



RHIZOME OF *MARANTA ARUNDINACEA* LINN. (*TUGAKSHEERI*)– PHARMACOGNOSTICAL STUDY

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ABSTRACT

Tugaksheeri is a major ingredient of many important polyherbal formulations like *Chyavanaprasha*, *Sitopaladichoornam*, *Taleesaptradichoornam*, *Dadimashtakachoorna* etc. It is widely cultivated due to high nutritive value of its starch, which is used for commercial preparation of weaned foods and biscuits. The drug has controversial botanical identities, among them the most accepted and cultivated source plant is *Maranta arundinacea* Linn. of marantaceae family. The present work aimed to an attempt for the standardization of *Maranta arundinacea* Linn. rhizome by carrying its pharmacognostical evaluation. The macroscopy and microscopy of fresh rhizome and dried rhizome powder were investigated and compared with available references from authentic text books like *API*, *Quality standards of Indian Medicinal Plants* and Research articles. The rhizome appeared as ivory white, fleshy, cylindrical pieces of 20-45 cm length and .5 cm thick, covered with pale scale leaves and scars of fallen leaves. Microscopy of fresh rhizome showed epidermis, cortex, vascular bundles, sclerenchymatous bundle sheath and starch grains. Dried rhizome powder appeared as creamy white with fine texture, characteristic odour and mealy sweetish taste. Powder microscopy showed the presence of fibre fragments, fragments of vessels with annular and reticulate thickening, starch grains with hilum. All these features found similar with available data. So, the pharmacognostic study of rhizome is helpful in sample identification, quality and purity standards.

KEY WORDS: *Maranta arundinacea* Linn., Rhizome, Pharmacognosy

INTRODUCTION

Tugaksheeri commonly known as West Indian arrowroot is an important starchy medicinal plant mentioned in ancient scriptures of Ayurveda. It is a major ingredient in *Chyavanaprasha*,^[1] *sitopaladichoornam*,^[2] *Italeesaptradichoornam*,^[3] *Dadimashtakachoorna*^[4] etc. It is widely cultivated due to high nutritive value of its starch, which is used for commercial preparation of weaned foods and biscuits. It is a well recommended diet for the sick, convalescent and infants when weaned. In folklore the mashed rhizome of the plant has been used by the South American Indians to treat the wounds caused by poisoned arrows. Hence the name arrow root plant.^[5] The drug has controversial botanical identities; among them the most accepted and cultivated source plant is *Maranta arundinacea* Linn. of marantaceae family. Pharmacognosy is a branch of pharmacology dealing with recognizing the natural substances that have medicinal uses, and it lays down parameters of standardization and authentication of medicinal plants. The present work aimed to an attempt for the standardization of *Maranta arundinacea* Linn. Rhizome by carrying its pharmacognostical evaluation.

EXPERIMENTAL

A. Materials used

Mature fresh rhizome of *Maranta arundinacea* Linn. devoid of any contamination was collected from the cultivated lands of Kalluvazhy village at Palakkadu district during the month of January 2021. The collected plant specimen was identified by a senior faculty at Pharmacognosy unit, Department of Dravyagunavijnanam, Govt. Ayurveda College, Tripunithura.

B. Methods

a) Macroscopic and microscopic analysis

Rhizome was studied macroscopically for important identification features, i. e. size, shape, external features, cut surface, colour, fracture, odour and taste. For microscopical studies a transverse section was prepared and stained. Powder macroscopic and microscopic features were also analysed and compared with available references.

RESULT

Macroscopic evaluation of fresh rhizome of *Tugaksheeri* (*Maranta arundinacea* Linn.)

