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STANDARDIZING AND ASSESSING THE SIGNIFICANCE OF ARKADUGDHA IN KARANJADI TAIL: A REVIEW

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ABSTRACT

Agadtantra is a branch of *Ashtang* Ayurveda, dedicated to the Ayurvedic understanding of toxicology, specifically addressing *Nidana* and *Chikitsa* related to various natural and synthetic poisons. This article explores the classification of *Arka* within the *Upavisha Varga*, as documented in the *Rasatarangini* and *Rasaratnasamucchaya*, and its therapeutic applications for *Kapha-Vataja* disorders, including *Shwasa*, *Kasa*, and *Kushtha*, due to its beneficial properties such as *Snigdha* and *Ushna Virya*. Additionally, *Karanjadi Taila*, derived from the *Karanj* tree (Millettia pinnata), is examined for its anti-inflammatory and antibacterial effects, particularly in the treatment of skin conditions like *Visarpa* and eczema, as referenced in the *Bhaishajya Ratnavali*. A key component of this formulation, *Arkadugdha*, is identified as a unique phytochemical with promising therapeutic potential. Ongoing research aims to extract and characterize *Arkadugdha*, enhancing our understanding of its properties and applications. This review consolidates current knowledge on the significance of *Arkadugdha* in *Karanjadi Taila*, highlighting the intersection of traditional Ayurvedic practices and modern scientific research in promoting holistic health solutions.

KEYWORDS: *Karanjadi Tail, Arkadugdha, Agadtantra, vicharchika.*

INTRODUCTION

Agadtantra is a crucial branch of Ashtang Ayurveda that focuses on the Ayurvedic perspective of toxicology, specifically addressing the Nidana and Chikitsa related to poisoning from various Sthavara and Jangama sources, as well as synthetic poisons.[1] *Arka*

is classified within the Upavisha Varga in both Rasatarangini[2] *and Rasaratnasamucchaya.*[3] *It serves as an effective remedy for Kapha-Vataja disorders but can increase Pitta levels. It is particularly beneficial for conditions such as Shwasa, Kasa, Aruchi, Gulma, Kushtha, Udarroga, Kandu, and Vrana. Its properties include Snigdha, Laghu, Tikta, and Lavana Rasa (Arkadugdha), as well as Katu, Tikta (Mulatwaka), and Ushna Virya.*[4]

Karanjadi Taila is mentioned in *Bhaishajya Ratnavali* under *Visarparogadhikar* which is indicated for *Visarpa*, *Visphota*, and *Vicharchika* (eczema). *Karanjadi* Tail, an esteemed formulation in traditional herbal medicine, is derived from the seeds of the *Karanj* tree (Millettia pinnata). Renowned for its therapeutic properties, this oil is primarily utilized for its potent anti-inflammatory and antibacterial effects. Its application in promoting skin health and its role in alleviating various ailments have garnered significant attention in both traditional and contemporary healthcare practices.

The key ingredient in *Karanjadi* Tail that has garnered significant attention is *Arkadugdha*, a unique and understudied compound found in the plant. *Arkadugdha*, a compound of particular interest in *Karanjadi* Tail, is a unique and understudied phytochemical that has demonstrated promising therapeutic potential. The extraction and characterization of *Arkadugdha* have been the subject of ongoing research, as researchers seek to better understand the properties and potential applications of this intriguing compound. This review aims to consolidate the current understanding of *Arkadugdha*, its significance in *Karanjadi* Tail, and the efforts undertaken to standardize its assessment and harness its therapeutic value.

Literature review

Karanjadi taila

For *Vicharchika* (Eczema), *Bhaishajya Ratnavali* has mentioned *Karanjadi* Tail. Certain ingredients found in *Karanjadi* Tail, such as *Gomutra* (cow urine), *Bhrungaraj* (Eclipta alba), *Snuhi* (Euphorbia 5 nerifolia linn.), and *Hridra kanda* (Curcuma Longa), also have a *Vishaghna* effect.

करंजसप्तच्छदलांगलीक्स्नुहयार्क दुग्धनलभृंगराजैः

तैल निशामुत्रविषैर्विपक्वं विसर्पविस्फोटविचर्चिकघ्नम् (भै. र. विसरोगाधिकार २४ - २५)

Ingradients of karanjadi tail

Sr. No.	Sanskrit Name	Latin Name	Family	Proportion used
1	*Karanjadia*	If well-known herbal medicines are formulated into a new mixture, however, the requirements for proof of safety and efficacy should take into account the well established uses of each herbal medicine. Pongamia pinnata	Leguminocae	1
2	*Saptparna*	Alsatonia scholaris	Apocynaceae	1
3	*Langli*	Gloriosa superba	Liliaceae	1
4	*Snuhi*	Euphorbia nerifolia linn.	Euphorbiaceae	1
5	*Arka*	Calotropis procera	Aclepidaceae	1
6	*Chitraka*	Plumbago Zeylanica	Plumbaginacae	1
7	*Bhrungaraja*	Eclipta alba	Compositaceae	1
8	*Haridra*	Curcuma Longa Linn.	Zingiberacae	1
9	*visha*	Aconitaum Ferox	Ranunculaceae	1
10	*Gomutra*			4
11	*Til tail*	Sesame Oil		4

