'*Alocasia indica* schott': THE PHARMACOGNOSTIC APPROACH

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Abstract

Alocasia indica schott belonging to family Araceae grown as ornamental herb in villages and towns. All parts are medicinally important. Roots are laxative, diuretic and used in inflammation, diseases of abdomen and spleen. Leaves and rhizomes are used in the treatment of impetigo, furunculosis, arthritis erache, piles and snake bite. Microscopic characters of root, rhizome and leaf were studied. Cortex of root contains calcium oxalate crystals. Stem and petiole shows the presence of mucilage canals in ground tissue, multicellular hair also project in cavities. A large number of conjoint collateral closed vascular bundles remain scattered. Water containing cavity is associated with xylem. Different phytochemical test were carried for the presence of phytochemical classes like carbohydrates, proteins, amino acid, fats and oils, steroids, glycosides, alkaloid, tannins and phenolics. Drug of Alocasia indica consists of mucilage cavities, fibres and vessles. These microscopic characters are used in the identification of drug. Medicinal property is due to presence of alkaloids and glycosides.

Keywords: *Mucilage, Calcium oxalate, glycoside, Alocasia.*

Introduction

Alocasia indica schott belonging to family Araceae grown as ornamental herb in villages and towns. It is perennial herb 1.5 to 2.5 m tall. Rhizomes cylindrical, long, shout, with many nodes. Leaves very large ovate with long stalks, 60-100 cms long and 25-40 cms broad, margins wavy, nerves yellowish , basal lobes round. Inflorescence in spadix, bearing male flowers above and female below. Berry avoid, red when ripe.

All parts are medicinally important Roots are laxative, diuretic and used in inflammation and diseases of abdomen and spleen. (Khare, 2007). Leaves and rhizome are used in the treatment of impetigo, furanculosis, arthritis, erache, piles and snakebite (Prajapati et al., 2003)

Material and Method

Plants were collected and plant parts like root, rhizome and leaves were preserved in 4% formalin. All the section were stained in safranin and dehydrated following the usual method of johanson (1940) and mounted in D.P.X for microscopic observation.

Different phytochemical tests were carried out for the presence of phytochemical classes like carbohydrates, proteins, amino acid fats and oil, steroid, glycosides, alkaloids, tannins and phenolics.

Observations and discussions

T.S. of Root –

Outline circular

Epidermis- Single layered, cells parenchymatous, rectangular, compactly arranged without intercellular spaces measuring about 37.4 x 32.44 µm in size.

Cortex – Multilayered, cells parenchymatous, polygonal, thin walled, compactly arranged without intercellular spaces and measuring about 62.4 x 41.6 µm in size. Calcium oxalate crystals are present.

Endodermis : Indistinct

Pericycle : Indistinct

Vascular Bundles – Vascular bundles are radial 7 to 9 patches of xylem strands alternate with phloem. Metaxylem elements are towards the centre and measuring about 141 x 125 µm in size. Protoxylem elements are towards the peripheri and measuring about 33 x 37 µm in size.

Pith – Parenchymatous pith is present in centre. Cells are polygonal, thin walled, compactly arranged without intercellular spaces and measuring about 33 x 29.12 µm in size

T.S. of stem

Outline circular

Epidermis – Single layered, cells parenchymatous, cuticularized rectangular, compactly arranged, without intercellular spaces, measuring about 42 x 63 µm in size.

Ground tissue : Cells parenchymatous, oval, thin walled, enclosing small intercellular spaces measuring about 124 x 83.2 µm in size. Calcium oxalate crystals are present.

Vascular bundle: Vascular bundles are scattered through out the ground tissue. Smaller vascular bundles towards the peripheri and larger towards the centre. Each vascular bundle in conjoint, collateral, endarch and closed. Vessels measuring about 124 x 141µm in size. Lysigenous cavity is associated with protoxylem in vascular bundle.

Latex canals -Large latex cavities measuring about 312 x 374.4 µm in size are present in ground tissue. Multicellular short hairs measuring about 104 x 50µm in size are present in latex cavity.

T.S. of petiole

Outline circular, cuticle is present

Epidermis - Single layered, cells parenchymatous, rectangular, compactly arranged without intercellular spaces and measuring about 37x17µm in size.

