Charaka Samhita	*Kandugna, Asthapanopaga, Shiro virechanopaga*
Sushrutha Samhita	*Pippalyadi*
Ashtanga Hrudaya	*Kandughna, Pippalyadi*
Bh. Ni & K. Ni	*Dhanya*
Dhanwantara Nighantu	*Karaveeradi*
Raja Nighantu	*Shalyadi*

MORPHOLOGICAL DESCRIPTION OF MUSTARD SPECIES (19)

Several species of mustard are cultivated globally for various purposes, including as oilseeds, leafy vegetables, and fodder crops. *Sinapis alba*, commonly referred to as white mustard, is widely grown in regions such as Canada, the United Kingdom, the Netherlands, Japan, Italy, Denmark, North Africa, and the United States. The plant is characterized by its long, branched, and hairy foliage, along with small, yellow flowers arranged in a cruciform pattern. Its fruits are enlarged at the seed-bearing regions, with seeds measuring approximately 1.5–3 mm, enclosed by two cotyledons and not easily discernible to the naked eye.

Brassica juncea, commonly known as Indian mustard or "*Rai*," is believed to have originated from a hybridization event between Brassica campestris and Brassica nigra, with its primary domestication in China and subsequent spread to northern India. This species bears small seeds containing up to 35% oil and features bright yellow flowers.

Brassica nigra, or black mustard, is native to southern Europe. The plant typically grows up to 1 meter tall and is distinguished by its green, hairy foliage and smooth, four-angled fruits. Its seeds are dark reddish-brown to black, distinctly different in appearance from those of brown mustard, and are noted for their stronger pungency compared to white mustard**.**

Table 4: Chemical constituents of *Sarshapa* **(20)**

Mustard Species	**Chemical Constituents**
White or Yellow Mustard (*Sinapis alba*)	*p*-hydroxy benzyl-isothiocynate, p-hydroxy benzylamine.
Brown Mustard (*Brassica juncea*)	Glucosinolate, sinigrin, sinapine, methyl isopropyl, *sec*-butyl, 3-butenyl, 4-pentenyl, butyl, phenyl, benzyl, 3-methylthopropyl, beta-phenylethyl isothiocyanates and fixed oils such as eicosenoic, glycerides of erucic, arachidic, behenic, oleic and palmitic acids.
Black Mustard (*Brassica nigra*)	Same as *Brassica juncea,* Sinirgrin being predominant.

KATU TAILA* OR *SARSHAPA TAILA

Katu taila is mentioned in *Bhava Praksha* (*Taila varga* 19/10,11,12) and *Ashtanga Hrudaya* (*Sutrasthana* 5/59).

Brassica nigra, or black mustard seeds, are macerated in warm water and then water-distilled to extract the oil. Due to the hydrolysis of glucosides in the seeds, sulphur-containing essential oils are present, giving the oil its distinctive smell. The quantity of fatty acids in an oil determines its health. The volatile oil content of yellow mustard seeds may be lower or non-existent. (21)

VERNACULAR NAMES

Tamil: Kadugu ennai

English: Mustard Oil

Kannada: Saasve Enne

Malayalam: Kadugu enna

Hindi: Sarso Ka Tail

Telugu: Avanune

Synonyms: Sarshapa Taila, Katu Sneha

***Rasa Panchaka* (22, 23)**

Rasa: *Katu, Tikta*

Guna: *Laghu, Snigdha, Tikshna*

Virya*: Ushna*

Vipaka*: Katu*

Doshagnata*: Vatakaphahara*

Karma*: Lekhana, Pittaraktakara, Medogna, shirakarnamayapaham.*

Rogagnata*: Kandu, Kushta, Krimi, Arshas, Shwithra, Kota, Dushtakrimi, Mutrakrichra, Vrana.*

KATU TAILA MURCHANA: (24)

Katu taila murchana was first mentioned in *Bhaishaya Ratnavali* in *Jwara Cikitsa***.** Initially it was mentioned in Chakradatta Ratnaprabha, but it was not explained elaboratedly. The other references are found in *Sharangadhara Samhitha*, *Bharat Bhaishajya Ratnakara* and *Bruhat Yoga Tarangini*.

