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PHARMACOGNOSTICAL PROFILE OF RHIZOME OF NELUMBO NUCIFERA GAERTN.

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ABSTRACT: *The rhizome of Nelumbo nucifera Gaertn (fam. Nymphaeaceae) was studied to fix the parameters for pharmacognostical standards. The present investigation deals with the macro and microscopically characters of rhizome along with studies on some physical constants, behavior of powdered rhizomes on treatment with different chemical reagents and florescence characteristics on exposure to U.V light, which would help in identification of the drug.*

INTRODUCTION

Nelumbo nucifera Gaertn (Family *Nymphaeaceae*) is a large aquatic herb with stout creeping yellowish white rhizomes, (indigenous drugs of India, 1958). It is a well known plant and almost all parts are used in indigenous system of medicine (Pharmacognosy of Indigenous Drugs, 1982). Rhizome commonly called as 'Kamalakand' Are consumed as food in Asian countries. They are nutritive, mucillginous, diuretic, collagogue, demulcent (Indian Medicinal plants, 1975). The anti diabetic activity of the rhizome on streptozotocin induced rats has been studied in our laboratory (Mukherjee et. Al 1992). The present investigation deals with some pharmacognostical parameters. This profile of pharmacognostical study includes macroscopical and microscopical characters of the rhizomes, so also the behavior of the powdered rhizomes on treatment with different chemical reagents, fluorescence analysis and physical constants were studied.

MATERIALS AND METHODS

Plant material

The rhizomes of the plant were collected from midnapore district of west Bengal, India. It was dried under shed, pulverized by a mechanical grinder and passed through 40 mesh sieve. All chemicals were of analytical grade obtained from Glaxo Laboratories (India) Ltd. Macrocopical characters and relating to length, diameter, texture etc. were studies (Table 1). T.S. of rhizome shows an outer layer of epidermis, surrounded by cuticle followed by dense sub-epidermal layer, a spongy layer and inner dense layer, continuous with parenchyma cell. There are intercellular space n the inner dense layer. Vascular bundles are found scattered. The bundles are close without cambium and surrounded by thick –walled lignified sclerenchymatous fibres. Hydathodes are also observed. Air canals are large, elliptic or rounded, surrounded by thin walled, elongated epithelial cells. Abundant starch grains of varying shapes are present in the parenchymatous cells (fig 1 Table 2) Physical constants such as total ash, acid

insoluable ash, sulphated ash and different extractive values after successive e extraction were studied (Table 3)

'Spot tests' were performed by placing a small amount of powdered rhizomes in the grooves of a white porcelain plate and on treatment with several reagents the changes in behaviour were noted (Table 4).

The fluorescence characteristics of the powdered rhizomes with different reagents were studied under filtered U-V light and results are furnished in Table 5.

The presence of steroid, reducing sugar, alkaloid and saponin were confirmed when the extracts were treated with different test reagents (Table 6).

RESULTS

All the results obtained are mentioned in Table -6

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Table 1
MACROSCOPICAL CHARACTERS OF RHIZOME

i) Lengh	: 60-140 cm
ii) Diameter	: 0.5 – 2.5 cm
iii) Colour	: Yellowish white to yellowish brown, smooth, longitudinally striated with brown patches.
iv) Nodes, Internodes	: Present
v) Odour	: Indistinct
vi) Fracture	: short and britle.

vii) When freshly cut, it shows a few cavities surrounded by several larger ones.

Table 2
MEASUREMENT OF SOME PARTS F RHIZOME

Plant Parts	Microns
Air canals –	120-250
Hydathodes –	80-100
Parenchymatous cells –	85-110
Starch grains:	
a) Simple –	8-12 in diameter
b) B) Compound -	55 – 90 by 33-40.

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Table 3
PHYSICAL CONSTANT VALUES

Constants	Percentage (w/w)
Total ash –	4.43
Acid insoluble ash-	1.15
Sulphated ash-	6.73
Pet ether (40o-60o) Extract –	1.232
Benzene Extract.	0.897
Chloroform extract	8.247
Methanol extract	20.258
Water extract	15.051

Table 4
BEHAVIOUR OF POWDERED RHIZOMES ON TREATMENT WITH DIFFERENT CHEMICAL REAGENTS

Treatment	Colour Developed
Powder as such	Grey
Picric acid (Saturated aqueous solution)	Yellowish
Nitric acid (Sp.gr 1.42)	Reddish yellow
Hydrochloric acid (Sp.gr 1.16)	Dark brown
Sulphuric acid (80%)	Reddish brown
Acetic acid (Glacial)	No change
Ferric chloride (5% aq solution)	Yellowish black
Iodine solution (aqueous)	Black
Antimony trichlolride	Milky white
Sodium hydroxide (1N aq. Solution)	Red