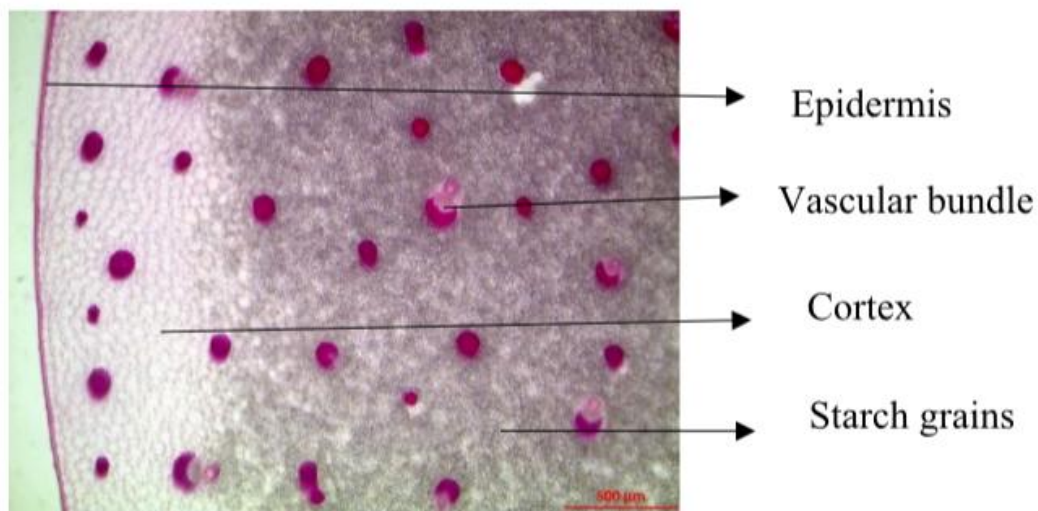


Picture No:1 Fresh rhizome of *Tugaksheeri*(*Maranta arundinacea* Linn.)

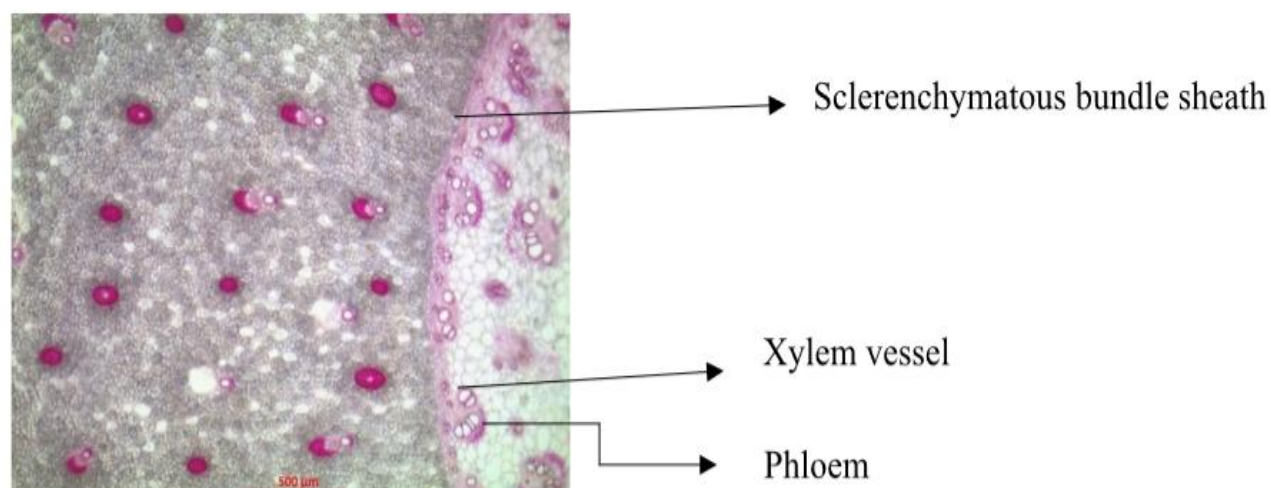
Table No:1 Organoleptic evaluation of fresh rhizome of *Tugaksheeri*

Shape	Fleshy, cylindrical, obovoid
Size	Length variable from 20-45 cm and 2.5 cm thick.
External characters	Covered with pale scale leaves, and scars of fallen leaves.
Cut surface	White with small round yellowish area at the center.
Texture	Smooth
Colour	Ivory to white
Fracture	Hard
Odour	Starchy
Taste	Mild sweet

