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EXPLORATION OF THE SOURCE PLANT OF "*LESHOKTA DRAVYA PRACHINAMALAKA*" (NON-PRECISE DRUG OF AYURVEDA): AN EXPERIMENTAL STUDY

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ABSTRACT

INTRODUCTION

The study focuses on identifying the source of the Prachinamalaka plant mentioned in Ayurvedic texts such as Shivakosha, with the help of pharmacognosy and rasa pariksha. The plant is categorized as one of the Leshokta plants, with its references available in the Phalavarga of Samhitas and Nighantus. Morphological similarities indicate two potential sources: Flacourtia montana (red-colored fruits resembling Prachinamalaka) and *Baccaurea courtallensis* (wild edible fruit in Kerala with traditional uses). The study aims to analyze and determine the plant's source.

Rationale of study -

The experiment of taste determination of *Flacourtia montana* and *B. courtallensis* has been conducted as two source plants of Prachinamalaka (*Leshokta dravya*).

Materials and Methodology:

1. Fruits of Flacourtia montana (F. montana) and *Baccaurea courtallensis* (B. courtallensis).
2. Standard proforma for taste determination (Pilot study by Nisteshwar *et al.*).

Experimental Steps:

- Fruits were authenticated by regional research institutes.
- Macroscopy (pharmacognosy) of the fruits was conducted.
- Samples were preserved as voucher specimens in a departmental laboratory.
- Rasa pariksha was conducted on 35 healthy volunteers for both fruits.

Procedure:

For B. courtallensis: Rind and pulp were tested separately using 5ml juice samples.

For F. montana: Whole fruit samples were tested.

Volunteers underwent preliminary screening using the 'Ashtavidh Pariksha' method and provided informed consent before the study. Observations on taste and aftertaste were documented via a structured questionnaire.

Results: -

Pharmacognosy findings:

F. montana: Red, cherry-sized fruits; sour and sweet taste; ethnomedicinal use for jaundice and abdominal disorders.

B. courtallensis: Pinkish-red fruits, wild edible, sour taste, traditionally used for pickling, and as anti-toxic and anti-inflammatory medicine.

Taste observations (Rasa Pariksha):

B. courtallensis: Amla (sour) rasa and Tikta-Kashay (bitter-astringent) anurasa for rind; Amla rasa for pulp.

F. montana: Amla (sour) rasa and Madhur (sweet) anurasa.

Volunteer responses highlighted distinct sensations like salivation, tingling, and pleasurable bodily effects from both fruit samples, which denotes more of sour taste.

Discussion: -

The experimental study established *Baccaurea courtallensis* as a possible source for Prachinamalaka based on taste similarity (Amla Rasa) and traditional knowledge from local uses. Pharmacognosy findings also support Flacourtia montana due to morphological parallels. However, traditional uses, suggest that both plants could potentially serve as sources for Prachinamalaka, depending on regional interpretations.

Conclusion: -

The study concluded that B. courtallensis is closer to the description of Prachinamalaka as per the rasa pariksha experiment, with supporting traditional and morphological evidence. However, a single rasa determination cannot definitively confirm the source. Further comprehensive research involving larger populations and advanced methodologies is necessary to reach a final conclusion about the textual Prachinamalaka plant.

Keywords: Prachinamalaka, Leshokta, Phalavarga, Samhitas, Nighantus, Morphology, *Flacourtia montana*, *Baccaurea courtallensis*

INTRODUCTION –

In *Ayurveda*, the terms ***Anukta*** and ***Leshokta*** are used to classify substances based on their mention in classical texts. ***Anukta*** refers to entities that are not mentioned or extra-pharmacopeial, while ***Leshokta*** refers to entities that are briefly mentioned. According to *Charaka samhita Sutrasthana* **[1]**, not all drugs are described in detail to avoid excessive expansion. The properties of drugs can vary according to their habitat, making it essential to examine the drug (*Dravya Swarupa Pariksha & Dravya Prayoga Pariksha*) before use. For undescribed or extra-pharmacopeial drugs, it is crucial to determine their *Rasapanchak Pariksha* using their *Panchbhautika* constitution and infer their actions through experimental studies.