Ground tissue : Cells parenchymatous, oval, thin walled, enclosing small intercellular spaces, measuring about 83 x 91 µm in size,. Calcium oxalate crystal are present

Vascular bundles - Vascular bundles are scattered throughout the ground tissue. Smaller vascular bundles are present towards the peripheri and larger towards the centre, Each vascular bundle is conjoint, collateral, endarch and closed, Lysigenous cavity is associated with vascular bundle.

Latex canals- Large latex canals measuring about 208 x 332µm in size are present in ground tissue. Multicellular short hairs are present in the cavity.

Leaf : surface view

Stomatal complex - Leaf is amphistomatic. Stomata many 2 to 3 cells apart in upper epidermins, less in number in lower epidermis. Stomata are paracytic.Guard cells measuring about 50 x 8.3µm in size. Pore is small, oval, measuring about 4 x 8.3 µm in size.

Epidermis – Cells parenchymatous, polygonal, thin walled, compactly arranged, without intercellular spaces measuring about 58 x 62 µm in size

T.S. of Leaf -

Epidermis - Single layered, cells parenchymatous, rectangular, compactly arranged without intercellular spaces and measuring about 41.6 x 50µm in size

Midrib- In between upper and lower epidermis parenchyma cells are present. Vascular bundles are present on lower side in mid rib. Each vascular bundle is conjoint and collateral and closed, Red coloured tannin cells are present in midrib.

Lamina- Mesophyll is differentiated into palisade and spongy parenchyma.

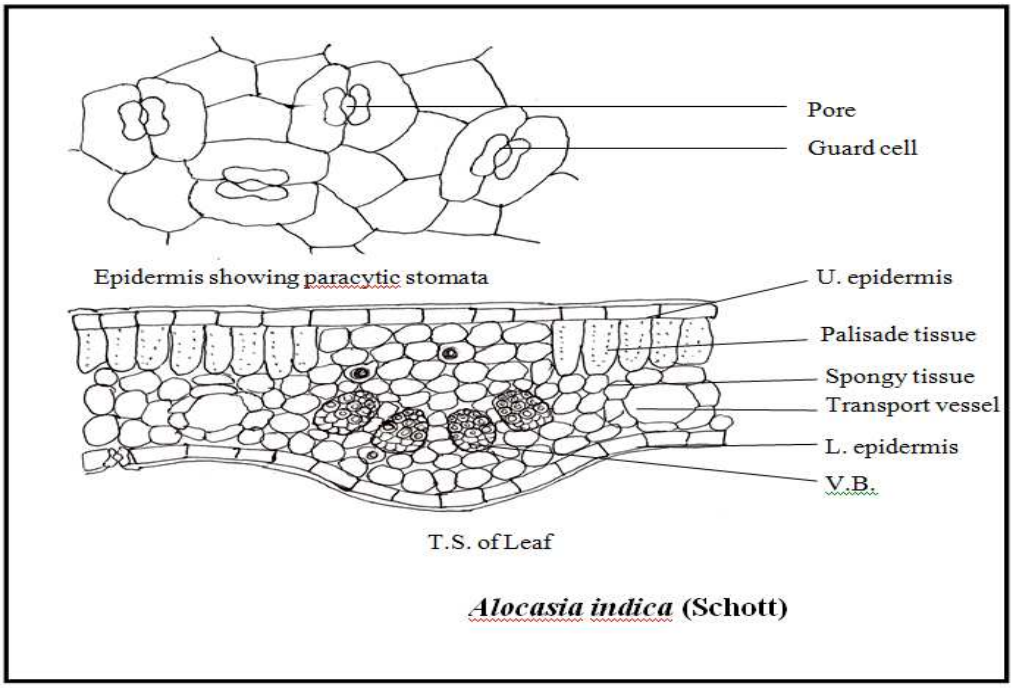
Palisade- In one layer below upper epidermis. Cells are parenchymatous, columner, elongated, compactly arranged, with their long axis at right angle to the leaf epidermis, without intercellular space, measuring about 62.4 x 20.8µm in size.

Spongy - Present above lower epidermis. Cells parenchymatous, oval, thick walled, compactly arranged without intercelluar spaces and measuring about 33 x 25µm in size.