Properties of karanjadi tail

Sr. No.	Sanskrit Name	Rasa	Guna	Virya	Vipaka	Doshghnata	Upavishisha/ Visha	Vishaghna/ Vishahara	Prabhav
1	*Karanjadia*	Tikta, katu, kashay	laghu, tikshna	Ushna	Katu	Kapha-Vaat	-	-	-
2	*Saptparna*	Tikta, kashay	Laghu, snigdha	Ushna	Katu	Kapha-Pitta Tridoshaghna	-	-	Vishamjwaraghna
3	*Langli*	Katu, tikta	Laghu, tikshna		Katu	Kapha-Vaat	Upavisha		Garbhapatan
4	*Snuhi*	Katu	Laghu, tikshna,		Ushna	Kapha-Vaat	Upavisha	Vishaghna	
5	*Arka*	Katu, tikta	Laghu, ruksha, tikshna	Ushna	Katu	Kapha-Vaat	Upavisha	Vishaghna	-
6	*Chitraka*	katu	Laghu, tikshna	Ushna	Katu	Kapha-Vaat	`	`	`
7	*Bhrungaraja*	Katu, Tikta	Ruksha, Laghu	Ushna	Katu	Kapha-Vaat			
8	*Haridra*	Tikta, Katu	Laghu, ruksha	Ushna	Katu	Tridosha		Vishaghna	`
9	*Visha*	Madhur	laghu, ruksha, tikshna, Vyavai, Vikasi	Ushna	Madhur	Tridosha	Visha		
10	*Gomutra*	*Katu, Tikta, Kashay*	*Ushna, Tikshana*	Ushna	Katu	Kapha-Vaat	-	Vishaghna	-
11	*Til tail*	Madhur, Kashay, Tikta	Guru, Vikasi, Vishad, Vyavayi, Sara, Sukshma, Tikshna, Ushna.	Ushna	Madhur	Vaat-Kapha	-	-	-

Drug Review – *Arka*

Arka is one of the main constituent in karanjadi tail, which is traditionally used in *Ayurvedic* and Unani systems of medicine and described as *Visha* in *Agadtantra*.

Scientific name : Calotropis procera
Kingdom : Plantae
Class : Dicotyledones
Division : Gamopetalae
Order : Gentianales
Family : Asclepiadaceae
Genus : Calotropis
Species : Procera

Nighantu	***Rasa***	***Vipaka***	***Virya***
BhavaprakshNighantu[5]	*Katu, Tikta*	*Katu*	*Ushna*
Raj Nighantu[6]	*Katu*	*Katu*	*Ushna*
DhanvantariNighantu[7]	*Katu*	*Katu*	*Ushna*

Classical categorisation

Charaka - *Bhedaniya, Vamnopaga, Swedopaga*

Sushruta - *Arkadi, Adhobhagahara*

Vagbhata – *Arkadi*

The latex contains calotropin, α-calotropeol, 3-epimoretenol, gigantin, giganteol, isogiganteol, α-lactuceryl acetate, α-lactuceryl isovalerate, lupeol, proceroside, proceragenin, syriogenin, taraxast-20α- (30)-en-(4-methyl- 3-pentenoate), 3'-thiazoline cardenolide uscharidin, uzarigenin, voruscharin and β-sitosterol, powerful bacteriolytic enzyme in latex.[8] The latex contains 11-23% rubber, the triterpenoids α- and β-amyrin, lupeol, taraxasteryl acetate, α-and β-calotropeol, 3-epimoretenol, multiflorenol, cyclosadol, several triterpene esters, the sterols β-sitosterol and stigmasterol, the non-toxic cysteine proteases calotropin, procerain and procerain-B and the alkaloid choline.[8]

Fresh latex of C. procera was screened for antifungal activity against dermatophytes: Trichophyton spp., Microsporum spp., and Epidermophyton spp. The result shows Trichophyton spp. being the most susceptible followed by the Microsporum spp. and Epidermophyton spp. were least inhibited.[9]

Case reports about toxicity of calotropis

Ramya Iyadurai et al. reported a patient who experienced cardiovascular collapse after a traditional healer administered calotropis orally and topically to treat a snake bite. The toxidrome of this patient did not fit into the clinical presentation of any of the big four snakes associated with snake envenomation in our country.[10]

Shrikant Waikar, V. K. Shrivastava reported a series of 16 instances of calotropis-induced ocular toxicity that occurred over the course of three weeks. The common features in all cases were delayed diminution of vision over a period of 2-4 hrs, absence of pain after initial burning sensation, inferior conjunctival staining and corneal oedema with Descemet's membrane folds.[11]