A search in Ayurveda classics revealed that one *leshokta dravya* of *phalavarga* is '*Prachinamalaka*,' which has limited description and requires further exploration. The fruits of *Prachinamalaka* are used for *Vishaghna* (anti-toxic), *Jwaraghna* (antipyretic), and *Tridoshaghna* (balancing the three doshas) purposes. *Prachinamalaka* is mentioned in *Bruhattrayee's phalavarga* and *amlavarga*, but it is not prevalently used in clinical practices **[2-3]**. Identification characters of *Prachinamalaka* according to *Ayurveda* include habitat near water bodies (*Paniyamalaka*), red-colored fruit (*Raktam*), berry-sized fruit (*Badaramlaka*), and sour taste.

Table 1: Textual references of uses of *Prachinamlaka* [4-12]

Ref.	Prachinamalaka Uses
Charaka samhita (phala varga)	***Doshaghna, Vishaghna***
Sushrut Samhita (phalavarga)	***Garadosha hara***
Ashtang hriday (phala varga)	***Alpaguna* than *Pilu***
Ashtang sangrah (phala varga)	***Alpaguna* than *Pilu***
Dhanvantari Nghantu	***Vaat shamak, Durjaram guru***
Madanpal nighantu (phaladi varga)	***Jwarahara, Tridoshhara***
Kaiyadeva (aushadhi varga)	***Vishghna, Ruchya***
Bhavprakash (amraphaladi varga)	***Tridoshhara, Jwarahara***
Shivakosha	**Mentioned**
Bhojanakutuhala	**Indigestion (overdose)**

Many stalwarts of *Dravyaguna* accept *Flacourtia montana* as the botanical source of *Prachinamalaka* due to the habitual and morphological similarities of its fruits. However, scientific research on this has not been conducted yet.

Flacourtia montana is a medium-sized tree with thorny branches, commonly found in the forests of Maharashtra's Konkan region. It produces red-colored, cherry-sized, six-seeded wild edible fruits. Its regional name is Atak. Ethnomedicinally, it is

used for the treatment of jaundice and abdominal disorders.

Another edible fruit from Kerala, *Baccaurea courtallensis*, also shows habitual and morphological similarities with Prachinamalaka. As a result, many experts from southern states accept it as a potential source of Prachinamalaka, although it requires experimental evaluation of its fruit.

Baccaurea courtallensis is a tree commonly found in the evergreen forests of the Western Ghats and parts of the southern Indian state of Kerala **[13]**. It is commonly known as '*Mooti Maram'* or '*Mooti Pazham'* tree. Other regional names include Mootapalam, *Muttithuri*, *Kalikuki*, and *Muttathuri*. It bears red-colored, fleshy fruits that are edible. Local tribal communities, such as the *Irula, Kuruma, Kattunaika, Kurichia, Kani, Paniya*, and *Adiya*, use these fruits to make various formulations like pickles and murabbas **[14-16]**. *Baccaurea courtallensis* has demonstrated potential as an antioxidant and has anti-inflammatory effects. Preliminary phytochemical analysis and in vitro antioxidant activity studies of *Baccaurea courtallensis* have also been conducted.

Table 2: Ethnobotanical uses of *Baccurea courtallensis* [17]

Botanical name	Local name	Part used	Uses
B. Courtallensis	**Mootapalam/ Muttithuri/ Kalikuki/ Muttathuri.**	**Root, leaves**	**The paste of root and leaves are mixed with hot water and taken internally to treat piles and act as antidote**
		Fruit	**Local tribal people use treatment for sterility, mouth, and stomach ulcers and for controlling serum cholesterol degree**
		Fruit rind	**In Kerala, fruit rind is pickled. The pericarp of tender fruit is consumed as antipyretic.**
		Leave	**In Kerala, boiled water of fruits, bark and leaves powder form is taken internally to take out poison traditionally. The fresh leaves paste is applied on swellings for anti-inflammatory purposes.**

The study involves the *Rasapariksha* (taste determination experiment) of two sources of the *Prachinamalaka* plant based on the descriptions provided in the Ayurveda classics.

