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Pharmacognostic Study of *Bhustrina* (*Cymbopogon citratus* Stapf.)

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ABSTRACT

Background: The plant *Cymbopogon citratus* Stapf. commonly known as Lemon grass belongs to Poeceae family and is a native of tropical countries, especially in Southeast Asia. Various studies has been done on the plant to reveal its potential therapeutic effects. **Methodology:** The study deals with detailed study about Ayurvedic literature of *Cymbopogon*, macro morphology and microscopy of transverse section of the *Cymbopogon* leaves. Other parameters like physicochemical constants and phytochemical screening were studied using the standard protocol. **Results:** The study provides referential information for the correct identification and standardization of crude drug of *Cymbopogon citratus* Stapf.

Key words: *Bhustrina, Lemon grass, Cymbopogon citratus Stapf.*

INTRODUCTION

Healing using the medicinal plants is as old as mankind itself. The connection between man, nature and his search for drugs in nature dates from the far past. We have enough evidence from various sources like written documents, preserved monuments, and even original plant medicines. In the recent era, the medicinal plants have gained popularity in treating many ailments in the society. But the sad fact is that many globally valuable plant sources are disappearing at a high speed.

Cymbopogon citratus Stapf. is a popular, aromatic and evergreen plant that has been listed under the Ayurvedic literatures as well as the pharmacopoeias. The grass owns a remarkable seat in the South Asian culinary systems. Apart from that researches have proven the plant possesses various pharmacological activities such as anti-amoebic, [1] antibacterial, [2] antidiarrheal,[3] antifungal,[4] and anti-inflammatory[5] properties. The other activities like antimalarial,[6] antinociceptive,[7] antioxidants,[8] hypoglycaemic and neurobehavioral have also been studied. These results are very encouraging and indicate that this more extensively to confirm these results and reveal other potential therapeutic effects.

The current study gives an insight of Ayurveda literature about the plant, detailed macro morphology and microscopy of transverse section of the *Cymbopogon* leaves. Other parameters like physicochemical constants and phytochemical screening was also looked upon to confirm the authenticity of the crude drug.

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LITERATURE STUDY

Cymbopogon is referred as Bhustrina in Ayurveda. Bhustrina is combined of two words, bhu + truna which mean that it covers the ground either by aroma or spread in bunches. Ayurveda quotes the drug in various nighantus and the properties are explained.(Table 1)

ISSN: 2456-3110 ORIGINAL ARTICLE Mar-Apr 2020

Table 1: Properties of Bhustrina in Nighantus[9]

SN	*Nighantu*	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Karma*	*Rogaghnata*
1.	Bhavaprakasha	Katu Tikta	Teekshna Ushna Rechana	Ushna	Katu	Swedajanan Mutrajanana Jwaragna Uttejaka Vatanulomana Chetanakaraka Udwestananirodhi Mukhashuddhikaraka Kaphavatahara Deepana Pachana Ruchya	Pratishyaya Jwara Vamana Atisara Aadhmana Shoola Aakshepa Visoochika
2.	Kayyadeva	Katu Tikta	Teekshn Ushna Rechana Laghu Rooksha	Ushna	Katu	Vidaha Teekshna Ushna Laghu Ruchikaraka Ruksha Agnideepak Mukhashodhana Avrushya Raktapittakaraka	Krimi Kasa Shwasa Dadru
3.	Raja	Katu Tikta	-	-	-	Hantibhutagraha Vishadoshanashana Vatasantapanasha	-
4.	Dhanwantari	-	Laghu Ushna Ruksha			Sleshma Aama	Jantusamuttan
5.	Madanapala	Katu Tikta	-	-	-	Vatashamana Sleshmagna	Kushtanashan Arochaka Krimigna