Oral mucosa injury following ingestion of latex has been reported. The patient presented immediately following ingestion of the toxic dose of latex manifested with features of gastritis.[12]

In case series from Nalgonda in south India among 60 patients with Calotropis poisoning, most of the patients presented with abdominal pain (25%), hepatitis (16.6%), stomatitis (20%), vomiting (13.3%), diarrhea (10%), hyperkalemia (5%), tachycardia (8.3%), convulsions (1.6%). There was no mortality in this case series.[13]

Medico legal aspect[14,15, 16,17]

1) Roots of C. procera are poisonous to cobra snakes. Its root is used by snake charmers to frighten snakes away or to control them.
2) It can be used as cow poison by combining it with feed or by placing a cloth covered in the juice inside the rectum of animals.
3) The juice is applied on the skin to produce chemical lesion to bring a false charge of assault on an enemy.
4) Latex is sometimes used as a depository and arrow poison. For a criminal abortion, the juice is ingested or inserted into the uterus using an abortion stick, sometimes used for infanticide.
5) *Madar* juice is used by tanners for removing hair from skin which is also imparts a yellow color to skin and destroys offensive odour of fresh leather.
6) Accidental poisoning may sometimes occur from an overdose of medicinal preparation of *Madar* administered by quacks.

MATERIAL AND METHODS

To gather a comprehensive understanding of *Arkadugdha* and its significance in *Karanjadi Tail*, this review involved an extensive examination of the existing scientific literature. A systematic search was conducted across various electronic databases, including PubMed, Embase, and Cochrane Library, using keyword combinations such as *Arkadugdha, Karanjadi* Tail. *Shodal Nighantu, Madanadi Nighantu, Kaydeva Nighantu, Madhava Dravyaguna* were referred for details about the properties of *Arkadugdha*, to know the details about toxic effects and medicoleagal aspects, the modern book of forensic medicine and toxicology was also referred. Details about the contents of *Karanjadi taila* and its indication in various skin diseases were reffered from *Bhaishajya ratnavali*.

OBSERVATION AND RESULT

Microscopic characters of *arka* leaves: Transverse section of midrib showed upper and lower single layered epidermis, externally occurred with thick, few epidermal cells of both surface, 2 to 3 cells trichomes, epidermis followed by 3 to 8 collenchyma, parenchymatous cells thin walled, vascular bundle, xylem consist of mostly vessels and tracheids, lamina dorsiventral mesophyll differentiated into a palisade and spongy tissue, upper and lower epidermis covered externally closely arranged palisade parenchyma cells, spongy parenchyma, vascular bundle also present in scattered in this region.

Evaluation of physical constant: Physical constant have a major role in identification and purity determination of crude drugs. In the present study, physical constants such as total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive values were evaluated as per standard protocol.

Analytical parameters of *arka* leaves

Sr. no.	Test	Result
1.	Description	Leaf sub sessile, 6 to 15 cm by 4.5 to 8 cm, broadly ovate, ovate-oblong, elliptic
2.	Foreign matter	0.48 % w/w
3.	Total Ash	8.40 % w/w
4.	Acid Insoluble Ash	0.23 % w/w
5.	Water Soluble Extractive	26.25 % w/w
6.	Alcohol Soluble Extractive	6.94 % w/w

Analytical parameters of *arka dugdha*

Sr. no.	Test	Result
1.	Description	White coloured milky liquid
2.	Moisture	92.14 %w/w
3.	Total Solid	7.86 %w/w
4.	Ph	5.61
5.	Weight per ml at 25^0C	1.0258 g/ml
6.	Total Ash	1.58 % w/w
7.	Acid Insoluble Ash	0.20 % w/w

The *Dugdha* of *Arka* is highlighted in the *Madanadi Nighantu* for its effectiveness in treating conditions such as *Krimi*, *Arsha*, *Kushtha*, and *Udara*. Additionally, the *Shodal Nighantu* emphasize its applications in managing *Kushtha*, *Gulma*, and *Shwitra*, alongside therapeutic methods like *Vamana* and *Virechana*. Together, these ancient texts illustrate a holistic approach to Ayurvedic treatment, showcasing the significance of *Dugdha* from *Arka* in addressing diverse health challenges.

DISSCUSSION

Arkadugdha plays a significant role in Karanjadi Tail, enhancing its therapeutic properties. The therapeutic qualities of Arkadugdha, which include its soothing and healing effects, complement the other ingredients in Karanjadi Tail. It helps promote skin health and aids in wound healing, making it particularly valuable for conditions like Shwitra and Vrana, as noted in the Shodal Nighantu. Furthermore, the qualities of Arkadugdha, such as its Snigdha (unctuous) and Laghu (light) Guna, contribute to the oil's overall absorption and effectiveness when applied topically.

Inclusion of Arkadugdha in Karanjadi Tail adds to the formulation’s overall efficacy, particularly in addressing skin ailments and inflammatory conditions.

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