RATIONALE OF STUDY -

The experiment of taste determination of *Flacourtia montana* and *B. courtallensis* has been conducted as two source plants of Prachinamalaka (*Leshokta dravya*).

OBJECTIVE –

To study the source of *Prachinamalaka* plant mentioned in Shivakosha with the help of pharmacognocy and rasa pariksha/ taste determination.

MATERIALS & METHODOLOGY

Materials -

1. Fruits of *B. courtallensis* Mull.
2. Fruits of *F. montana*
3. Standard proforma of taste determination **[18]** - Nisteshwar K. Pilot study on rasa (taste quality) determination of an extra ayurvedic pharmacopeial drug *Bulbophyllum neilgherrense* wight Annals of ayurvedic medicine Vol. 2 Issue- 3 July- Sept. 2013

Steps of experimental study –

Fruits of *B. courtallensis* were collected from Vanappuram dist. Idukki, Kerala & *F. montana* from Rajapur dist. Ratnagiri, Maharashtra

↓

Authentication of *B. courtallensis* were done from TBGRI Trivendram, Kerala, & *F. montana* from RARI, CCRAS Pune, Maharashtra

↓

Pharmacognocy (macroscopy) of the fruit was done in PDEA's College of Ayurveda and Research centre's laboratory at Nigdi Pune.

↓

Voucher specimen is preserved in departmental laboratory (Dept. of Dravyaguna)

↓

Rasa pariksha on 35 healthy volunteers was done.

↓

Result of experiment

↓

Conclusion of experiment

Plan of work –

Table 3

Experimental Fruits	*F. montana*	*B. courtallensis*
Plan of work	Rasa Pariksha by rasa nirdharan method	Rasa Pariksha by rasa nirdharan method
No. of volunteers	35 healthy volunteers	35 healthy volunteers

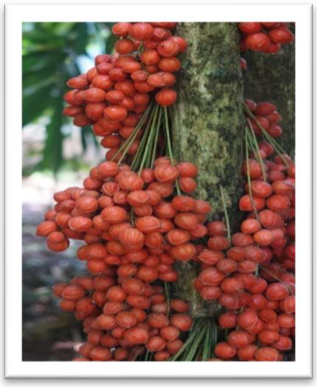
Pharmacognocy of *Flacourtia montana*

Flacourtia montana (Fam. – Salicaceae, flacourtiaceae) is middle or large sized thorny tree (5cm – 8 cm), distributed in western ghats of Konkan. Its leaves are ovate, with small flowers. It has red-coloured cherry sized fruits, with approx. six seeds. These fruits are edible and ethnomedicinally used for Jaundice, abdominal disorder. It is popular by its regional name *Ataka.*

Pharmacognocy of *Baccouria courtallensis*

Baccouria courtallensis is lesser-known wild edible tree distributed in Western Ghats of Karnataka, Kerala and Tamil Nadu and belongs to the family Euphorbiaceae. It is an evergreen forest tree with 15-18 m height; bark greyish in colour; branchlets rough. Leaves 10-18 x 1.5-8 cm, simple, alternate; Flowers are unisexual, crimson red, in densely clustered slender racemes forming rings around on tree trunk. Fruits are thick walled, pinkish red when ripe, after dry turns into brown in colour, often pubescent, dehiscent. Seeds 3, oblong, flat, leathery outer coat, inner coat brown, aril white.

Irula, Kuruma, Kattunaika, Kurichia, Kani, Paniya, Adiya tribes from western ghats use Stem, Leaves, Roots, Fruits of *B. courtallensis* in everyday practices and for treating diseases traditionally **[17]**. The plant commonly called *Mootapalam, Muttithuri, Kalikuki, Muttathuri, Koli, Kukke, Moottilpuli*, their edible fruits are sour in taste, fruit's rind use for pickling purpose. Roots are used of treating piles, leaves, fruits, and bark are together taken internally to take poison out, other uses for treatment of diarrhoea, dysentery, skin infection, controlling diabetes, piles, antidote, anti-inflammatory purposes etc. The most useful part of *B. courtallensis dravya* is fruit which is edible, sour in taste, daily consumed in form of pickle and also useful anti toxic, anti-inflammatory medicine as per folklore evidences.



