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A COMPREHENSIVE ETHNOBOTANICAL AND PHYTOPHARMACOLOGICAL REVIEW INTERGRATING TRADITIONAL CULINARY PRACTICES AND CULTURAL SIGNIFICANCE

I.G.P.R. Kulanatha

Jinendra Disanayaka

ABSTRACT

This study investigates the historical and nutritional significance of leafy vegetables from the Kandyan era, as recounted by 17 informants from three successive generations. Seven specific dishes featuring cooked leafy greens were examined, traditionally termed as Malluma and Ānama: Aba Kola Malluma (*Brassica juncea*), Kalukamberiya Kola Malluma (*Solanum nigrum*), Erabadu Kola Malluma (*Erythrina variegata*), Kurundu Dalu Malluma (*Cinnamomum zeylanicum*), Aththikka Dalu Malluma (*Ficus racemosa*), Alakola Dalu Ānama (*Xanthosoma sagittifolium*), and Kopi Dalu Malluma (*Coffea spp.*). Additionally, Chavya leaves (*Piper retrofractum / Piper chaba*) were an unexpected finding, used as a garnish in one of the dishes. Recipes for Aba Kola Malluma, Kalukamberiya Kola Malluma, and Kopi Dalu Malluma were shared by two informants each, while the other four dishes were described by four informants each. This study aims to identify and characterize key bioactive compounds present in these leafy vegetables, analyze the potential health benefits associated with these compounds, and explore Ayurvedic principles regarding their medicinal and culinary uses, thereby highlighting their potential for disease prevention and health promotion. Leafy vegetables were identified from an original dataset based on Kandyan food recipes. Relevant peer-reviewed articles (2014–2024) were sourced from Google Scholar and PubMed, along with Ayurvedic texts from the FIM library, to explore their medicinal applications.*Cinnamomum verum* is celebrated for its anti-inflammatory and antioxidant properties, aiding in blood sugar regulation, digestion, and cardiovascular health. *Coffea arabica* provides antioxidants that enhance cognitive function, boost energy, and offer protection against neurodegenerative diseases. *Solanum nigrum* supports liver health, alleviates skin conditions, and provides relief from respiratory disorders due to its hepatoprotective and anti-inflammatory properties. *Brassica juncea* is rich in vitamins and minerals, promoting bone health, immunity, and detoxification. *Ficus racemosa*, widely used in Ayurveda, aids digestion, manages diabetes, and offers anti-inflammatory benefits. *Erythrina variegata* (Indian Coral Tree) is valued for its analgesic and anti-inflammatory effects, supporting respiratory health, joint pain relief, and better sleep.These plants offer a range of health benefits, including enhanced immunity, improved digestion, and protection against inflammation and chronic diseases, highlighting their importance in traditional and modern health practices, and can be identified as functional food.

Key words: Kandyan Cuisine, Ethnobotany, Ayurvedic Principles, Functional Foods, Nutraceuticals, Traditional Dietary Medicin, Sri Lankan Culinary Heritage, Phytochemicals, Sustainable Food Systems

INTRODUCTION

Sri Lanka's traditional food culture stands as a vibrant testament to the nation's rich cultural heritage, offering a fascinating glimpse into its sociocultural dynamics. Food plays a vital role far beyond sustenance, shaping social relationships and reflecting variations in status and power, suggesting a potential Marxist or structuralize analysis. Analyzing culinary narratives and literary sources allows us to uncover these profound connections, providing invaluable insights into Kandyan folk-life of the pre-colonial era. Within this diverse food landscape, the Kandian culinary tradition occupies a unique position (Edirisuriya, 2012; Walpola Rahula Thera, 2014; Senanayake, 2019).

Collective Biocultural Heritage

This intricate relationship between human societies and their food systems, encompassing both cultural practices and ecological knowledge, is conceptualized as collective biocultural heritage. This refers to the knowledge, innovations, and practices of indigenous peoples and local and mobile communities that are collectively held and inextricably linked to traditional resources and territories, local economies, the diversity of genes, varieties, species and ecosystems, cultural and spiritual values, and customary laws shaped within the socio-ecological context of communities.Sri Lanka's enduring traditional food culture, particularly the Kandyan culinary tradition, serves as a vibrant manifestation of this concept. It acts as a profound lens through which to examine the nation's rich cultural heritage and complex sociocultural dynamics, where food deeply shapes social relationships and signifies variations in status and power. By meticulously analyzing folklore, culinary narratives, and literary sources, this research illuminates these intricate connections, gaining invaluable insights into traditional Kandyan folk-life.

