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Review Article

PHARMACOGNOSTICAL REVIEW ON SUBSTITUTES FOR TEJAPATRA IN SRI LANKAN HERBAL MEDICINE

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Abstract

Tejapatra or Patra is a well-known herbal ingredient which is included in numerous Ayurvedic and Indigenous medicinal preparations. Most books revealed Tejapatra / Patra is a leaves of Tamalapatra (*Cinnamomum tamala* L.), and this plant is grown in India and does not grow in Sri Lanka. However, some texts state that leaves of Kurudu (*Cinamomum zeylanicum*) take as a Tejapatra / Patra whereas certain other books mentioned Kollankola (*Pogostemon heyneanus* R.) used as a Tejapatra / Patra. Practically, for the preparation of herbal medicine in Sri Lanka these both varieties (Kurudukola and Kollankola) are taken as a substitute to Tejapatra / Patra. Therefore, this literary study was carried out to analyze Ayurvedic pharmacodynamic and modern Morphological, Microscopical, physiochemical, Chemical and Biological characteristics of Kurudukola, Kollankola and Tamalapatra to find out most appropriate leaves could be used as a substitute to the classical Tamalapatra. Literature found out both Kurudukola and Kollankola have similar and dissimilar characteristics compare to the Tamalapatra and hence these two plants could be used in place of Tamalapatra.

Key words: Tejapatra; Tamalapatra; Kollankola; Kurudukola

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INTRODUCTION

Polyherbal formulations used in Sri Lankan herbal medicine as well as Ayurveda medicine are common and due to various factors, ingredients of them are being alternated in commerce. Amongst them, Tejapatra (*Cinnamomum tamala* L.), which does not grow in Sri Lanka, is substituted either by Kollankola (*Pogostemon heyneanus* R.) or Kurudukola {*Cinamomum verum* J.S. Presl (ex; *zeylanicum*)}.

For example of Chandraprabha vati in English translation of Sharanghadara Samhita mentioned Tejapatra is Patraka,[1] Sinhala translation of Sharanghadara Samhita[2] mentioned Kollankola for the place of Patra and Ayurvedic Pharmacy[3] mentioned Kurundukola instead of Patra. Therefore, this study conducted to analyze various range of characteristics of Tamalapatra, Kurudukola and Kollankola, for evaluation of their equivalent or different qualities and justify the use of Kurudukola or Kollankola instead of Tamalapatra.

MATERIALS AND METHODS

The study was done by using literature of Ayurvedic pharmacodynamic and modern morphological, microscopical, physiochemical, chemical and biological characteristics of Kurudukola, Kollankola and Tamalapatra.

RESULTS

Table 1 is shown the comparison of Tamalapatra, Kurudukola and Kollankola with different characteristics.

DISCUSSION

Tamala and Kurudu are trees and the family is Lauraceae,[4][5] Kollankola is a herb and the family is Lamiaceae.[6] Kurudu and Tamala are mentioned under Karpuradi kula in Ayurvedic literature,[7][8] but Kollankola mentioned under Tulsi kula.[6] Microscopical characters having some similarities between leaves of Tamala and Kurudu[10][11] but completely dissimilar with Kollankola.[12] Literature revealed that the Rasa, Guna, Virya, Vipaka and Doshakarma is same in Tamalapatra and Kollankola,[7][13] because these two plants mentioned under Tejapatra.[1][3]

Ruksha Guna is additionally mentioned in Kurudukola[13] and Tikta, Katu, Madhura Rasa and Laghu, Tikshna Guna are same in all plants.[7][13][6] Ushna is the Virya of all plants and Vipaka is katu.[7][13][6] Kapha and Vatahara action is common in all plants but additionally mentioned Pitta vardhaka action in Kurudukola.[13]

Presence of essential oil is reported in all the three plants but the active ingredient is entirely different from each other.[14] However, triterpine α-pinene can be seen in all three plants.[6][15][16] Cinnamaldehyde, Linalool, Benzaldehyde, p-cymene and β phellandrene are both in Tamalapatra and Kurudukola.[15][16] Only β-pinene in Tamalapatra and Kollankola and caryophyllene in Kurudukola and Kollankola.[6][15][16]

Physiochemical parameters are different in each plant but all three plants have reported antimicrobial and anti-fungal action.[17][18]

CONCLUSION

The results revealed that, leaves of Kurudukola and Kollankola both have similar characteristics with Tamalapatra and hence these two plants could be used in place of Tamalapatra. But further clinical trials needed to be carried out to justify Kurundukola and Kollankola as potential substitutes to classical Tamalapathra.