***B. courtallensis* fruit**

Table 5: Macroscopy of fruits

Parameters	*F. montana* Fruit	*B. courtallensis* Mull. Fruit
Type of fruit	True fruit	True fruit
Aggregate of	Berry sized	Berry sized
Avg. weight	2.3gm.	17.12gm
Ave. size	1.87mm	31mm
Ridges	-	5-8
Organoleptic characters		
Colour	Brownish red	Creamsan red
Shape	Round/ oval	Spherical, Round/ oval
Odour	Characteristic	Characteristic
Texture	Somewhat hard but fleshy	Hard
Fracture	Smooth	Smooth

***F. montana* Fruit**

***B. courtallensis* Mull.**

SOP of *Rasapariksha* of *B. courtallensis* fruit and *F. montana*

1. *B. courtallensis* fruits of western ghat are collected from farm situated at a Vanappuram, dist. Idukki Kerala. These fruits were authenticated by TBGRI Trivendram Kerala. These fruits have watery pulp inside and somewhat hard outer rind. Taste of outer rind and inner pulp are somewhat different hence, instate of whole fruit rasapariksha of outer rind and pulp were conducted separately.
2. *F. montana* fruits are collected from wild region of Konkan, village Dongao tq. Rajapur dist. Ratnagiri, Maharashtra. These fruits were authenticated by reginal laboratory.

- The group of multiple people screened by '*Ashtavidh Pariksha',* to selected 35 healthy volunteers (35 volunteers for *B. courtallensis* fruit and 35 volunteers for *F. montana* fruits separately)
- Inform consent sheet was given to each selected volunteer and introduction of the procedure given orally.
- After recieved the consent form actual *Rsapariksha* performed
- Each volunteer asked whether he/she nil by mouth since night or not.
- Firstly, *B. courtallensis* fruit' rind juice of 5ml was given to each volunteer with yes/ no type questioner for *rasa* determination and multiple-choice questions for *Anurasa* determination.
- Volunteers were advised to took some sips of water for moisturized the mouth, then advised to take juice.
- They solved questioner accordingly.
- After rind juice experiment, they were asked to take water and rise out, and drink some sips to eliminate the previous taste of mouth.
- They were asked to take 5ml of *B. courtallensis* fruit's pulp juice and solve the questioner.
- They solved questioner accordingly.
- They submitted both questioner with answers.
- Whole fruit of *F. montana* was given to each volunteer with yes/ no type questioner for *rasa* determination and multiple-choice questions for *Anurasa* determination.
- Volunteers were advised to took some sips of water for moisturized the mouth, then advised to eat the fruit.
- They solved questioner accordingly.
- They submitted the questioner with answers.

Screening proforma for healthy volunteers

Experimental study of rasa assessment of *B. courtallensis* fruit in healthy volunteers

Name of volunteer:

Case no. Date:

Age:

Sex:

Address:

Weight:

Religion:

Height:

Occupation:

Rutu:

Marital status:

BMI:

Education:

Current disease/symptoms (within 7 days):

Family history:

अष्टविध परीक्षण (प्रश्न परीक्षा)