Traditional Dietary Wisdom and Study Focus

Traditional diets, rooted in historical and cultural contexts, hold a wealth of knowledge about sustainable living, nutrition, and ecological balance. Across the globe, communities have relied on indigenous food practices that harmonize with their natural environment, offering insights into sustainable agricultural methods and dietary health. In Sri Lanka, the Kandyan era represents a period where the interplay of culture, agriculture, and cuisine reached a distinctive peak.

Leafy vegetables, often consumed as "Malluma" and "Ānama", ~~which followed distinct preparation technique,~~ were a cornerstone of this diet, valued for their medicinal properties, nutritional richness, and symbolic significance in rituals and everyday life. This study embarks on an exploration of the dietary practices of the Kandyan period, with a focused examination of seven specific leafy vegetable preparations: Aba Kola Malluma (AKM), Kalukamberiya Kola Malluma (KKM), Erabadu Kola Malluma (EbKM), Kurundu Dalu Malluma (KDM), Aththikka Dalu Malluma (ADM), Kopi Dalu Malluma (KDM), and Alakola Dalu Ānama (ADA). This research also includes the unexpected finding of garnishing practices using Chavya leaves (CG).

These dishes, crafted from a variety of indigenous leafy greens, are emblematic of the era's approach to sustainable living and nutritional wisdom. Through this research, we aim to uncover the cultural, nutritional, and agricultural significance of these leafy vegetables. By analyzing their role in the Kandyan diet, this study seeks to highlight their relevance not only in the historical context but also in contemporary discussions on sustainable food practices and traditional knowledge systems. Furthermore, the research delves into the preparation methods,

health benefits, and the sociocultural factors that shaped their prominence in the ~~mixed cultural and~~ historical Kandyan dietary lore.

By bridging these insights with modern nutritional science, this study aspires to contribute to a deeper understanding of traditional dietary practices, fostering a renewed appreciation for Sri Lanka's culinary heritage and its potential implications for sustainable living in the present day. This research sheds light on the preservation of Kandyan culinary traditions and their nutritional value, emphasizing the continuity of these cultural food practices.

Research Queston

What are the cultural, nutritional, and agricultural significances of selected Kandyan era leafy vegetable preparations, and how can this knowledge be applied to improve contemporary dietary practices and promote sustainable food systems?

Significance of the Study

This study is significant for its contribution to preserving and promoting Sri Lanka's culinary heritage, with a focus on sustainable nutritional health and community well-being. By analyzing the historical context and nutritional value of these seven leafy vegetable preparations, the research highlights the enduring relevance of traditional dietary practices. Additionally, the study sheds light on the sustainable agricultural methods of the Kandyan era, offering valuable lessons for modern food systems in addressing socio-ecological challenges. Furthermore, revitalizing these traditional dishes has the potential to enhance contemporary diets while fostering cultural appreciation. The findings will also provide a foundation for future interdisciplinary research in nutrition, ethnobotany, and sustainable agriculture, contributing to the evolution of food recipes over time.

LITERATURE REVIEW

Theoretical Framework

The theoretical foundation for this study lies in the intersection of ethnobotany, cultural anthropology, and nutritional science. Ethnobotanical theories emphasize the relationship between human societies and their use of plant resources, providing a framework to understand how traditional communities relied on indigenous plants for food and medicine. Cultural anthropology further highlights the role of food in shaping societal identity, rituals, and customs, while nutritional science evaluates the health benefits of traditional diets. Together, these perspectives offer a holistic lens through which the dietary practices of the Kandyan era can be examined, highlighting their ecological, cultural, and nutritional dimensions.

Previous Research Findings

Existing research on traditional Sri Lankan diets underscores the importance of plant-based foods, particularly leafy vegetables, as integral to health and sustainability. Studies have documented the medicinal properties of various indigenous plants and their role in Ayurveda, while others have analyzed the nutrient content of common leafy greens. Historical research has explored the agricultural practices of the Kandyan era, focusing on rice cultivation and irrigation systems. However, specific studies on the culinary traditions of the Kandyan period, particularly regarding leafy vegetable preparations like "Malluma," remain scarce. The available literature largely emphasizes either medicinal or agricultural aspects without delving into the culinary and cultural nuances of these foods.

Gaps in the Literature

Despite the growing body of work on traditional diets and indigenous plants, significant gaps remain in understanding the integration of leafy vegetables into the daily lives and cultural practices of the Kandyan era. Most existing research either overlooks or only briefly mentions the culinary preparations and their sociocultural contexts. Additionally, there is limited analysis of the sustainability of agricultural practices that supported the cultivation of these plants. Furthermore, while modern studies highlight the nutritional value of traditional diets, they rarely connect these findings to specific historical periods or preparations. This study seeks to fill these gaps by providing a focused exploration of the cultural, nutritional, and agricultural dimensions of Kandyan leafy vegetable preparations, thereby contributing to a more comprehensive understanding of traditional Sri Lankan dietary practices.