ISSN: 2456-3110 ORIGINAL ARTICLE Mar-Apr 2020

							Udardashamana
6.	Adarsha	Katu Tikta Kashaya	-	-	-	-	-
7.	Madhava dravyaguna	Katu	Teekshna	-	-	Vaktrashodhana	-
8.	Siddhasara	Tikta	Ushna	-	-	-	-

Abhidanamanjari, Abhidanaratnamala, Astanga nighantu, Chamatkar nighantu, Dravyaguna sangraha, Paryayaratnamala, Madanapala nighantu, Madanadi nighantu, Rajavallabha Nighantu, Laghunighantu, Shivakosha, Saraswathi nighantu, Sidhamantra, Shodala nighantu, Soushrutha nighantu, and *Hridayadeepika Nighantu* donot have reference about the drug.

Cymbopogon citratus (DC.) Stapf (Poaceae family), commonly known as lemon grass, is a perennial tropical grass with thin, long leaves and is one of the main medicinal and aromatic plants cultivated in different parts of the world. The name *Cymbopogon* is derived from the Greek words 'kymbe' (boat) and 'pogon' (beard), referring to the flower spike arrangement.[10] *Cymbopogon* are perinnial plants that are tall up to and above 1m. They possess narrow and and long leaves which mostly has presence of silica thorns at its edges.

The leaves are 0.5 to 1 inch (1.3-2.5cm) wide, about 3 ft (0.9m) long and have gracefully drooping tips. The evergreen leaves appear bright bluish green and when crushed releases a citrus aroma. The leaves bear glandular hairs which are usually present with a basal cell. The Leaf arrangement is mostly from the soil, usually without a stem. Leaf belongs to simple with linear shape and entire margin. They have a defined parallel venation which has persistent citrus fragrance. The leaf blade is long up to 36 inch and the leaf colour is green. Plant is known for its essential oil which is widely used in flavouring, fragrance, aroma therapy, medical industry and as a culinary herb. *Cymbopogon* is used in various parts of the world in treating the digestive disorders, fever, menstrual disorders and joint diseases.

Figure 1: Lemon Grass

As per the geographic origin the chemical composition of the plant varies, however the compounds like hydrocarbon terpenes, alcohols, ketones, esters and mainly aldehydes are constants in the plant. Quantitative study indicates presence of essential oils like Citral α, Citral β, Nerol Geraniol, Citronellal, Terpinolene, Geranyl acetate, Myrecene and Terpinol Methylheptenone. Cympopogon also has the presence of rich phytoconstituents such as flavonoids and phenolic compounds. The Phenolic compounds includeluteolin, isoorientin 2'-O-rhamnoside, quercetin, kaempferol and apiginin.[11]

The plant *Cymbopogon citratus* Stapf. have been reported with activities like Anti amoebic, Antibacterial, Antidiarrhoeal, Antifungal, Antimalarial, Anti-inflammatory and Anti-anxiety. A study also says,

ISSN: 2456-3110 ORIGINAL ARTICLE Mar-Apr 2020

the leaves are popularly used as antispasmodic, analgesic, anti-inflammatory, antipyretic, diuretic and sedative.The study about the antioxidants and antinociceptive activities has been carried out in in lemongrass. A few ethno botanical trials, reports on treatment of fever and headache were investigated.

Materials and Methods

Cymbopogon citratus leaves were collected from the campus of Sri Sri College of Ayurvedic Science & Research, Bangalore, and preserved as per the standard method. The taxonomic identity of the plant was confirmed by Dr. Shivamanjunatha M.P., Scientist (Texonomist), Department of Dravyaguna, Sri Sri College of Ayurvedic Science & Research, Bangalore.

Pharmacognostic Evaluation

Organoleptic Evaluation - Organoleptic features of the plant were evaluated by observing color, odour, taste, size, shape of morphology and special features like texture. A part of quantitative microscopy, stomatal number, stomatal index, was determined by using fresh leaves of plant.