1. नाडी
2. मल
3. मूत्र
4. जिह्वा
5. नेत्र
6. क्षुधा
7. तृष्णा
8. आकृती

Table 4: Questionary as per standard proforma used

Sr. No.	Symptoms	Questionary	Finding (Y/N)
1.	Besmears the mouth	तोंडात लिंपुन टाकल्याप्रमाणे वाटते का?	
2.	Feeling of unctuousness	तोंडात गुळगुळीत/ स्निग्ध झाले का?	
3.	Pleasurable sensation in body	खाल्ल्या खाल्ल्या मनाला प्रसन्नता वाटली का?	
4.	Abundant saliva secretion thereby cleansing the mouth	मुखात लालास्त्राव होऊन मुख स्वच्छ झाल्यासारखे वाटते का?	
5.	Tingling sensation of teeth	दात आंबल्यासारखे वाटतात का?	
6.	Horripilation in skin	अंगावर काटा आला का?	
7.	Shrinking of eyebrows and lids	भुवया आणि डोळ्यांच्या पापण्या आकुंचीत झाल्या का?	
8.	Tongue and mouth get moistened and soft	जीभ व मुखात स्त्राव होऊन ओलावा व मृदुता जाणवली का?	
9.	ing sensation in buccal cavity and throat	मुखात व गळ्यात आग होते का?	
10.	Tingling sensation on tongue tip	जिभेच्या टोकाला टोचते/ चुरचुरते का?	
11.	Burning sensation in tongue and oral cavity	जिव्हाग्र, मुख ते घश्यापर्यंत दाह जाणवतो का?	
12.	Salivation	मुखस्त्राव झाला का?	
13.	Secretions from eyes and nose	नाका-डोळ्यांतून पाणी स्त्रावले का?	
14.	Cleansing and drying the mouth	मुख स्वच्छ होऊन कोरडे झाल्याप्रमाणे वाटले का?	
15.	Feeling of temporary loss of taste of perception	तात्पुरती तोंडाची चव गेली का?	
16.	Feeling of stiffness in tongue	जीभ जड, आकसल्याप्रमाणे वाटली का? तोंड स्वच्छ झाले का?	
17.	Chocking feeling in throat	घश्याला तोठरा बसून आवळल्याप्रमाणे वाटते का?	

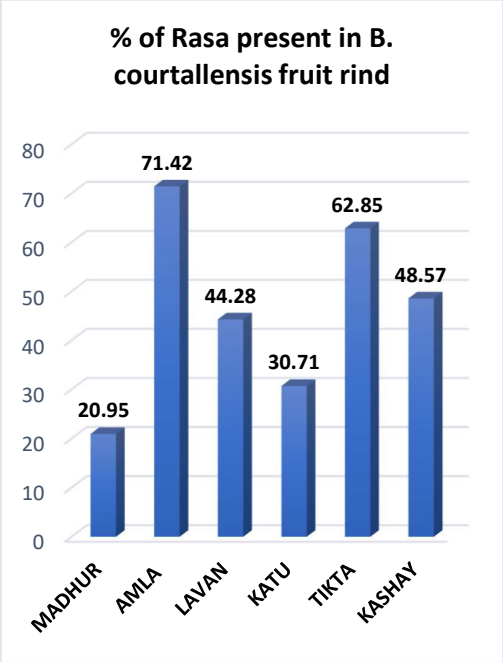
Assessment criteria –

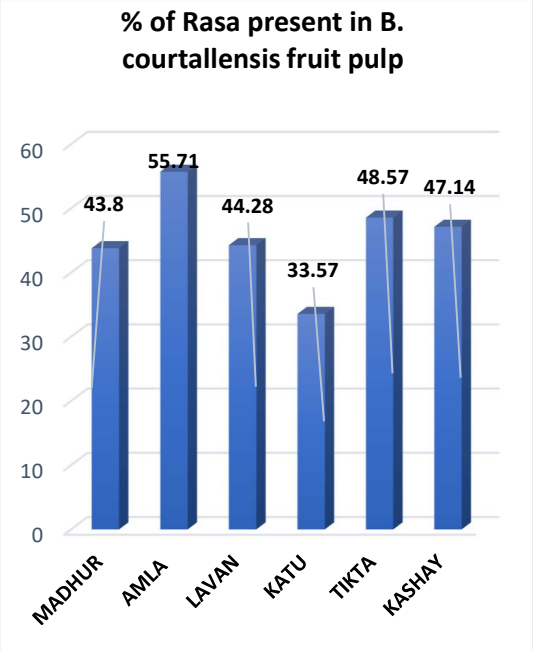
1. First detected *Rasa* having higher percentage of positive responses will be the *Pradhan rasa* **[19]**.
2. *Rasa* having higher 2nd, 3rd percentage of positive responses will be the *Anu-rasa* **[19]**.