RESEARCH OBJECTIVES

1. Identification and Characterization of Bioactive Compounds
    - Identify key bioactive compounds present in various leafy vegetables.
    - Characterize their chemical structures and properties using advanced analytical techniques.
2. Analysis of Potential Health Benefits
    - Evaluate the biological activities of the identified bioactive compounds.
    - Investigate their roles in disease prevention and health promotion based on modern scientific evidence.
3. Exploration of Ayurvedic Principles
    - Examine Ayurvedic literature to understand the traditional medicinal uses of leafy vegetables.
    - Correlate Ayurvedic insights with modern scientific findings to highlight the holistic benefits of these vegetables.
4. Promotion of Disease Prevention and Health Promotion
    - Assess the potential of bioactive compounds in leafy vegetables for preventive healthcare strategies.
    - Develop recommendations for incorporating these vegetables into diets for improved public health.

METHODOLOGY

This study used a mixed-methods approach, combining qualitative data from in-depth interviews and a comprehensive literature review to assess the nutritional and health implications of traditional leafy vegetables.

Qualitative Data Collection

The qualitative component involved semi-structured interviews with 17 key informants. These interviews explored the cultural significance, preparation methods, and perceived health benefits of the leafy vegetables. Thematic analysis was used to identify patterns in the data related to nutritional and health aspects.

Literature Review

A thorough review of academic literature from 2014 to 2024 was conducted using Google Scholar and PubMed. The review focused on studies evaluating the pharmacodynamics

properties, phytochemical analysis, and health benefits of the leafy vegetables. The literature provided a scientific basis for the traditional practices discussed in the interviews.

Data Synthesis

The qualitative findings were synthesized with insights from the literature review to identify connections between traditional knowledge and modern scientific evidence. This integrated analysis allowed for a comprehensive evaluation of the role of these leafy vegetables in contemporary diets and informed culturally relevant dietary recommendations.

Data Presentation

Data were primarily presented in tables and figures to summarize quantitative findings and highlight key trends. Thematic narratives, derived from qualitative analysis, were concurrently used to illustrate and elaborate on key findings, providing rich contextual detail.

