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CRITICAL REVIEW OF KARKOTAKI (*Momordica dioica* ROXB. EX WILLD.,)

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ABSTRACT

Karkotakī (*Momordica dioica* Roxb. ex Willd., family: Cucurbitaceae), known in traditional Ayurvedic literature including the Charaka, Shusrutha, Astanga Hrudaya samhita's, Nighantu's like Dhanwatari, Madanapala, Kaiyadeva, Raja Niganthu, Bhāvaprakāśa Nāighaṇṭu is reviewed as a potent medicinal herb. Recognized for its Tiktarasa, rich in tannin properties, it is employed as a febrifuge, antiseptic, anthelmintic, and spermicidal agent. Ayurvedic classics describe its utility in managing conditions such as Jwara (Antipyretic), Raktasrava (bleeding piles), Mutraghāta (urinary disorders), and Sarpa visha vikara (Snake poisoning) as a natural sedative, thereby harmonizing the doshas. All parts of the plant—Phala (fruit), Patra (leaves), and Kanda (rhizome)—are utilized in traditional formulations, evidencing its wide-ranging therapeutic applications. Modern pharmacological investigations have substantiated these traditional claims by demonstrating that Karkotakī possesses hepatoprotective, antibacterial, hypoglycaemic, analgesic, and fertility-regulating activities. This review synthesizes traditional Ayurvedic knowledge with contemporary scientific findings, highlighting the ethnobotanical relevance, pharmacogenetic characteristics, and pharmacological potential of Karkotakī. The integration of classical Ayurvedic insights and modern biomedical research underscores its promise as a source of novel therapeutic agents, advocating further clinical research and standardization of herbal formulations for comprehensive health management.

KEYWORDS: Karkotakī, *Momordica dioica,* Febrifuse, Jwara.

INTRODUCTION

Ayurveda, the knowledge of life science bestowed health and longevity in the form of preventive and curative measures, Swasthavritta and sadvritta will cover the Preventative aspects in the body and mind respectively while shodhana and shamana drugs are used in the management of different diseases except few exceptions the Preventive aspects are cowered by Adravya chikitsa and curative Aspects are mainly Covered by Dravya guna.[1]

Karkotaki *(Momordica dioica* Roxb. ex Willd.,) a perennial, dioecious climbing creeper of the family Cucurbitaceae, is traditionally known in Ayurvedic medicine as Karkotaki and commonly referred to as Parora or Kakora.[2] Recognized in classical texts for its therapeutic potential. Karkotaki

is esteemed for its harmonizing properties on the doshas and its role in maintaining systemic balance. Ayurvedic literature underscores its use in addressing fever, bleeding piles, urinary disorders, Snake poisoning, Jaundice, and other systemic disturbances.[3]

Fruits have hypoglycaemic, hepato-protective, anti-inflammatory, analgesic. Leaves possess anthelminthic, aphrodisiac, antihemorroidal, antipyretic, antiasthmatic, and analgesic properties. Root juice has stimulant, astringent, antiseptic, anti-diabetic, anti-inflammatory and antiulcerant effect.[4]

Materials:

Karkotaki consists of the root of *Momardica dioica* Roxb. Ex.wild. (Family: Cucurbitaceae) a vine found throughout India up to an altitude of 1500 m, also cultivated for its fruits which are used in vegetables.[5]

Table 1 Vernacular name:[6]

Sanskrit	Karkotaki, karkotaka, Peethapuspha, Mahajali
English	Spine gourd
Kannada	Madhagalkayi
Hindi	Kekasa, kekasa, kakoda, karora.
Telugu	Aagakara
Tamil	Egaravalli
Assamese	Batkarila
Bengali	Bonkarela, Kankrol
Nepali	Karalikayi
Punjabi	Dharkarela, kirar
Marati	Kartoki, Kantole
Malayalam	Vempawal

Table 2 Synonyms: [7,8,9,10,11]

Synonyms:	C.S	S.S	A.H	D Ni	M. Ni	Kai Ni.	R. Ni	BP. Ni
Karkotaki	+	+	+	+	+	+	+	+
Pitapuspa	-	-	-	-	+	+	+	+
Mahajalini	+	-	-	-	+	+	+	+
Devi	-	-	-	+	+	+	-	+
Kanya	-	-	-	+	+	+	-	+
Yogishririthi	-	-	-	-	-	+	-	+
Tagari	-	-	-	-	-	+	-	+
Nakradamani	-	-	-	+	-	+	-	+
Visha katakini	-	-	+	+	+	+	-	+
Dhamargava	+	-	-	-	-	-	-	-
Kumariga	-	-	-	+	-	-	-	-
Sarpa Damani	-	-	-	+	-	-	-	-
Swadu phala	-	-	-	+	-	-	-	-

Figure 1

Figure 2

Figure 3

Figure 4

Habit:

Karkotaki (*Momardica dioica*)- dioecious, perennial,with tuberous roots : stem slender, Branched, furrowed, glabrous and shining. Tendrils simple, elongate, striate, glabrous. Leaves membranous, broadly ovate in outline, variable 3.8cm by 3.2-8cm.., cordate at the base, glabrous, minutely punctate, entire or more or less deeply 3-5-lobed, the lobes triangular, ovate or oblong, distantly denticulate; petioles 1.3-4.5 cm. long, channelled above, pubescent, eglandular. Mille flowers: Peduncle solitary, 1-flowered, 3.8-12.5 cm. long, slender, angled, usually pubescent near the top, otherwise glabrous; bract cucullate, inserted a little below the flower and enclosing it, orbicular-reniform, 1.3-2 cm. broad, usually pubescent on both sides, strongly nerved, often ciliolate. Calyx-lobes distant, 5-8 mm. long, linear-lanceolate. Petals 1.3-2.5 cm. long, wholly yellow, oblong-lanceolate. Female flowers: Peduncles nearly as long as those of the male, usually with a small bract near the base. Ovary clothed with long soft papillae. Fruit 2.5-6.3 cm. long, ellipsoid, shortly beaked, densely echinate with soft spines. Seeds many, 1 cm. long, broadly ellipsoid, slightly com-pressed, slightly and irregularly corrugated, enclosed in a red pulp. [12]

Habitat:

In India, it is extensively distributed from the Himalayas to the southern peninsula, as well as in other regions of the Indian subcontinent, including Pakistan, Bangladesh, Myanmar, and Sri Lanka, where it grows both wild and cultivated for its edible fruit.[13]

Types: Based on flowering

1. Female flowers present in plant called as Karkotaki
2. Male flowers present in the plants called as Vandya Karkotaki[14]

Chemical composition:[15] Ash Contains Manganese, Alkaloid A Fragrant Extractive Matter and Ash 3to 4 P.C

Nutrient Composition of fruit [16]:

Crude protein (g) -19.38, Crude lipid (g) -4.70, Carbohydrates (g)- 47.92, Crude fibre (g)- 21.30 Ash (g) -6.70, Calcium (mg) -33.00, Phosphorus (mg)-42.00, Iron (mg)-4.60, Calorific value (kcal)- 311.50

Vitamin composition in fruits of Spine gourd: (g/100g)

Vitamin A (2.5), VitaminB1 (Thiamine)-1.8, Vitamin B2 (Riboflavin)-3.5, Vitamin B3 (Niacin) 1.9, Vitamin B5 (Pantothenic Acid)-18.0, Vitamin B6 (Pyridoxin)-4.3, Vitamin B9 (Folic Acid)-3.6, Vitamin B12 (Cyanocobalamin)-4.0, Vitamin D2 & 3 (Cholecalciferol)- 3.0, Vitamin H (Biotin)- 6.5, Vitamin K (Phytonadione)-5.0.

Pharmacological action:

Several pharmacological investigations have been conducted on *Momordica dioica* to validate its traditional medicinal uses. Various extracts obtained from different parts of the plant have been analysed, revealing significant therapeutic potential.

1. Antimalarial Activity[17]

An in vivo and in vitro investigation conducted by Mishra et al. (year not specified) demonstrated the schizonticide effect of the alcoholic extract of *M. dioica* against *Plasmodium berghei* (NK65 strain). Administered at a dosage of 1 g/kg over a 4-day period, the extract showed a parasite suppression rate exceeding 50%, indicating promising antimalarial potential.

2. Antiallergic Activity[18]

Gupta et al. (year not specified) studied the antiallergic effect of alcoholic extracts of *M. dioica*. Their results revealed that the extract successfully inhibited passive cutaneous anaphylaxis in both rats and mice, supporting its potential use in managing allergic reactions.

3. Antifertility Activity[19]

Shreedhara et al. (year not specified) explored the reproductive toxicity of aqueous and ethanolic root extracts in female rats. Administered at a dose of 200 mg/kg, both extracts demonstrated significant estrogenic effects, including increased uterine weight. The abortifacient efficacy was reported to be 83% with the aqueous extract and 100% with the ethanolic extract, indicating substantial antifertility action.

4. Analgesic and Anti-inflammatory Activities[20]

Ilango et al. (year not specified) evaluated the analgesic and anti-inflammatory properties of hexane (HE) and ethyl acetate soluble portions (EASP) of the fruit pulp methanolic extract. At doses of 50 and 100 mg/kg in experimental models (mice and rats), both HE and EASP exhibited statistically significant activity when compared to standard pharmaceutical agents.

5. Antifeedant Activity[21]

Narsimhan et al. (year not specified) assessed the antifeedant effect of *M. dioica* fruit pulp using hexane and ethyl acetate extracts. Their study, conducted against the pest *Spodoptera litura*, revealed a moderate and concentration-dependent antifeedant effect, highlighting its potential in biopesticide development.