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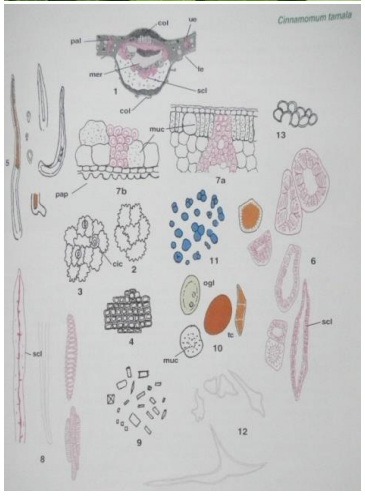
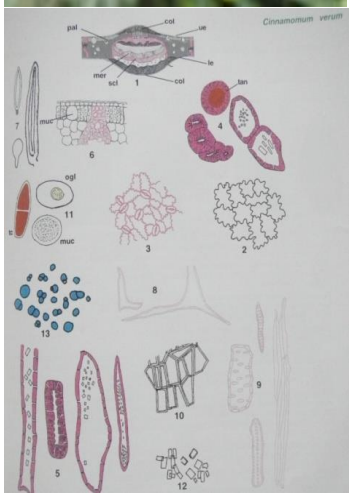
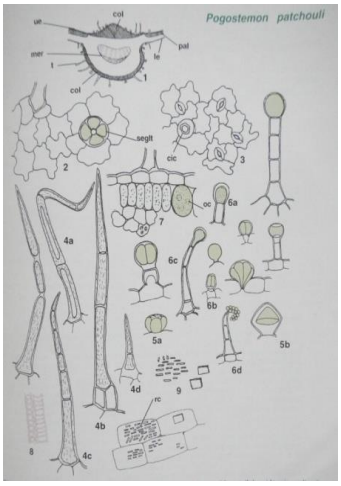
Table 1: Comparison of Tamalapatra, Kurudukola and Kollankola

	Cinnamomum tamala **(Tamalapatra)**	***Cinnamomum zeylanicum*** **(Kurudukola)**	***Pogostemon heyneanus*** **(Kollankola)**
Family:	Lauraceae[4]	Lauraceae[5]	Lamiaceae[6]
Ayurveda Kula:	Karpuradi[7]	Karpuradi[8]	Tulasi[6]
Description of plant:	A medium size tree, 7.5m in height and 1.35m in girth. Bark dark brown; leaves opposite or sometimes alternate, flowers pale yellow, pubescent, in panicles; fruits black, ovoid.[4]	A moderate size or large tree with a rather thick, reddish bark. Leaves simple opposite or sub opposite without stipules; flowers bisexual or monoecious, pale yellow, small.[5]	A large, straggling undershrub with horizontal branches. Leaves simple, opposite; flowers irregular, bisexual and white.[9]
Microscopical characteristics [10][11][12]	 	 	 
Pharmacodynamic properties according to Ayurveda:	Rasa-Tikta, Katu, Madhura Guna-Laghu, Tikshna Virya-Ushna Vipaka- Katu Dosha karma- Kapha Vatahara[7]	Rasa-Tikta, Katu, Madhura Guna-Laghu, Ruksha, Tikshna Virya-Ushna Vipaka-Katu Dosha karma- Kapha Vatahara, Pittavardhaka[13]	Rasa-Tikta, Katu, Madhura Guna-Laghu, Tikshna Virya-Ushna Vipaka- Katu Dosha karma- Kapha Vatahara[6]
From Leaves:	Yield an essential oil (0.3-0.6%w/w) yellow to dark brown coloured liquid, penetrating fragrant odour, very pungent taste.[14]	Yield an essential oil (2-3%w/w) dark brown coloured liquid, penetrating fragrant odour, very pungent taste.[14]	Yield an essential oil (1.5-2%w/w), light yellow to brown in colour, odour is characteristic woody.[14]
Active principle of the essential oil:	β-Caryophyllene[14]	Euginol[14]	Patchouli alcohol[14]
Essential oil content:	0.70-1.0% v/w	1.5-2.5% v/w	1.0-1.5% v/w
Total ash:	15-17 w/w	14-15 w/w	12-13 w/w

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Acid insoluble ash:	1.3-1.5 w/w	1.2-1.3% w/w	Less than 1%w/w
Water soluble Extractive:	8-10% w/w	12-15% w/w	6-7% w/w
Alcohol soluble Extractive:	13-14% w/w	14-15% w/w	16-17% w/w
pH on water extract after 1hour:	6.8	6.5	6.5
Presence of Mucilage:	Present [14]	Present[14]	Absent[14]
Chemical composition of essential oil;	Cinnamic aldehyde Linalool, Eugenol, Eugenol acetate, Benzaldehyde, Camphor, Cadinene, α – terpineol, α and β-pinene, p-cymene, limonene, geraniol, ocimene, γ- terpinene, β phellandrene, benzylecinnamate, benzyle acetate[15]	Cinnamaldehyde, O-methyle eugenol Benzaldehyde, l-α-pinene l-α and l-β phellandrene, p-cymene, caryophyllene, benzyle benzoate, linalool, safrole, acetyleugenol, cinnamyl acetate, cinnamyl alcohol[16]	α-pinene, β-pinene, nerolidol, β-patchouline, α- patchouline, β – caryophyllene α-guaiene , delta guaiene seycheline, α- gurjunene[6]
Experimental pharmacology	The essential oil from leaves possesses anti- bacterial and anti -fungal properties[17]	Antibacterial and antifungal activities of the essential oil have been demonstrated *in vitro*. The essential oil of *C. verum* is active *in vitro* against the following bacteria: *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus* , *Salmonella typhimurium*, and *Pseudomonas aeruginosa*. It was also active *in vitro* against the following fungi: *Aspergillus* spp., *Cladosporium werneckii*, *Geotrichum candidum*, *Kloeckera apivulata*, *Candida lipolytica* and *C. albicans*[18]	Animal data suggests that patchouly oil is nontoxic with short term oral use. Patchouly oil may have bactericidal activity, and the component pogostone appears to have antibacterial and antifungal activities. The components eugenol, cinnamaldehyde, and benzaldehyde may have insecticidal activity against insects in stored grain[19]

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