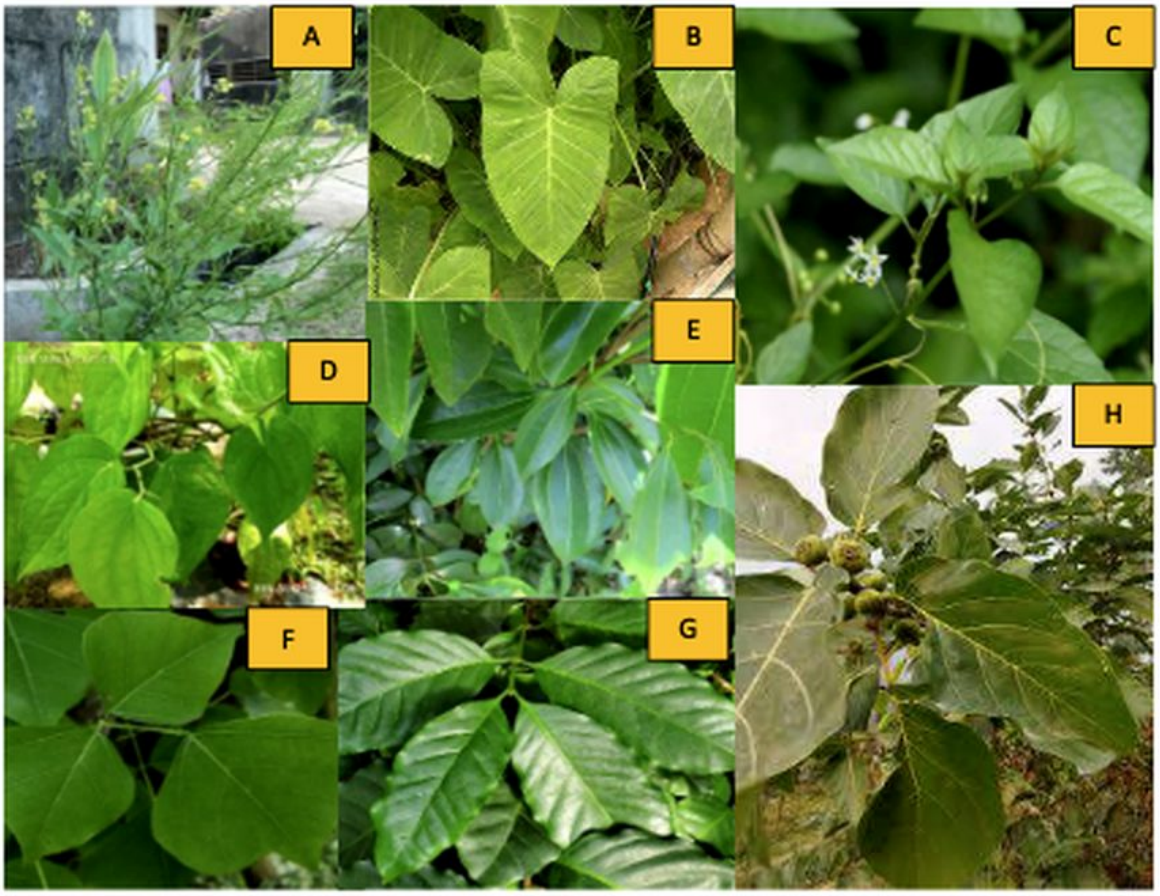


Fig. Seven Culinary Leaves found in Kandyan Dishes Data set

A. Aba (*Brassica nigra/juncea*), **B.** Ala kola (*Xanthosoma sagittifolium*), **C.** Kalukamberiya (*Solanum americanum*), **D.**Siviya (*Piper retrofractum/Piper chaba*), **E.** Kurundu

(*Cinnamomum zeylanicum*), **F.** Erabadu (*Erythrina variegata*), **G.**Kopi (*Coffea spp.*), **H.** Aththikka (*Ficus racemosa*)

Separate finding:
Chavya leaves (*Piper chaba* / *Piper retrofractrum*, Piperaceae) are incorporated as a garnish in Polos ānama (dish number 4). However, the number of key informants specifically mentioning the use of Chavya leaves for this purpose was not recorded as a distinct data point.

RESULTS AND DISCUSSION

This section explores the nutritional composition and health benefits of traditional Kandyan leafy vegetables. The investigation draws from interviews with knowledgeable individuals, alongside a comprehensive review of scientific literature. By examining the specific nutrients, health advantages, and cultural significance of each leafy vegetable, the aim is to provide a deeper understanding of their role in promoting well-being. This exploration uncovers the nutritional power of these and discusses their relevance in modern diets.

Overview of Findings

Seven leafy vegetable preparations comprised 21.875% of the 32 dishes. "Ala kola dalu Ānama" was most frequently mentioned (31.25%), followed by "Thamberiya (Kalukammaeriya)kola Malluma" (9.375%); the other five were mentioned ~6.25% each. Two main Malluma preparation methods were identified: untampered (e.g., Aba Kola) and oil-tempered (e.g., Kopi Dalu). These preparations offer rich nutritional benefits. Chavaya (Siviya) leaves as a garnish (3.125%) highlighted Ayurvedic digestive practices.

Dish Name / Scientific Code	Common Names	Botanical Name & Family	District/Area	Number of Key Informants	Key Informant Codes
Alakola Dalu Ānama (ADA – 18)	Arum, Aroid, Taro	Xanthosoma sagittifolium (L.) Schott (Araceae)	Matale Kandy	3	M, N, O
Aba Kola Malluma (AKM – 25)	Mustard Greens	Brassica juncea (L.) Czern. (Brassicaceae)	Kandy	1	P
Aththikka Dalu Malluma (ADM – 30)	Cluster Fig, Red River Fig, Gular Fig	Ficus racemosa (Moraceae)	Badulla	2	P, Q
Chavya leaves (garnish) (CG – 4)	Long Pepper	Piper retrofractum/Piper chaba (Piperaceae)	Various	Not separately recorded	Not separately recorded
Erabadu Kola Malluma (EbKM – 28)	Indian Coral Tree,	Erythrina variegata (Fabaceae)	Madagama (Ūva Province)	2	Q, O

	Tiger's Claw				
Kurundu Dalu Malluma (KDM – 29)	Cinnamon	Cinnamomum zeylanicum (Lauraceae)	Badulla	2	P, Q
Kalukamberiya Kola Malluma (KKM – 26)	American black nightshade	Solanum nigrum (Solanaceae)	Matale	1	P
Kopi Dalu Malluma (KDM – 31)	Coffee	Coffea spp. (Rubiaceae)	Badulla	1	P
Koora thampala (EKM-KT-28)	Spiny amaranth	Amaranthus viridis (Amaranthaceae)	N/A	N/A	N/A

Table 2: Culinary Leaf Species — Botanical Details, Phytochemistry, and Ayurvedic Properties