Rasa Panchaka:[22]

Rasa: Tikta

Guna: Laghu, Tikshana

Virya: Sheetha

Vipaka: Katu

Dosakarma: Tridosaghna, Vatapittahara-Kaphahara, Pittakaphahara(Phala fruit)

Karma: Kaphahara, Pittahara, Vrunashodhana, Ruchikara, Rasayana**.**

Rogaghnata: Gulma, Sula, Pittavikara, Prameha, Kasa-svasa, Jwara, visa, Vrana.[23]

Therapeutic uses:

Karkotaka is taken with milk for 10 days and it breaks and expel Calculi and gravels (asmari- asmasarkara) as mentioned in texts.

Karkotaka and some other plant drugs are used as vegetable. The roots and fruits are used in other diseases. The root is used as emetic; Fruits are commonly household vegetable(saka).[24]

Ekamoolika Prayoga: Jwara- In fever, Karkotaka, Parpata, Gojihva, tender radish, and Guduchi leaves should be used as vegetable. (S.S.U.39/152) [25]

The root of Karkotaki or fruit of Devadali is used as snuff (Nasya) in Jaundice[26]

Table 3 Reference of Krkotaki in different Samhita and Nighantu

Samhitha	Context	Reference
Charaka Samhita	Shaka varga: |	(cha sutra 27/ 93)
Charaka Samhita	Jwara adhyaya as patya ahara	(cha chi 3/ 190)
Charaka Samhita	Synonumus of dhamargava:	(Cha ka. 4/ 3)
Sushrut Samhita	While explaining thikta varga karkotaki is mentioned	(Shu sutra. 42. 11)
Sushrut Samhita	While explaining shaka varga	(Shu sutra 46 .262 Shaka varga)
Sushrut Samhita	Ahara upayogi chakshushya shaka	(Shu Uttara. 17/ 51)
Sushrut Samhita	Jwara adhyaya as patya ahara	(Shu Uttara. 39/ 151)
Ashtanga Hridaya	Shaka varga	(A.H su. 6/ 76)
Ashtanga Hridaya	Vrana bhojanam:	(A.H su 29/35)
Ashtanga Hridaya	Vamanopaga:	(A.h Chi 1/ 7.)
Ashtanga Hridaya	Rasa dravyani yushadinam upakarini	|(A.H chi 1/75)
Ashtanga Hridaya	Kakadhani taila. Preparation: for nasya for Grantya arbhuda	(A. H U 30/ 18)
Bhava Prakash Nighantu	while explaining the guduchi varga dravyas	B.p Guduchaydi varga. 242-243)
Bhava Prakash Nighantu	while explaining the shaka varga	(B.p Shaka varga. 70)
Madhanapala nighantu	while explaining the shaka varga	(Ma ni shaka varga 29)
Madhanapala nighantu	while explaining the shaka varga	(Ma ni shaka varga 30)
Raja nighantu	while explaining the shaka varga	Raja ni. Guduchyadi varga 61-63)
Abidhana Manjari	while explaining the shaka varga	Abidhana Manjari – 777-778
Abidhana ratna mala	While explaining the tikta skanda dravya	Tikta Skanda Abidhanaratnamala 144-145)

Kaiyadeva nighantu	While explaining the oushadi varga	(ka.oushadi varga 794-798)
		Chapatkara Nighantu21
Kaiyadeva nighanthu	While explaining the oushadi varga	kaideva Nighantu oushadi varga 595 – 598
Kaiyadeva nighanthu	While explaining the oushadi varga	kaideva Nighantu oushadi varga 598 – 600
Dravya guna sangraha	while explaining the shaka varga	Dravya guna sangraha shaka varga 28
Dhanwanthari Nighantu	while explaining the guduchi varga dravyas	(Dhanwanthari Nighantu guduchaydi varga 210-224)
Niganthu kosha	while explaining the shankha kanda	Niganthu kosha Shankha kandha 361
shodala Nighantu	while explaining the Guduchadi Varga	shodala Nighantu Guduchadri Varga 220
Saraswati nighantu	while explaining the Lata varga	Saraswati latavarga 38

DISCUSSION AND CONCLUSION:

In conclusion, *Momordica dioica Roxb.* holds considerable promise as a natural therapeutic agent, exhibiting strong phytotherapeutic and pharmacological properties. Given the global rise in chronic diseases such as diabetes, cancer, and hypertension—coupled with the alarming spread of antibiotic resistance and adverse effects of synthetic drugs—there is an urgent need to explore plant-based alternatives. The traditional knowledge surrounding medicinal plants, particularly in systems like Ayurveda, offers a valuable foundation for modern scientific validation. As highlighted in this study, *Momordica dioica Roxb.* may serve as an effective, sustainable, and safer prakritika vikalpa to synthetic medicines in contemporary healthcare**.**

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