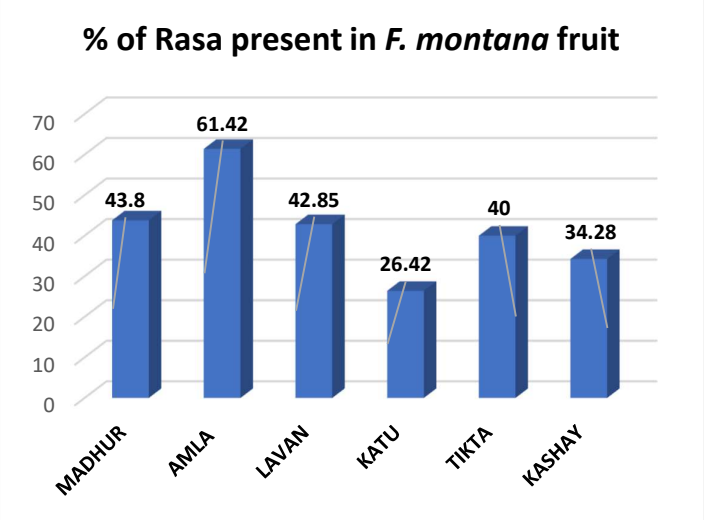
Table 6: Observations Taste determination of Fruits

Sr. No.	Symptoms		Positive response of volunteers in %		
			B. courtallensis Fruit (Rind)	*B. courtallensis* Fruit (Pulp)	*F. montana* Fruit
1.	Besmears the mouth	*Madhur*	20	31.42	20
2.	Feeling of unctuousness		17.14	25.71	45.71
3.	Pleasurable sensation in body		25.71	74.28	65.71
4.	Abundant saliva secretion thereby cleansing the mouth	*Amla*	94.28	97.14	80
5.	Tingling sensation of teeth		74.28	40	60
6.	Horripilation in skin		42.85	22.85	34.28
7.	Shrinking of eyebrows and lids		74.28	62.85	71.42
8.	Tongue and mouth get moistened and soft	*Lavan*	85.71	80	85.71
9.	Burning sensation in buccal cavity and throat		2.85	8.57	0
10.	Tingling sensation on tongue tip	*Katu*	20	17.14	11.42
11.	Burning sensation in tongue and oral cavity		11.42	14.28	5.71
12.	Salivation		88.57	97.14	85.71
13.	Secretions from eyes and nose		2.85	5.71	2.85
14.	Feeling of temporary loss of taste of perception	*Tikta*	62.85	48.57	40
15.	Feeling of stiffness in tongue	*Kashaya*	68.57	62.85	51.42
16.	Chocking feeling in throat		28.57	31.42	17.14

Graphical presentation of above observations: -







RESULT: -

B. courtallensis Mull. fruit has *Amla* Rasa and *Tikta* - *Kashay Anurasa*

F. montana, fruit has *Amla* Rasa and *Madhur Anurasa*.

DISCUSSION -

Taste by tongue is the best method for ascertaining the Rasa of a drug as Rasa is nothing but an experience perceived by tongue. Rasa is one of the tools for identification of the drug and to know the therapeutic application. According to the standard proforma of taste determination

was used to decide source plant of textual *Prachinamalaka* plant. *B. courtallensis Mull*., an herb in tribal use has shown to have Amla Rasa and Tikta - Kashay Anurasa & *F. montana,* fruit has Amla Rasa and Madhur Anurasa.

Fruits of *B. courtallensis* and *F. montana* both having Amla rasa. Among these two plants *F. montana* is a thorny plant. Textual references of *Prachinamalaka* are from *Amla skandha.* There is not a single reference of *Prachinamalaka* that it has thorns.

With references and results *B. courtallensis* is nearer to *Prachinamalaka*. Further study is needed to reach at final conclusion about source of textual *Prachinmalaka* plant.

CONCLUSION: -

Rasa pariksha experiment conducted to find two source plants of *Prachinamalaka* i.e. *F. montana* & *B. courtallensis* for their *Pradana rasa* and *Anurasa* based on Shivadatta's description. *B. courtallensis* is nearer to *Prachinamalaka*. Further study is needed to reach at final conclusion about source of textual *Prachinmalaka* plant.

But one cannot decide the source plant from single taste. Hence, further research is needed for ultimate decision.

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