Sinhala Name	Botanical Name	Key Phytochemicals	Ayurvedic Tridosha Effects & Uses
Kalukamberiya	Solanum nigrum	Alkaloids (solanine, solasodine), flavonoids, saponins, phenolic compounds, steroidal alkaloids.	Pacifies Kapha and Pitta doshas. Used as an anti-inflammatory, anti-diabetic, and anthelmintic agent. Traditionally used for otalgia, asthma, skin disorders, and diabetes.
Erabadu	Erythrina variegata	Alkaloids, flavonoids, steroids, terpenoids, saponins, tannins.	Balances Kapha and Vata doshas, increases Pitta dosha. Enhances digestive fire. Used as an anthelmintic and anti-inflammatory. Treats respiratory and digestive issues.
Kurundu Dalu	Cinnamomum zeylanicum	Flavonoids, saponins, alkaloids, phenolic compounds.	Pacifies Kapha and Vata doshas. Used as an anti-inflammatory, antimicrobial, and blood purifier. Treats skin diseases and respiratory/gastrointestinal disorders.
Aththikka Dalu	Ficus racemosa	Sugars, proteins, alkaloids, flavonoids, sterols, glycosides.	Balances Kapha and Vata doshas. Enhances digestive fire. Used as a digestive stimulant, carminative, and respiratory aid.
Kopi Dalu	Coffea spp.	Caffeine, chlorogenic acids,	Pacifies Kapha and Vata. Used as an anti-inflammatory, analgesic, and nervine tonic.

		diterpenes, flavonoids.	
Ala Kola Dalu	Xanthosoma sagittifolium	Phenolic compounds, flavonoids, tannins.	Reduces Kapha and enhances digestive fire. Used as a lunch dish for adults.
Chavaya / Siviya	Piper chaba / P. retrofractum	Piperine, essential oils, alkaloids, lignans.	Balances Kapha and Vata. Used as a digestive stimulant, anti-inflammatory, and wound healing agent. Recommended to promote wakefulness.

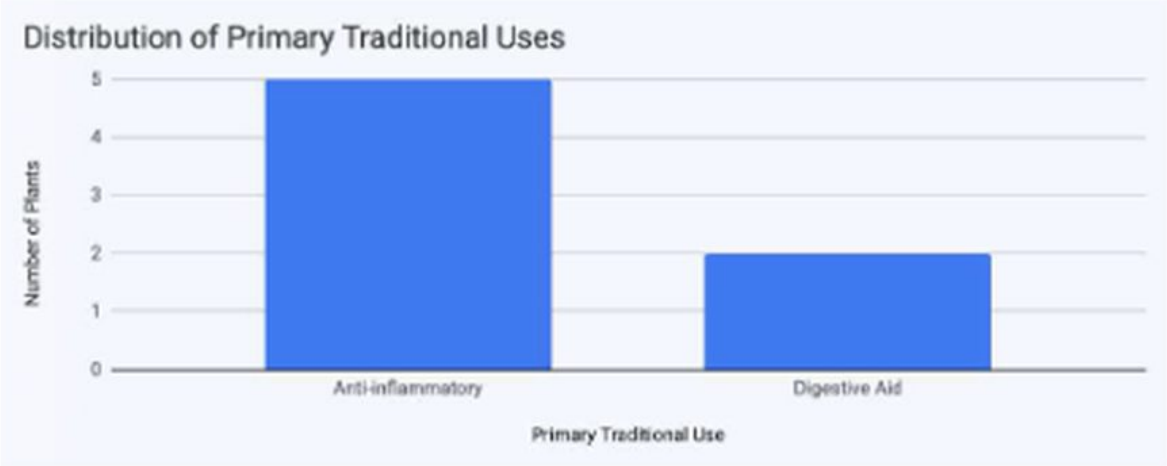


Fig 1 'Distribution of Primary Traditional Uses; '

- Anti-inflammatory' is the most common primary traditional use, accounting for 5 plants.
- 'Digestive Aid' is the second most common primary traditional use, accounting for 2 plants.

Table 3: Comprehensive Nomenclature and Sources for Culinary Plants

Common Name	Botanical Name	Sanskrit Name	Sinhala Name	Tamil Name	Key Source
Night Shade	Solanum americanum	Kakamachi	Kalukamberiya	Manal-takalli	Solanum nigrum complex sources
Indian Coral Tree	Erythrina variegata	Paribhadra	Erabadu	N/A	Erythrina variegata reviews
Spiny Amaranth	Celosia argentea	Vitunna	Kurundu Dalu	N/A	Celosia argentea reviews

Cluster Fig	Ficus racemosa	Udumbara	Aththikka Dalu	Ah-ththi-kaa	Ficus racemosa reviews
Coffee	Coffea spp.	Kāphī	Kopi Dalu	Kaapi	Coffea species studies
Taro / Elephant Ear	Colocasia esculenta	Kacchu	Ala kola	Chembu	Colocasia esculenta reviews
Long Pepper	Piper retrofractum	Chavya	Chavaya / Siviya	Thippili	Piper retrofractum reviews
Mustard Greens	Brassica nigra	N/A	Kalukamberiya	N/A	Brassica species studies

Culinary and Cultural Integration

In the Sri Lankan context, particularly within Kandyan traditional cuisine, the use of leaves as food encompasses a rich variety of preparations, deeply intertwined with geo-cultural identity, social status, and overall well-being. These leafy preparations are not merely culinary items but are fundamental expressions of ancestral foodways, esteemed for their medicinal and nutritional benefits.