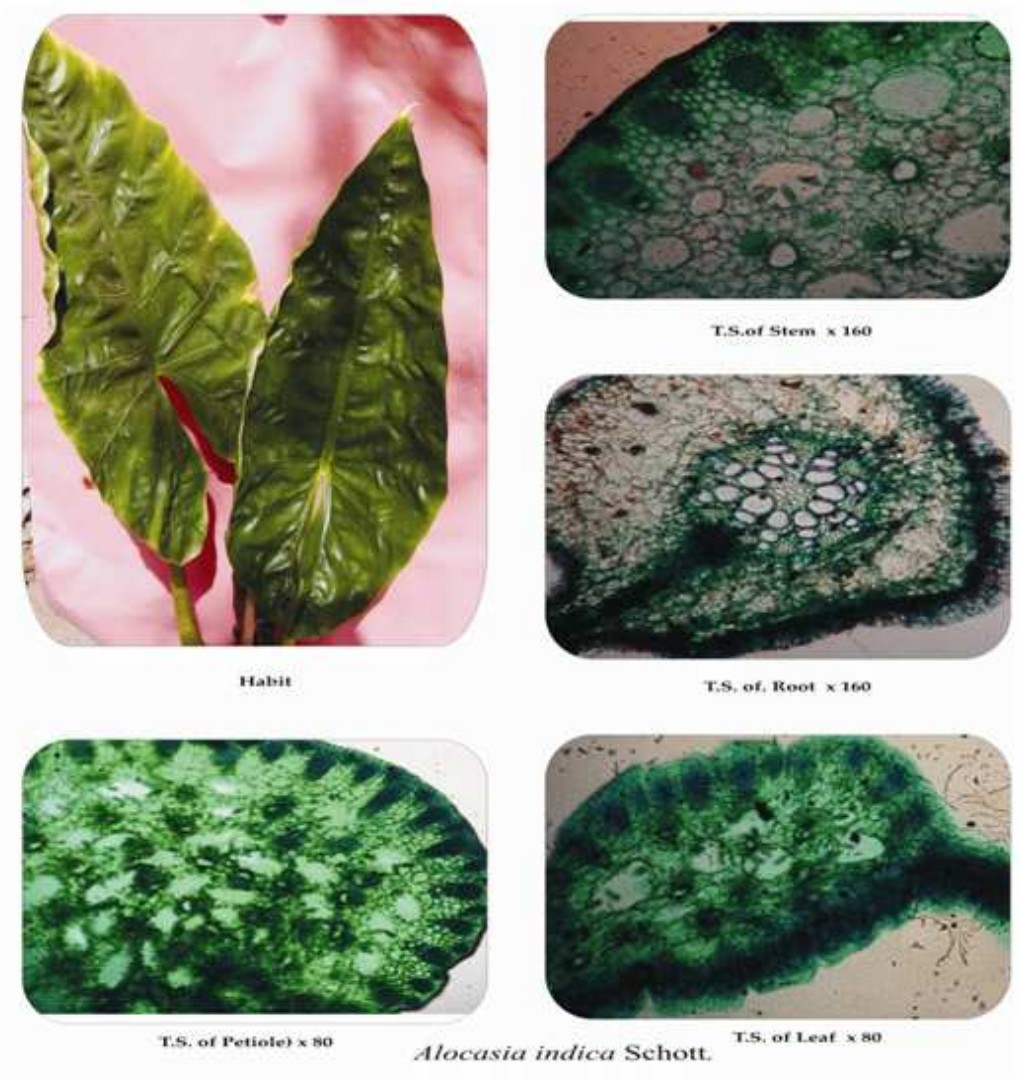
Vascular bundle – Vascular bundles are conjoint, collateral and closed, run parallel in lamina. Transport vessels are present in the lamina