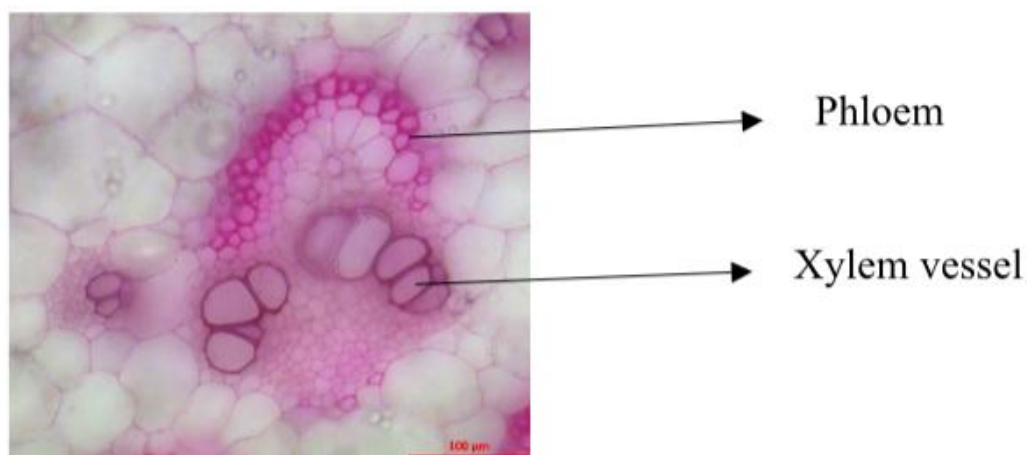
Microscopic evaluation of fresh rhizome of *Tugaksheeri* (*Maranta arundinacea* Linn.)



Picture No:2 T S of fresh rhizome of *Maranta arundinacea* Linn.



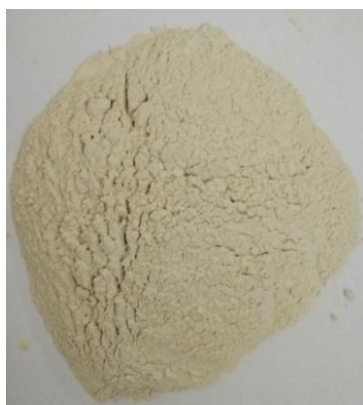
Picture No: 3 T S of fresh rhizome of *Maranta arundinacea* Linn.



Picture No: 4 Vascular bundle

Microscopic features of fresh rhizome of *Maranta arundinacea* Linn. showed epidermis, cortex, vascular bundles, sclerenchymatous bundle sheath and starch grains. Epidermis consists of a single layer of small polygonal cells. Cortex contains large polygonal cells with intercellular spaces. Many medullary vascular bundles were scattered in the cortical region. Each vascular bundle is covered by a semilunar sclerenchymatous bundle sheath. Stele consists of compactly arranged smaller vascular bundles towards endodermis and larger ones in the centre. Irregularly ovoid, or pear shaped, starch grains present in parenchymatous cells.

Macroscopic evaluation of powder of dried rhizome of *Tugaksheeri* (*Maranta arundinacea* Linn.)



Picture No:5 Dried rhizome powder of *Maranta arundinacea* Linn.

Table No:2 Organoleptic evaluation of powder of dried rhizome of *Tugaksheeri*

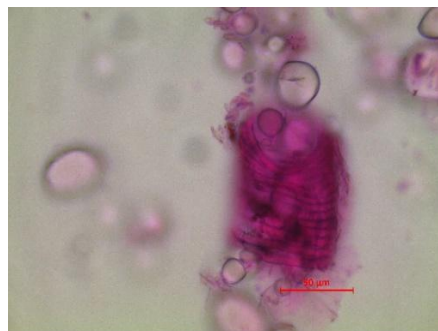
Colour	Creamy white
Texture	Fine
Odour	Characteristic
Taste	Mealy sweetish

Microscopic evaluation of powder of dried rhizome of *Tugaksheeri*

Fibre fragments, fragments of vessels, vessel fragments with annular thickening, vessel fragments with reticulate thickening, fragments of cork cells, starch grains with hilum fibres with pointed ends were identified in the microscopic evaluation of *choorna* (powder) of rhizome of *Maranta arundinacea* Linn