Common leafy preparations include:

- **Malluma:** Leaves mixed with scraped coconut, typically mildly heated.
- **Oil Tempering:** Leaves prepared with specific spices, without scraped coconut, and often with less heat. This process enhances spice flavor by releasing fat-soluble aroma compounds and bioactive phytochemicals, improving both taste and health benefits. Additionally, spices' natural antioxidants stabilize cooking oils during heating, reducing oxidation and prolonging shelf life (Jaswir et al., 2000; Upadhyay & Mishra, 2016; Wijesundara et al., 2020).
- **Ānama:** Dishes where leaves are a major component, often cooked with coconut milk and fresh or dry spices to a creamy consistency, receiving a bit more heat than Malluma or oil tempering.
- **Vyanjana:** A curry, similar to Ānama, that involves coconut milk and spices with moderate heat.

These dishes are generally suitable for both lunch and dinner. Our research corroborates that these plants have historically been acclaimed for their medicinal and nutritional benefits. Studies show that approximately 22% of 32 traditional dishes in Kandyan cuisine were leafy preparations, highlighting their prevalence. Key informants frequently revealed 'Malluma' and 'Ānama' as high-frequency preparations.

A particularly unique application observed is the garnishing of certain dishes with specific leaves for their medicinal benefits, functioning as nutraceuticals where the leaves form a smaller portion of the dish. For instance, Chavaya / Siviya (*Piper chaba* / *Piper retrofractum*) leaves are used as a garnish, signifying Ayurvedic benefits for digestion (Research & Reviews:

Research Journal of Biology, 2016; Earthstoriez, n.d.). This practice is notably seen in 'Polos Ānama'.

Polos Ānama (tender jackfruit preparation) consists of tender jackfruit, coconut milk, garlic, Siviya (*Piper chaba*/ *Piper retrofractum*), ginger, and salt. Its preparation involves cooking tempered and boiled jackfruit pieces with these ingredients, specifically garnished with small pieces of Chavaya leaves. This dish is consumed for both lunch and dinner, is suitable for all age groups, and is recognized for its Dhatuposhaka (tissue-nourishing) and agnidipthaka (digestive fire enhancing) effects. Among 17 key informants, 6 mentioned "Polos Ānama," indicating its notable frequency. However, the available data do not explicitly confirm if all 6 informants specified the use of Chavaya leaves as a garnish for "Polos Ānama."

As one informant narrated: "Ah, 'Polos Ānama'—that's made with tender jackfruit, tempered and boiled, cooked down with coconut milk, garlic, ginger, and salt. But the special touch, you see, is the Chavaya leaves; we always garnish it with small pieces of Siviya. It's a dish for any age, good for both lunch and dinner. It truly is Dhatuposhaka, nourishing the body, and it strengthens your agni—your digestive fire."

Ala Kola Dalu Ānama (derived from finely cut yam leaves, Ala Kola Dalu (*Xanthosoma sagittifolium* / *Colocasia esculenta*), with stems removed) is prepared by cooking with coconut milk, salt, pepper powder, and turmeric over moderate heat until a thick gravy forms. Tempering further enhances this preparation. It is traditionally consumed for lunch by any age group and is highly valued for its Dhatuposhaka (tissue-nourishing) properties.

Another informant described: "For 'Ala Kola Dalu Ānama,' we take tender yam leaves – a special variety called 'Ala' – and remove their stems. We cook these finely cut leaves in just a little coconut milk with salt, pepper, and turmeric until it thickens into a nice gravy. It's even better when it's tempered. We usually have it for lunch, and it's good for everyone. It's known to be Dhatuposhaka, meaning it really nourishes the body."

'Ānama' preparations specifically stand out due to their distinct preparation methods, offering rapid nourishment, promoting satiety (Thrupthi), and supporting the body's primary tissues (Dhātu) according to Ayurvedic principles. Reinvigorating these ancestral foodways provides crucial insights for contemporary diets, fostering improved health, biodiversity, sustainable living, and the preservation of Sri Lanka's rich culinary heritage.

