

PHARMACOGONOSTICAL EVALUATION OF VACHA (*ACORUS CALAMUS LINN*)

Anoop Kumar Singh¹, P.P. Sharma², T.N. Pandaya³

¹M.D. (Ayu), Assistant Professor, Uttarakhand Ayurved University, Gurukul Campus Hardwar, Uttarakhand, India

²Prof, & Ex Dean ³Ex Head, Dept. of the Dravyaguna, I.P.G.T. & R.A. Jamnagar, Gujarat, India

ABSTRACT

Vacha is identified botanically as *Acorus calamus* Linn belongs to the family Araceae. It is now found throughout India under cultivation as well as in the wild state, in plains, lower elevations and in Sikkim and Himalayas up to an elevation of 6000 ft, it grows well in damp marshy places such as meadows edges of lanes and banks of streams and rivers. *Acorus calamus* Linn is a strongly aromatic gregarious perennial herb. The rhizome is tortuous creeping partially underground, and much branched with fairly thick, long adventitious roots, arising from the lower side.. Microscopic study of T.S. of rhizome revealed presence of Epidermis, Cortex, Vascular bundles, Parenchyma cells, Endodermis, Vessels, Oil, Oleoresin, Starch grains, Solitary polygonal crystals. The powder of the rhizome was found Buff coloured; shows fibres, reticulate, annular vessels and simple spherical starch grains, measuring 3-6 μ in diameter, oleoresine content cells, oil globules and scleriform vessels. and pitted vessels. Cell constituents are resin, tannin, mucilage and Solitary polygonal crystals of calcium oxalate.

Key words: *Vacha* (*Acorus calamus* Linn.), Pharmacognostical Study

INTRODUCTION

Pharmacognosy of a plant gives a comprehensive knowledge regarding its method of identification and determination of quality and purity of the raw drugs. Every species has its own characteristic features which determine the authenticity of that particular drug. So it becomes helpful to differentiate closely related species of the same genus or the same family. It also enables us to standardize a drug. This is the need of today. Knowledge of the herbs in all their aspects has much importance. (Ch.Su.1/122). He also says that the drug whose name (name) form (rupa) and properties (guna) are not known, or the drug which, though known is not properly administered, will cause disaster.(Ch.Su.1/125).

Raja Nighantukar has given 7 methods for identification of drug. In the current era, in the age of globalization, raw drugs collection is done by unskilled persons causes doubt in the genuineness and possible adulteration. Unlike the traditional methods the participation of traders in the chain of procurement of drugs, adulteration is increasing day by day when the original genuine material is not available in sufficient quantity. In such instances efforts should be made for a systematic identification by pharmacognostical methods.

AIMS AND OBJECTIVES:-

- ♦ To study of microscopic character of the samples of the Rhizomes of *Vacha* (*Acorus calamus* L) .

MATERIALS AND METHODS:-

1. Material
2. Collection of Sample
3. Preservation of Sample
4. Pharmacognostical Study

Material: Rhizome and Rhizome Powder of the Drug Vacha (*Acorus calamus L*) has been used for this study. Photomicrographs & drawing were taken by using Canon digital camera attached to Carl Zeus microscope in Pharmacognosy dept. of I.P.G.T. & R.A., G.A.U. Jamnagar. Microscopic study of Root (Rhizome) was performed.

Collection of Sample: The Samples Vacha was collected from the Pharmacy of IPGT & RA, GAU, and Jamnagar. The authenticity of these samples were confirmed by comparing their characters with arious floras and standard herbarium sample available at the Pharmacognosy Laboratory of I.P.G.T. & R.A., G.A.U., Jamnagar with the help of Pharmacognosy unit.

Preservation of Sample:

Organoleptic character	Vacha Churna (<i>Acorus calamus Linn.</i>)
Colour	Buff
Odour	Aromatic
Taste	Pungent, Bitter

2. Microscopic Study:

T.S. of Rhizome:

Epidermis: The transverse section of a fresh unpeeled rhizome is circular to oval with its outline slightly wavy. It reveals a single row of epidermis or rarely a very thin corky tissue (3.2a) or layer at the periphery followed by a broad cortex and a large stele or central cylinder. ¹Epidermis is single layered having radially elongated cells with heavily thickened outer walls ²

Cortex: The demarcation between the cortex and the steel is quite distinct. The arrangement of the ground or fundamental tissue is similar in both the cortex and stele. It appears like a network composed

The Samples Vacha (*Acorus calamus L*) Rhizomes was preserved in a solution made by the formulation as under,

1. Distilled water 90 %
2. Formaldehyde 05 %
3. Acetic Acid 05 %

PHARMACOGNOSTICAL STUDY:

1. Organoleptic Study: The drug evaluated by organoleptic characters like taste, odour, colour.

2. Microscopic Study: (i) Root: - Transverse sections taken by free hand and photomicrography had been done after proper mounting and staining.

(ii) Powder microscopy: - Powder of the drug was studied microscopically and microphotographs were taken by using canon digital camera attached to Carl Zeiss microscope.