Comparison of the Sanskrit synonyms[12] of Cymbopogon with its morphological traits and characters

- मालातृण - Broad-leaved turpentine grass
- गुह्यबीज - having concealed seeds
- अतिछत्त्रक - marsh barbel flower
- सुगन्धा - type of fragrant grass
- रोहण - growing over
- गोमयप्रिय - fond of cow-dung

Microscopic Study

Transverse Section of Leaf

For qualitative microscopic analysis, transverse sections of the leaf were prepared. *Cymbopogon* leaves were boiled with water until it became soft. Hand sections of the leaves were cut and transferred to clean slides. As per the standard procedure, staining was performed. The identifying characters were studied with staining and the pictures were shot under Digital camera microscope.

Physicochemical analysis

Physico-chemical parameters like foreign organic matter, moisture content, ash value, extractive values, pH and specific gravity were determined as per the standard protocols done for medicinal plants

Phytochemical Screening

The phytochemical analysis was conducted to identify the natural phyto-constituents present in the powdered crude drug. All the tests were carried out using conventional protocols.

Results

Table 3: Organoleptic features of the leaves

Type	Simple leaf
Colour	Upper surface - dark green Lower surface - light green
Odour	Smells like Lemon
Taste	Bitter
Shape	Leaf blades linear & tapered to both ends
Venation	Parallel venation
Margin	Entire margin

Microscopic evaluation of Leaf

Leaf is isobilateral, vts of leaf at mid rib region mesophyll is bounded by an upper and lower epidermis. VTS of leaf at mid rib region showed that the mesophyll is not differentiated because of isobilateral nature. Homogenous tissue is scattered in the centre, which is parenchymatous in nature. These tissues is bounded by a upper and lower epidermal cells. Upper epidermis shows wavy structure, cells are oval to isodiametric in nature covered by a waxy cuticle. This is very rough in nature. The adaxial

ISSN: 2456-3110 ORIGINAL ARTICLE Mar-Apr 2020

surface is covered by single layer cells, which is also a wavy and very rough to touch and it is pricky in nature than the abaxial surface. The epidermal cells are very small than the upper epidermis. The mid rib portion is made up of parenchymatous cell and the 2-3 layer of portion near to the lower epidermis is made up of collenchymatous cells. Vascular bundles are observed near the lower epidermis, surrounded by sclerenchymal sheaths. The lower epidermises below the vascular bundles project outwards.