Key Observations

Rich Phytochemical Diversity: All plants examined are rich in broad classes of phytochemicals, including alkaloids, flavonoids, saponins, and phenolic compounds (Keerthana et al., 2024; Ahmad, 2018; Jayawardena & Fernando, 2020; Rull & Sani, 2020). This commonality suggests shared underlying mechanisms, particularly for antioxidant and anti-inflammatory effects. The detailed breakdown of specific compounds, such as solanine in Kalukamberiya (*Solanum nigrum*) (Ahmad, 2018; Easy Ayurveda, 2017; Khan et al., 2023), specific isoflavonoids in Erabadu (*Erythrina variegata*) (Surbhi & Senthil kumar, 2024; Palani & Anitha, 2020; Nakra, n.d.), and cinnamaldehyde/eugenol in Kurundu Dalu (*Cinnamomum zeylanicum*) (Ali & Das, 2023; Pathirana & Jayasinghe, 2021) provides a more precise understanding of their bioactivity. The discovery of mangiferin as a unique and potent compound in Kopi Dalu (*Coffea spp.*) leaves, notably absent in beans, significantly re-evaluates

the economic and health potential of the entire coffee plant (Maimaiti & Li, 2024; Rull & Sani, 2020; Jayasinghe & Abeysekera, 2021).

Plant Part Specificity: The analysis consistently demonstrates that different parts of the same plant (e.g., leaves, bark, roots, fruits, latex) often possess distinct phytochemical profiles and, consequently, different therapeutic applications. This validates the precision of traditional knowledge, which often dictates which specific part to use for a particular ailment. For example, Kurundu Dalu (*Cinnamomum zeylanicum*)'s bark, leaf, and root have different primary active constituents (Jayawardena & Fernando, 2020; Pathirana & Jayasinghe, 2021; Ali & Das, 2023), necessitating precise sourcing for targeted therapeutic outcomes. Similarly, Aththikka Dalu (*Ficus racemosa*) utilizes its leaves, bark, roots, fruits, and latex, each with unique chemical signatures and uses (Chandra & Sharma, 2018), which highlights the inherent sophistication of traditional practices in discerning subtle differences in plant efficacy.

Corroboration of Traditional Uses: A remarkable number of traditional Ayurvedic uses for these plants are corroborated by modern pharmacological studies. This includes anti-inflammatory, antimicrobial, hepatoprotective, antidiabetic, and analgesic activities across various species (Abeywickrama, 2020; Ahmad, 2018; Khan et al., 2023; Surbhi & Senthil kumar, 2024; Palani & Anitha, 2020; Jayawardena & Fernando, 2020; Pathirana & Jayasinghe, 2021; Chandra & Sharma, 2018; Earthstoriez, n.d.; Rull & Sani, 2020). This scientific validation reinforces the empirical efficacy of traditional medicine and provides a robust foundation for further drug discovery and development.

Nuances and Contradictions in Ayurvedic Pharmacodynamics: While many Ayurvedic properties align with observed pharmacological actions, some discrepancies were noted, particularly concerning the precise Rasa, Guna, Virya, and Vipaka for some plants like Kalukamberiya (*Solanum nigrum*) (Ahmad, 2018; Easy Ayurveda, 2017; IAFA for Allergy, n.d.; Khan et al., 2023) and Erabadu (*Erythrina variegata*) (Keerthana et al., 2024; Nakra, n.d.; Palani & Anitha, 2020; Surbhi & Senthil kumar, 2024). For instance, conflicting descriptions of Virya (hot vs. cooling) and their effects on Pitta dosha highlight the complexity of synthesizing information from diverse traditional sources or regional variations (Abeywickrama, 2020). Similarly, the Ayurvedic properties of Ala Kola Dalu (*Xanthosoma sagittifolium* / *Colocasia esculenta*) (Institute of Ayurveda and Alternative Medicine, n.d.; Ranasinghe & Jayawardena, 2020) appear to contradict the general Kapha-reducing and Agni-enhancing claims for the common name. This is because Ayurwiki notes that Colocasia esculenta is understood in Ayurveda to increase Kapha (Ayurwiki, n.d.), which emphasizes the ambiguity of common names and the critical need for rigorous botanical identification and deeper textual analysis in Ayurvedic studies (Atlantis Press, 2020; Divya, n.d.) to resolve such inconsistencies for precise therapeutic application.

Multi-Target Therapeutic Potential: Many of these plants, including Kalukamberiya (*Solanum nigrum*) and Aththikka Dalu (*Ficus racemosa*), demonstrate a broad spectrum of pharmacological activities, suggesting their utility as "poly-pharmacological agents" for complex chronic diseases like diabetes, inflammatory disorders, and cancer (Ahmad, 2018; Chandra & Sharma, 2018; Kumar et al., 2011; Pathirana & Jayasinghe, 2021). This aligns seamlessly with the holistic approach of traditional medicine, where a single plant may address multiple symptoms or underlying imbalances, offering a promising avenue for integrated healthcare solutions.