Table 5: Drugs used in *Murchana* of *Katu taila*

Sl. No	Drug	Latin name	Part used	Quantity
1	*Amalaki*	*Euphorbia officinalis*	Pericarp	*2 Karsha*
2	*Haridra*	*Curcuma longa*	Rhizome	*2 Karsha*
3	*Musta*	*Cyprus rotendus*	Rhizome	*2 Karsha*
4	*Bilva*	*Aegel marmelose*	Fruit	*2 Karsha*
5	*Dadima*	*Punica granatum*	Fruit	*2 Karsha*
6	*Nagakesara*	*Mesua Ferra*	Stamens	*2 Karsha*
7	*Krishna Jeeraka*	*Veronia anthelmentica*	Fruit	*2 Karsha*
8	*Ushira*	*Vettivera zizynoidis*	Whole plant	*2 Karsha*
9	*Nalika*	*Cinnamomum zeylanicum*	Bark	*2 Karsha*
10	*Vibhitaki*	*Terminalia chebula*	Pericarp	*2 Karsha*
11	*Manjishta*	*Rubia cordifolia*	Stem	*2 Pala*
12	*Sarshapa Taila*	*Brassica compestris*	Seed oil	*1 Prasta*
13	Water			*1 Adhaka*

Procedure: Heat the *Katu taila* until the froth disappears. Add 1 Adhaka of water along with the fine powders of drugs mentioned above from 1 to 11. Boil in *mandagni* until the *taila siddha lakshanas* attain. Later, filter it and store for further usage.

ANALYTICAL STUDY OF *KATU TAILA*

Test was performed under Form-50 [Rule 160-D (f)], *The Drug & Cosmetic Act* 1940.

Table 6: *Organoleptic characteristics* of *Katu taila*

Tests	Results
Colour	Golden Yellow
Odour	Distinct
Form	Taila

Table 7: Physico-chemical Standards of *Katu taila*

Tests	Results
Loss on Drying at 110 C	0.088%
Refractive Index at 40 C	1.470
Acid Value	3.837
Iodine value	100.48
Saponification value	196.69
Rancidity Test	Negative
Specific Gravity at 15 C	0.910
Microbial Limit Test	No Growth

Total Bacterial growth Total Fungal Growth	

The above-mentioned values are as per API standards. (25)

DISCUSSION.

Mode of Action of *Katu Taila* in the Management of *Padadari*

Katu Taila is recognized as a potent therapeutic agent in Ayurvedic dermatology, valued both for its pharmacodynamic attributes and its rich phytochemical profile. *Padadari*, classified under *Kshudra Rogas* in Ayurveda, often manifests as painful fissures or cracks in the heels, primarily due to aggravated Vata dosha. This aggravation is commonly observed in individuals who frequently walk barefoot, consume excessively dry foods, or have inadequate hydration. Prolonged exposure to such factors results in excessive dryness (*Rukshata*), hardening of the skin, and in some cases, the formation of a callus. Continuous contact with water can also contribute to similar symptoms (26).

Classical Ayurvedic texts including *Sushruta Samhita*, *Bhava Prakasha*, *Vangasena*, *Gada Nigraha*, *Bhaishajya Ratnavali*, and *Yogaratnakara* outline various therapeutic protocols for *Padadari*. Among these, *Padabhyanga* (therapeutic foot massage) and proper moisturization of the feet are emphasized as essential practices.

Katu Taila plays a vital role in this context due to its inherent qualities—Ushna (hot), Snigdha (unctuous), and Tikshna (penetrating). These attributes help counter the *Rukshata* and rigidity associated with *Vata* vitiation, promoting skin softness, improving circulation, and facilitating deeper tissue absorption of active compounds. Additionally, the *Katu* (pungent) and *Tikta* (bitter) tastes contribute to its *Lekhana* (scraping) action, which aids in exfoliating dead skin and enhancing skin cleansing and regeneration.