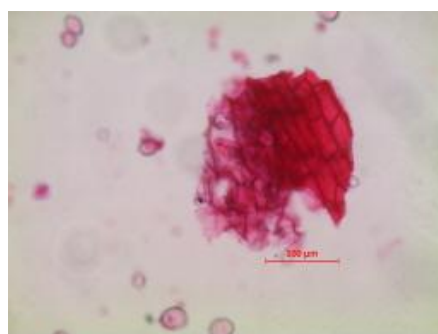
Fibre fragments



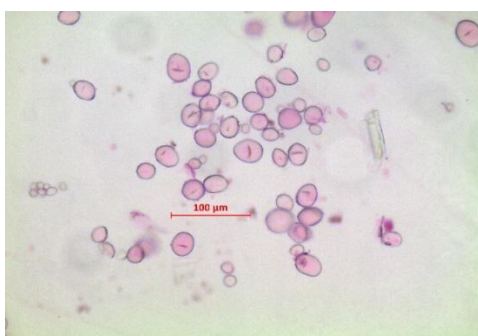
Vessels with annular thickening



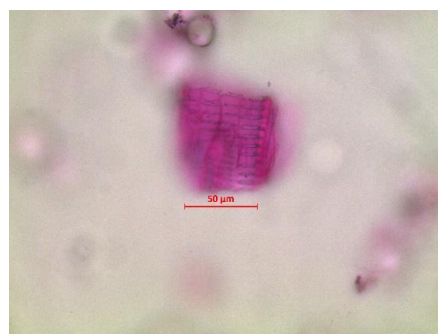
Elongated spindle fibers



Fragments of cork cells



Starch grains with hilum



Vessels with reticulate thickening

Picture No: 6 Powder microscopy of *Maranta arundinacea* Linn. rhizome

DISCUSSION

Pharmacognostical evaluation helps to ensure the authenticity and genuineness of the drug. In the present study, pharmacognostical evaluation of *Tugaksheeri* (*Maranta arundinacea* Linn.) rhizome was done based on the analysis of macroscopical, microscopical and powder microscopic features. From the macroscopic examination the

fresh rhizome of *Maranta arundinacea* Linn. was, fleshy, cylindrical tubers covered with scale leaves and these features were comparable with macroscopic features obtained from the authentic text books, *Indian medicinal plants* of Arya Vaidya Sala, Kottakkal,^[6] *Wealth of India Raw materials* Vol 6^[7] and *Ayurveda Pharmacopoeia of India*.^[8] Microscopic features of the fresh rhizome were observed in the department of Dravyagunavijnanam, Government Ayurveda College, Tripunithura. Evaluation of microscopic features showed the presence of epidermis, cortex, vascular bundles, starch grains and sclerenchymatous bundle sheath. And these features obtained were compared with the microscopic characters of rhizome explained in *Ayurveda Pharmacopoeia of India*, *Quality standards of Indian medicinal plants* ^[9] and the research article published by P V Shintu et al,^[10] were found similar. Powder macroscopic features like colour, texture, odour and taste were analysed and compared with data available in *Ayurveda Pharmacopoeia of India* and research article published by N Rajashekhar et al. ^[11] The colour, odour and taste of the powder of dried rhizome were found similar with the available data, but there is a difference in the texture of the powder. In the previous research work of N Rajashekhar et al the texture of the rhizome powder was fibery, but in the present study it was found fine. This may be due to variation in drying and difference in the quality of pulverizer used. Powder microscopic features of the dried rhizome showed fragments of fibre, fragments of vessels with annular thickening, elongated spindle fibres, fragments of cork cells and starch grains with hilum. The structures identified in the powder microscopy were compared with the data available in *Ayurveda Pharmacopoeia of India* and the Research article published by P V Shintu et al and were found similar. Thus, identity and genuineness of the fresh and powdered rhizome of the drug was ensured through the pharmacognostic evaluation.

CONCLUSION

Pharmacognostic study of rhizome of *Maranta arundinacea* Linn. is helpful in sample identification, quality and purity standards.

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CONFLICTS OF INTEREST

There are no conflicts of interest associated with this publication

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