Dual Role as Food and Medicine: The dual role of these plants as both food and medicine is profoundly evident in Sri Lankan culinary traditions, particularly in Kandyan cuisine. Leafy green preparations are fundamental to geo-cultural identity and well-being, valued for their nutritional content and specific medicinal benefits as nutraceuticals. This highlights the Ayurvedic concept of "food as medicine," where regular dietary intake contributes to long-term health maintenance and disease prevention, thereby opening significant avenues for the development of functional foods and nutraceuticals.

Safety Considerations: The discussion consistently points to the importance of safety considerations. While these plants offer immense therapeutic value, potential toxicities (e.g., unripened fruits of Kalukamberiya (*Solanum nigrum*)) (Ahmad, 2018; Khan et al., 2023; Wikipedia, n.d.) or specific dosha aggravations (e.g., Pitta aggravation by Chavaya / Siviya (*Piper chaba / Piper retrofractum*)) (Molecules, 2019; Research & Reviews: Research Journal of Biology, 2016) necessitate careful adherence to traditional knowledge regarding preparation and dosage. This underscores the critical need for rigorous toxicological studies and standardization in modern applications.

Local Community Narratives and Folklore: Beyond their documented medicinal and culinary uses, these plants are deeply interwoven with the local community narratives and folklore of Sri Lanka, reflecting their geo-cultural identity and historical significance. Traditional culinary practices, such as the use of Chavaya / Siviya (*Piper chaba / Piper retrofractum*) as a garnish for its digestive benefits, highlight a nuanced understanding of food as medicine within the community. Folklore links Kurundu Dalu (*Cinnamomum zeylanicum*) to the ancient name of Sri Lanka and notes its historical medicinal use (Jayawardena & Fernando, 2020). Aththikka Dalu (*Ficus racemosa*) holds profound spiritual significance in Theravada Buddhism (Earthstoriez, n.d.). Broader traditional narratives exist for Kopi Dalu (*Coffea spp.*) (Earthstoriez, n.d.) and Kalukamberiya (*Solanum nigrum*) (Ahmad, 2018; Wikipedia, n.d.) in other regions, underscoring the deep cultural integration of these plants. Further ethnographic research, including interviews with local elders and knowledge keepers, would be invaluable in uncovering more specific and nuanced Sri Lankan folklore associated with these leaves and their traditional uses, such as beliefs about their protective powers, their role in rituals, or specific stories explaining their medicinal properties or origins.

Emerging Applications: Beyond direct human health, some plants show unexpected potential, such as Erabadu (*Erythrina variegata*)'s capacity for heavy metal removal (phytoremediation) (Surbhi & Senthil kumar, 2024; Palani & Anitha, 2020). The valorization of Kopi Dalu (*Coffea spp.*) leaves into novel functional beverages, as recognized by EU approval, further demonstrates the ongoing potential for these botanical resources to contribute to both public health and sustainable economic practices (Maimaiti & Li, 2024; Rull & Sani, 2020; Jayasinghe & Abeysekera, 2021).

Future Directions and Recommendations: The findings of this analysis underscore several critical areas for future research. To address the ambiguities in Ayurvedic pharmacodynamics and common names, comprehensive studies focused on the precise botanical identification and phytochemical profiling of these plants are necessary. Furthermore, rigorous toxicological and clinical trials are required to validate the traditional uses and to establish standardized dosage protocols, particularly given the safety considerations noted. The documented ethnobotanical knowledge, folklore, and specific preparation methods of the Kandyan community provide a valuable foundation for these investigations. Capturing this heritage through further

ethnographic research will be vital for preserving this knowledge and for developing sustainable, culturally relevant nutraceuticals and functional food products.

CONCLUSION

This report provides a comprehensive analysis of seven significant Sri Lankan medicinal plants, integrating their ethnobotanical context with detailed phytochemical and pharmacological evidence, and is significant for its contribution to preserving and promoting Sri Lanka's culinary heritage, particularly by highlighting the unique regional food varieties found in the Kandyan region. In essence, the selected Sri Lankan medicinal plants represent a rich and underexplored reservoir of therapeutic agents. The integration of traditional Ayurvedic knowledge with modern scientific inquiry not only validates ancient wisdom but also provides a robust framework for identifying novel bioactive compounds, elucidating their mechanisms of action, and developing new pharmaceutical, nutraceutical, and functional food products. Continued interdisciplinary research, addressing existing ambiguities and focusing on standardization and safety, is crucial to fully harness the therapeutic value of these remarkable botanical resources for global health.

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