Preliminary Phytochemical Investigations of *Alocasia indica* Schott

Sr. No	Test performed	Observation	Inference
1	**CARBOHYDRATES**		
a	**Molisch test -** To the test tube, few drop of Molisch's reagent was added (Alcholic α- Napthol). 2ml of conc. Sulphuric acid was added slowly form the side of the test tube	Violet ring is formed at junction of two liquids	Carbohydrate present
b	**Fehling's test -** 1ml Fehling's A and 1ml Fehling's B was mixed and boiled for 1 min. To this solution was added equal volume of test solution. And boiled for 5-10 min	First yellow , then brick red ppt is observed	Reducing sugars present
c	**Benedict's test -** Equal volume of Benedict's reagent and test solution was mixed in the test tube and heated to boiling water bath for 5 min	Sol appeared green yellow or red	Reducing sugars present
d	Barford's Test- Test solution was heated with Barford's reagent on water bath.	Red ppt is obtained	Monosaccharide present
e	**Aniline acetate test -** Test solution was boiled in test tube. Filter paper soaked in aniline acetate was held in the vapour	Filter paper did not turned pink	Pentose sugars absent
f	**Cobalt- Chloride test -** 3ml test solution was mixed with 2ml cobalt chloride. Boiled and cooled. Few drops of NaOH solution were added.	Sol appeared greenish blue and pink	Glucose and fructose present
g	**Iodine test -** 3 ml test solution and few drops of dilute Idoine Solution was mixed	No color	Starch absent
2	**PROTEINS**		
a	**Heat test-** The test solution was heated in boiling water bath	Coagulation did not occurred	Protein absent
b	**Biuret test-** Test solution was treated with biuret reagent (40% sodium hydroxide and dilute copper sulphate solution)	Violet or pink color	Protein present
3	**AMINO ACIDS**		
a	**Million's test -**Test solution was treated with Million's reagent and heated on water bath	Brick red ppt	Amino acid present
b	**Ninhydrin test -** Test solution with Ninhydrin reagent was boiled	Purple or Bluish colour	Amino acid present
4	**FATS &OILS** **Filter paper test**	No change	Fats and oils absent
5	**GLYCOSIDES**		
a	**General test -** 200mg of drug with 5ml of dilute sulphuric acid was extracted by warming on a water bath, filtered and neutralized the acid extract with 5% solution of sodium hydroxide. 0.1 ml of fehlings solution A and B was added until it became alkaline (Test pH - Paper) and heated on water bath for 2min	Formation of Red ppt.	General test for glycoside Present
A	**Test for Anthraquinone Glycosides**		
a	**Modified Borntrager's test -** 200 mg of test material was boiled with 2ml of sulfuric acid and treated with 2ml of 5% aqueous ferric chloride solution (freshly prepared) for 5min. It was shaked with equal volume of chloroform .lower layer from chloroform was separated and shaked it with dilute. Ammonia (half of volume of chloroform).	Ammonical layer showed pink to red color	Anthraquinone glycoside present
B	**Test for cardiac glycosides** **i] Legal's test -** Test solution was treated with pyridine made alkaline with sodium nitorprusside	Pink to red color	Cardiac glycosides present
C	**Test for saponin glycosides -** 2 ml of solution of drug in water was placed in test tube and shaked	Persistant foam formed	Saponin glycosides present
	Test for flavonoid glycosides		
a	**Shinoda test -** Test solution was treated with fragment of magnesium ribbon and cone. HCL was added.	Appearance of Pink color	Flavonoids present
6	**ALKALOIDS**		
a	**Dragendorffs test-**Test solution was treated with Dragendorffs reagent (potassium bismuth iodide)	Orange brown ppt	Alkaloids present
b	**Mayer's test -** Test solution was treated with Mayer's reagent (Potassium mercuric iodide)	Cream colored ppt occurred	Alkaloids present
7	**TANNINS AND PHENOLICS** **a) Ferric chloride test -** Test solution was treated with few drops of 5% ferric chloride solution	NO color	Hydrolysable Tannins absent
	b) To the test solution few drops of potassium dichromate solution was added	No ppt	Tannins and phenolic compound absent



***Alocasia indica* (Schott)**



Discussion

The genus *Alocasia indica.* Schott is characterized by latex cavities with multicellular hairs, Mucilage cavities, calcium oxalate crystals, scattered vascular bundles with lysigenous cavity in stem, petiole and midrib. Paracytic stomata, latex canals, transport vessels, calcium oxalate crystals, fibres are the microscopic characters of this plant. These characters are used in identification of drug. The compounds that are responsible for medicinal property of the drug are usually the secondary metabolites, Carbohydrate such as glucose, fructose and sucrose proteins and amino acids form reserve food. Glycoside, flavonoids and alkaloids are responsible for therapeutic use.

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