From a phytochemical perspective, mustard oil contains key bioactive compounds such as sinigrin and allyl isothiocyanate, which exhibit antimicrobial, anti-inflammatory, and antioxidant properties. These help in minimizing microbial invasion and reducing local inflammation. Compounds like erucin and oleic acid offer emollient and reparative benefits, promoting skin hydration and tissue regeneration. Furthermore, linoleic acid and alpha-linolenic acid help to maintain the skin's moisture barrier and support wound healing by preventing trans epidermal water loss (27).

Other constituents including tocopherols (Vitamin E), carotenoids, palmitic acid, polyphenols, and condensed tannins function as antioxidants and detoxifying agents, collectively enhancing the healing environment of the skin (28).

Formulations & *Padabhyanga* containing *Sarshapa* or *Katu taila* in treating *Padadari* (29, 30, 31, 32, 33, 34, 35)

- *Bhaishajya Ratnavali – Padabhyanga* is mentioned, where *Katu taila* can be used. Lepa preparation with *Kalka* of *Sarjarasa, Saindava* Lavana mixed with *Madhu, Ghrita* and *Katu taila*.

Upodika Taila application – *Sarshapa* is one of the ingredients.

- *Yogaratnakara – Snehana* and *Lepa* preparation with *Kalka* of *Sarjarasa, Saindava* Lavana mixed with *Madhu, Ghrita* and *Katu taila.*

Upodika taila application.

- *Chakradatta – Pada Pramarjana* with *Sarjarasa, Saindava* Lavana mixed with *Madhu, Ghrita* and *Katu taila.*

Upodika Kshara Taila application.

- *Vangasena* – Powders of *Sarjarasa, Saindava* Lavana mixed with *Madhu, Ghrita* and *Katu taila.*

Upodika taila & *Unmatta taila (*Application of *katu taila* cooked with *dhattura* juice and alkali water of *manaka).*

- *Gada nigraha - Lepa* preparation with *Kalka* of *Sarjarasa, Saindava* Lavana mixed with *Madhu, Ghrita* and *Katu taila.*
- *Sushruta Samhitha – Padabhyanga, Lepa* Containing *sarshapa* seeds with other herbal drugs.
- *Bhava Prakasha* - Powders of *Sarjarasa, Saindava* Lavana mixed with *Madhu, Ghrita* and *Katu taila.*

Unmatta taila Application.

Physico-chemical Analysis

Organoleptic characteristics include colour, odour, and physical form. In this case, the substance exhibited a golden-yellow hue, emitted a distinctive odour, and had the typical consistency of *taila* (oil).

Loss on Drying:

The results were found to be 0.088% which infers that the sample doesn't have moisture content in it.

Refractive Index:

The refractive index of the sample is 1.470 which shows the purity of the taila and the concentration of the substance dissolved in it.

Acid Value:

The acid value of *Katu taila* is 3.837 which shows that there's no increase of free fatty acids present in the *taila*.

Iodine Value:

The iodine value of the sample is 100.48 which shows that the sample is not susceptible for oxidation.

Saponification Value:

The saponification value is found to be 196.69 which infers that the product is more stable for further use.

Rancidity test:

The oil is checked for Rancidity and found to be negative.

Microbial Limit Test:

No growth was observed.

With the above-mentioned tests and results, *Katu taila* can be further taken for future use.

Previous Research works on *Padadari* on Application of *Katutaila*

Dr Sunil a. Arali has done a clinical study on "A Comparative Clinical Study of *Grithayavakshara Lepa* and *Katutaila* in Management of *Padadari* W.S.R Rhagades" and concluded that the application of *Katu taila* as well as *Ghritayavaksharadi lepa* together provided the best results on foot crack (36).

CONCLUSION

The diverse activity and convenient availability contribute to a powerful therapeutic choice for *Padadari* control. In this situation, its incorporation into both traditional and modern protocols may provide a long-term and affordable solution. As there are no much supportive articles on the review of *Sarshapa*, and S*arshapa taila* in the use of *Padadari*, this study will serve the purpose. The analytical findings support the future clinical studies.

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