Table 5
FLUORESCENCE CHARACTERISTICS OF THE POWDERED RHIZOME

Treatment	Colour Developed
Powder as such	Light green
Powder mounted with nitrocellulose	White
Powder treated with sodium hydroxide in methanol-	Reddish black

Powder treated with sodium hydroxide in methanol- dried and mounted with nitrocellulose-	Green
Powder treated with sodium hydroxide in Water-	Black
Powder treated with sodium hydroxide in water- dried and mounted with nitrocellulose-	Blue
Powder treated with Hydrochloric acid-	Green
Powder treated with Hydrochloric acid- dried and mounted with nitrocellulose-	White
Powder treated with nitric acid diluted with equal volume of water	White
Powder treated with sulphuric acid diluted with equal volume of water	Green
Powder treated with antimony trichloride	Brown

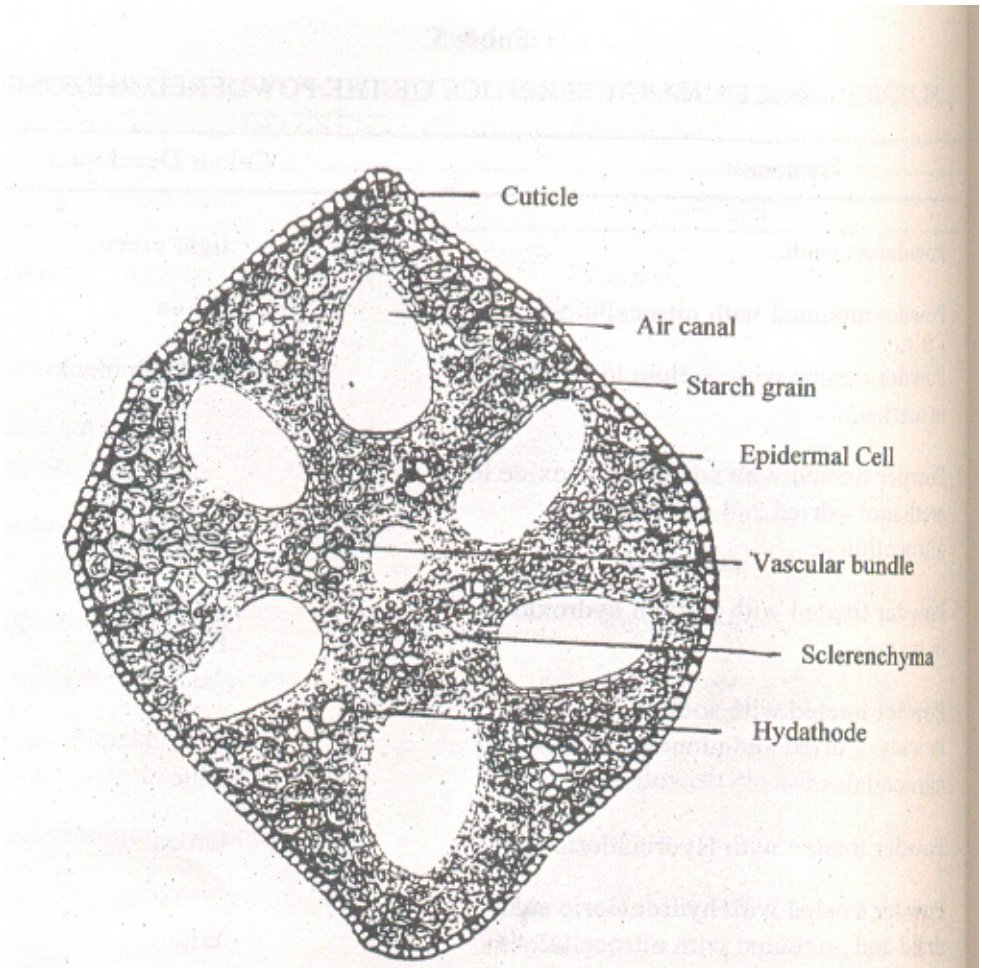

Figure 1

Transverse Section of the rhizome of *N. nucifera*

Table 6
CHEMICAL GROUPS PRESENT IN DIFFERENT EXTRACTS

Extract	Alkaloid	Reducing sugar	Steroid	Flavonoid	Saponin	Tanin
Petroleum ether (40o-60o)	-	-	+	-	-	-

Benzene	-	-	+	-	-	-
Chloroform	+	-	+	-	-	-
Methanol	+	+	+	-	+	-
Water	+	+	+	-	+	-

+= Presence. - = Absence

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