Figure 2: Microscopic Study of the Cymbopogon leaves

Fig. 2a: VTS of leaf

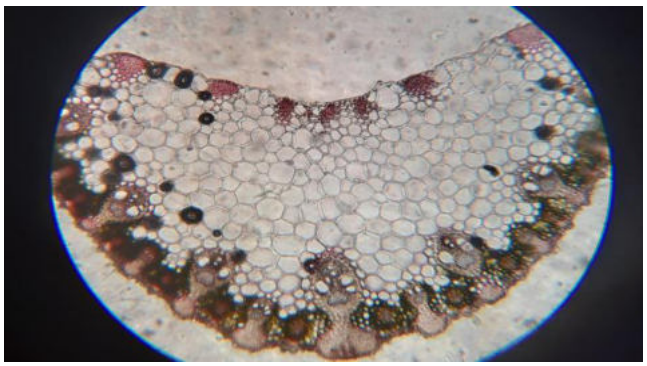

Fig. 2b: Section at midrib region

Fig. 2c: VTS of limina

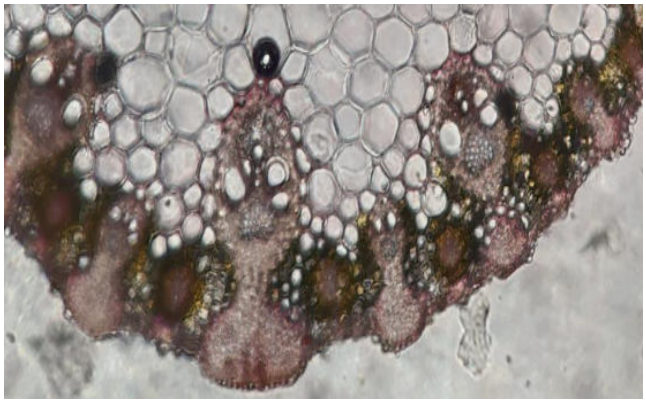

Fig. 2d: Section of lower epidermis at midrib

Fig. 2e: Portion of lamina

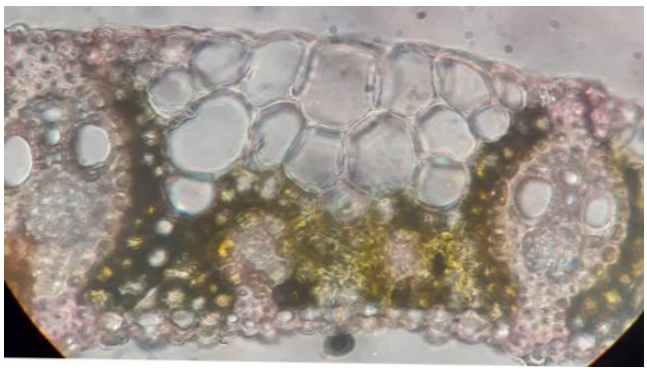

Fig. 2f: Enlarged portion of lamina

Fig. 2g: End portion of lamina

ISSN: 2456-3110 ORIGINAL ARTICLE Mar-Apr 2020

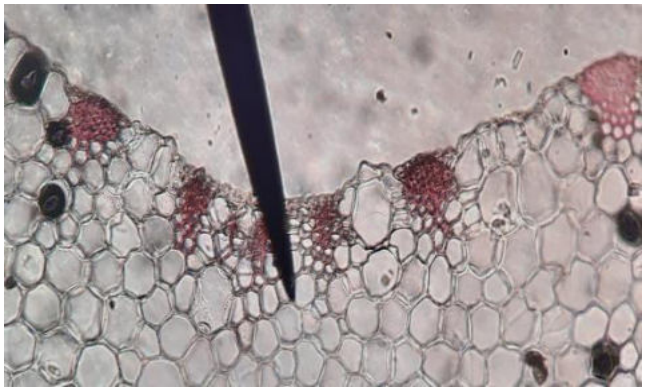

Fig. 2h: Enlarged portion of mid rib at adaxial surface

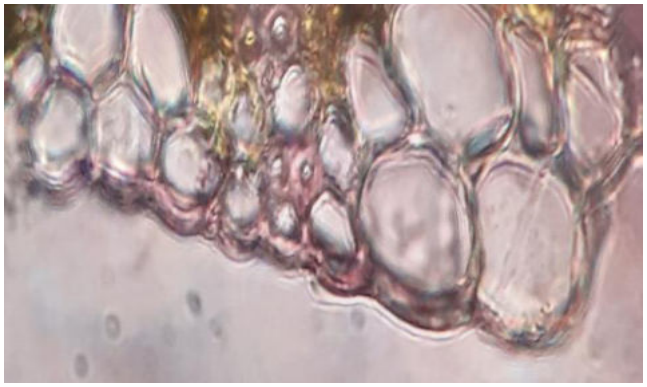

Fig. 2i: Abaxialepidermal cells

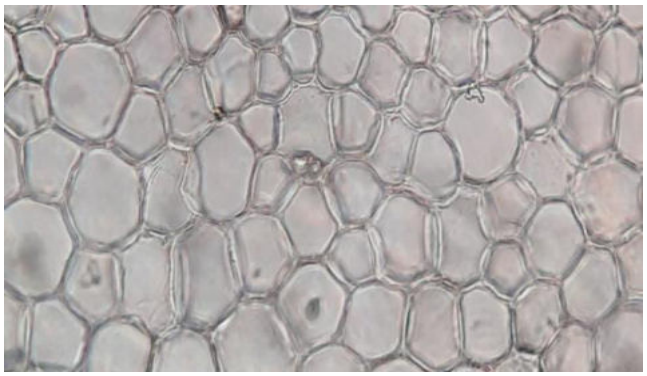

Fig. 2j: Tissues at midrib

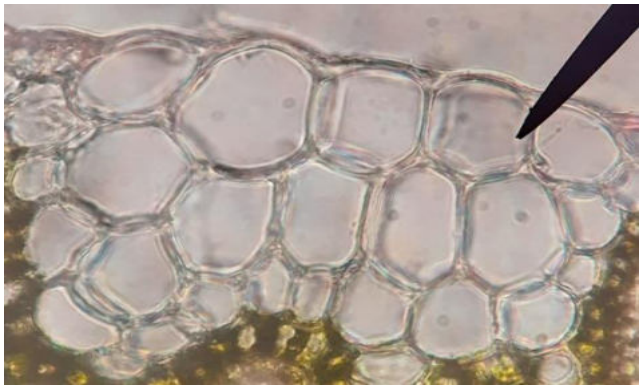

Fig. 2k: adaxial epidermal cells

Figure 3: Enlarged vascular bundles

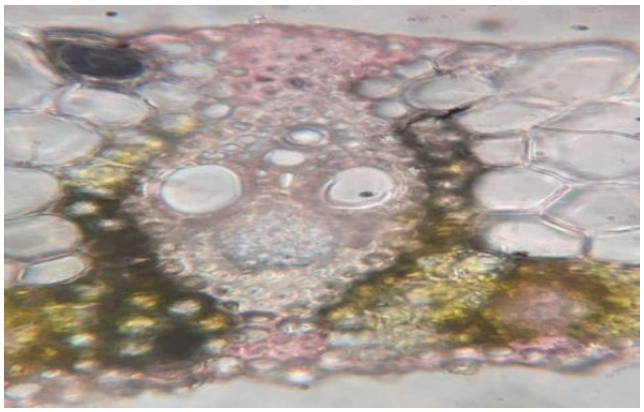