OBSERVATION AND RESULTS

1. Organoleptic Study: Organoleptic characters of root powder of the samples of Vacha (*Acorus calamus L*).

of chains of neatly arranged spherical cells with the vascular bundles arranged in a scattered manner at the junctions of the network. The outermost region (outer skin) in most cases consists of one or rarely two rows of thin-walled broadly rectangular cells very often with remnants of dead tissue outside. The cortex is a fairly wide zone and composed of spherical to oblong thin-walled cells of various sizes. The cells towards the periphery are smaller, at times somewhat collenchymatous, and more or less closely arranged. Those towards the inside are rounded and form a network of chains of single rows of cells enclosing large air spaces.¹

Vascular bundles (3.2c): These have light yellowish brown contents. A limited number of fibre groups and concentric fibro-vascular bundles as well as secretory cells can also be made out in the cortex. All of them are of the concentric type (3.2e) (phloem surrounded by xylem). Unlike those situated in the cortex, most of the stelar vascular bundles are generally without associated fibre elements, though a few are surrounded with a, thin layer of thick-walled cells.¹

Parenchyma cells: The parenchyma cells are loaded with spherical starch grains. Secretory cells occur the parenchyma cells.¹

Endodermis: A distinct endodermis separates the stele from the cortex. Its cells are thin-walled and show the casparian strips. The steel is composed of rounded parenchyma or ground tissue cells arranged in chains of single rows enclosing large air spaces similar to those of the cortex, and several vascular bundles. These are found arranged closely crowded and in larger numbers nearer the endodermis.¹

Cortical region: Cortical region consists of thin walled parenchymatous cells arranged in chains leaving large intracellular spaces, sheathed collateral vascular bundles and bundles of fibres.²

Stelar region: (3.2d) Stelar region is outlined by single layer of barrel-shaped endodermal cells with abundant starch grains. Mostly leptocentric and few collateral vascular bundles in association with the leptocentric are observed in the ground of the stele.²

Vessels: Vessels are with simple and scalariform pits.²

Fibres: Fibres are thick walled and pitted.²

Ground tissue: Large oil cells, dark brown oleoresin content (3.2b) and starch grains are scattered in the ground tissue of both the cortex and stele.²

Cell content:-

- a) **Oil-** Large thin walled spheroidal oil cells with yellowish content scattered in the parenchymatous cortical regions.²
- b) **Oleoresin(3.2b)** – Cell containing dark brown oleo-resin , scattered in the sub epidermal and cortical regions.²
- c) **Starch grains** –Mostly round, rarely oval and irregular, simple, single or in aggregation, colourless, highly refractive and provided with several concentric rings and central faintly stained hilum².
- d) **Crystal (3.2c)**-Solitary polygonal crystals of calcium oxalate present in each cell of the storied row of cells running parallel to the fibres

Powder: Buff coloured; shows fibres(3.3b), reticulate, annular vessels(3.3a) and simple spherical starch grains(3.3d), measuring 3-6 μ in diameter, oleoresin content cells(3.3e), oil globules(3.3e) and scleriform vessels.(3.3e)³ and pitted vessels.(3.3f)² Cell constituents are resin, tannin, mucilage and solitary polygonal crystals of calcium oxalate(3.3e).

DISCUSSION

Acorus calamus Linn belongs to the family Araceae. It is now found throughout India under cultivation as well as in the wild state, in plains, lower elevations and in Sikkim and Himalayas up to an elevation of 6000 ft it rows well in damp marshy places such as meadows edges of lanes and banks of streams and rivers. *Acorus calamus* Linn is a strongly aromatic gregarious perennial herb. The rhizome *Acorus calamus* Linn is tortuous creeping partially underground, and much branched with fairly thick, long adventitious roots, arising from the lower side. It is about half an inch in diameter, rather spongy and powerfully aromatic. The dried

rhizome as generally sold in the bazaar, consists of simple or rarely branched sub-cylindrical to slightly flattened. The powder of the rhizome is Buff colour.

The Microscopical characters are shown in Table

	Vacha (<i>Acorus calamus Linn.</i>)
Epidermis	Single layered, radially elongated cells, heavily thickened outer walls.
Cortical region	Thin walled parenchymatous cells, sheathed vascular bundles & bundles of fibre, single layer of barrel-shaped endodermal cells with abundant starch grains.
Vessel& Fibres	Simple and scalariform pits, thickwalled and pitted. reticulate, annular vessels
Oleoresin	Dark brown.
Starch grains	Mostly round,rarely oval and irregular

CONCLUSION:

Vacha is identified botanically as *Acorus calamus* Linn belongs to family of Araceae. microscopic study of T.S. of rhizome of *Acorus calamus* Linn revealed presence of Epidermis, Cortex, Vascular bundles, Parenchyma cells, Endodermis, Vessels, Oil, Oleoresin, Starch grains, Solitary polygonal crystals. The powder of the rhizome was found Buff coloured; shows fibres, reticulate, annular vessels and simple spherical starch grains, measuring 3-6 μ in diameter, oleoresine content cells, oil globules and scleriform vessels and pitted vessels. Cell constituents are resin, tannin, mucilage and solitary⁴ polygonal crystals of calcium oxalate.

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CORRESPONDING AUTHOR

Dr. Anoop Kumar Singh

M.D. (Ayu)

Assistant Professor, Uttarakhand Ayurved University, Gurukul Campus Haridwar, Uttarakhand, India

Email: Singh.dranoop164@gmail.com

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