Fig. 3a: Vascular bundle

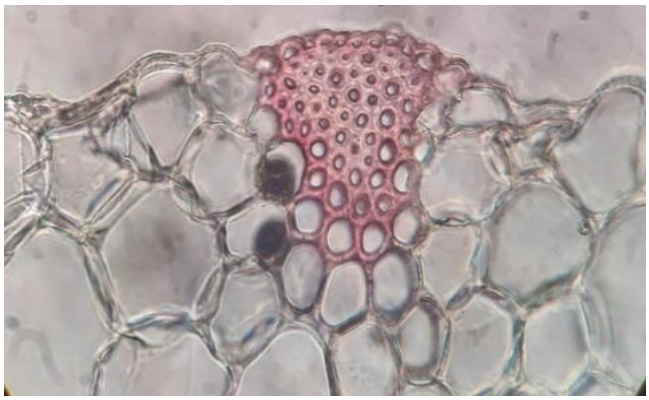

Fig. 3b: Sclerenchyma at abaxil surface

Table 4: Results of physicochemical analysis

1.	Loss On Drying	17.8
2.	Total Ash	10.9
3.	Acid Insoluble Ash	4.2
4.	Alcohol Soluble Extractives	7.5
5.	Water Soluble Extractives	11.3

Table 5: Results of Phytochemical analysis

SN	Phytoconstituent	Methanol Extract	Water Extract
1.	Alkaloids	-	-
2.	Carbohydrates	+	+
3.	Saponins	+	+

ISSN: 2456-3110 ORIGINAL ARTICLE Mar-Apr 2020

4.	Proteins	+	-
5.	Tannins	+	+
6.	Phenolic compounds	+	+
7.	Flavonoids	+	-

Discussion

Macroscopic examination of *Cymbopogon citratus,* Stapf. was carried out. The diagnostic feature of *Cymbopogon* leaves were thoroughly studied comparing the Ayurvedic synonyms and morphology of the plant. Study helped to identify the details of exact plant origin.

The microscopic evaluation of Cymbopogon leaves, the parameters like ash value, extractive values, and loss on drying of the powdered drug and phytochemical screening of the extracts considerable helped in the identification of this drug. The results of physicochemical analysis were calculated keeping the reference of air dried drug. Extractive values indicates the quantity and nature of constituents along with the specific constituents soluble in particular solvent in the extracts

The Ash value of the drug denotes the probable presence of inorganic salts naturally occurring in the drug or adhering to it. These can also vary depending upon the state of collection of the plant. Loss of drying was found to be 17.8 which might be due to presence of more water or volatile impurities. The presence of phyto-constituents like tannins, phenol, flavonoids carbohydrates, saponins and proteins supports the claim for it various activities like, antidiarrheal, anti-inflammatory, antioxidants, antibacterial, anti-filarial and antifungal properties.

Conclusion

The plant *Cymbopogon citratus* Stapf. was studied for its macro morphology and microscopic traits along with physico-chemical and phytochemical parameters. The study has helped to set the preliminary standards comparing the Ayurveda literature and morphology to identify the source plant. Further more researches can be carried out to understand more about its properties and pharmacological analysis.

Acknowledgement

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References

1. Blasi DV, Debrot S, Menound PA, Gendre L, Schowing J. Amoebicidal effect of essetnial oils in vitro. Journal of Toxicology and Clinical Expert. 1990; 110: 361-373
2. Sumita TC, Furlan MR, Jorge AO. Antibacterial activity of essential oils onmicroorganisms isolated from urinary tract infection. Rev Saude Publica.2004; 38: 326-328.
3. Tangpu V and Yadav AK. Antidiarrhoeal activity of Cymbopogon citratus and its main constituent, citral. Pharmacology online. 2006: 2: 290-298
4. Wannissorn B, Jarikasem S, Soontorntanasart T. Antifungal activity of lemon grass and lemon grass oil cream. Phytotherapy Research. 1996; 10: 551-554
5. Carbajal D, Casaco A, Arruzazabala L, Gonzalez RTZ. Pharmacological study of Cymbopogon citratus leaves. Journal of Ethnopharmacology. 1989; 25: 103-107
6. Tchoumbougnang F, Zollo PHA, Dagne E, Mekonnen Y. In vivo antimalarial Activity of Essential Oils from Cymbopogon citratus and Ocimum gratissimum on mice Infected with Plasmodium berghei. Planta Medica. 2005; 71: 20-23.
7. Viana GSB, Vale TJ, Pinho RSN, Matos FJA. Antinociceptive effect of the essential oil from Cymbopogon citratus in mice. J. Ethnopharmacol. 2000; 70: 323-3
8. Cheel J, Theoduloz C, Rodriguez J, Schmeda-Hirschmann G. Free radical scavengers and antioxidants from Lemongrass (Cymbopogon citratus (DC.) Stapf.). J. Agric. Food Chem. 2005; 53: 2511-2517
9. http://niimh.nic.in/ebooks/e-Nighantu/
10. Anita Ojha, Madhur Mishra, A. N. Singh, Madhulika Singh. Antimicrobial activity of Lemon Grass (Cymbopogancitratus) extract against microbes of

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environment and food origin. International Journal of Current Science Research, Volume: 4; Issue: 2; February-2018; pp 1525-1534. ISSN: 2454-5422

11. Gagan Shah, Maninderjit Kaur, Falgun Dhabiliya, Richa Shri, http://phcogfirst.com/sites/default/files/Pharmacognostic%20Standardization%20of.pdf, Pharmacognosy Journal; 2012, Vol 4, Issue 29
12. B.L.Rice, edited by N. Balasubramanya, Amarakosha 1970

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