PHARMACOGNOSTICAL, PRELIMINARY PHYTOCHEMICAL STUDIES OF KYLLINGA NEMORALIS (HUTCH&DALZ.) RHIZOME

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ABSTRACT

The plant velutta nirbasi *Kyllinga nemoralis* (Hutch &Dalz.) belonging to the family Cyperaceae has great medicinal values. so for, proper pharmacognostical, physiochemical and preliminary pytochemical studies of the rhizome have not yet been reported. Here the pharmacognostical evaluation includes examination of morphology and microscopical characters (Transverse section and powder microscopy) of rhizome and physiochemical constants such as ash values, loss on drying, foaming index and fluorescence analysis of rhizome. Phytochemical screening includes qualitative chemical examinations, Determination of various phytochemicals in the different solvents used for the extraction, percentage yield and extractive values. The studied characters can be a useful tool to identify the plant *Kyllinga nemoralis* by its pharmacognostical characters.

Keywords: *Kyllinga nemoralis* (Hutch&Dalz.), Powder microscopy, Fluorescence analysis.

1. INTRODUCTION

India is one of the richest floristic regions of the world and has been a source of plants and their products, since antiquity, and man uses them in different ways according to his needs, particularly as food and medicine. Among the entire flora, 35,000 to 70,000 species have been used for medicinal purposes (Tripathi KD., 1994). The plant *Kyllinga nemoralis* (Hutch& Dalz) Cyperaceae (Kirtikar KR et al., 2000) commonly known as velutta nirbasi (Orient Long Man., 1986) is used in diarrhoea, skin and eye diseases, antidote to poisons and used in fever, sprains and contusions, liver disorders, diabetes (Madhu C. Divakar., 2002) etc. The main constituents in the plant are triterpinoids, fixed oils, fats, saponins, glycosides, Flavonoids, tannins, phenolic compounds, carbohydrates etc.The main parts used in this plant are fruits and leaves.

2. MATERIAL AND METHODS

The species for the proposed study of *Kyllinga nemoralis* (Hutch & Dalz) were collected from central leather research institute (CLRI) campus, Chennai, Tamil nadu and it was identified by the plant botanist Dr. P.Jayaraman in plant anatomy research centre (PARC), Chennai.

Pharmacognostical studies

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Microscopic method allows more detail examination of a drug which can be used to identify the organized drug by their known histological character. It is mostly used for qualitative evaluation of organized crude drugs in entire and powder form. Here for the study simple microscope and niken labphot 2 microscopic unit used for morphology and microscopical studies respectively.

The required sample of organ (rhizome) were cut and removed from the healthy plant and fixed in FAA (formalin-5 ml, acetic acid- 5ml, 70% ethyl alcohol- 90 ml) after 24 hrs of fixing, the specimen was dehydrated with graded series of tertiary butyl alcohol, Infiltration of the specimen was carried by gradual addition of paraffin wax (melting point 58-60ºC) until solution attained super saturation. The specimens were cast into paraffin blocks. The paraffin embedded specimen were section with the help of rotary microtome. The thickness of the sections was 10-12 µm. The section was stained with toluidine blue in a polychromatic stain. The dye rendered pink colour to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage, blue to the protein bodies etc, wherever necessary section were also stained with safranin and fast green (starch). For powder microscopy, the powder materials of rhizomes were cleaned with NaoH and mounted in glycerin medium after staining. Different cell component were studied and measured. Ash value is helpful in determining the quality and purity of crude drugs, especially in the powdered form. It usually represents the inorganic salts naturally occurring in the

drug and adhering to it, but it may also include inorganic matter added for the purpose of adulteration. Hence, ash determination furnishes a basic for judging the identity and cleanliness of a drug and gives information related to its adulteration with inorganic matter.

Extractive values of crude drugs are useful for their evaluation especially when the constituents of a drug cannot be readily estimated by any other means. Further, these values indicate the nature of the constituents present in a crude drug. Loss on drying determination the amount of volatile matter of any kind (including water) that can be driven off under the condition specified (Kokate CK., 1994). Normally saponin contain drug may cause a persistent foam. It was studied with a drug powder. Some of the phytoconstituents shows more or less brilliant colorations, when exposed to near ultra region (3000-4000 A). Fluorescence characteristics of the powdered rhizomes of Kyllinga nemoralis also observed in day light and U.V light.

Phytochemical studies

The dried Powder material was initially defatted with petroleum ether (60-80ºC) in soxhlet apparatus for 72 hours and successively extracted with petroleum ether, Ethanol for 72 hours respectively. The extract was filtered while hot and solvent removed by distillation under reduced pressure and the percentage yield (Table 6) was calculated. The concentrated petroleum ether, Ethanolic extract were subjected to various chemical tests for the identification of different phytoconstituents (Agarwal OP., 2000; Harbone JB., 1988).

3. RESULT AND DISCUSSION

The organoleptic evaluation of the rhizome shows surface as rough, dry, brownish with shape of a short (2mm) diameter, circular, even in outline upto 6 inch long in size, rhizome in yellowish brown to dark brown in colour with astringent taste. It has aromatic odour. Transverse section of rhizome shows presences of large air chamber in between two epidermal layer of sheath. Epidermal cell are rectangular, single. There is wide cortex compressing of homogeneous parenchyma tissues cortex in 700 µm wide, stele in central, circular, 240 µm in diameter. Presences of spindle shaped parenchyma in pericycle, lignified schlerenchyma; diffusely distributed vascular bundles which are amphi vassal type, presence of tanniniform idioblast are the characteristic feature of rhizome of *Kyllinga nemoralis* (Hutch&Dalz.) were expressed in (Figure- 1). Presence of vessel elements, fibers, perforation plate and lateral pits are the characteristic features of powder microscopy of rhizome *Kyllinga nemoralis* (Hutch&Dalz) were expressed in (Figure-2). The results of the physical constant of the rhizome powder were tabulated in (Table no 1-4). This studies report useful for further investigation of the plant. The phytochemical investigation showed that the presences of saponin, glycoside, carbohydrate, tannins, flavonids, triterpinoids and fats are expressed in (Table-5).

4. CONCLUSION

The plant *Kyllinga nemoralis* (Hutch& Dalz) has been studied to compare and give detailed report on pharmacognostical, physiochemical and preliminary phytochemical studies made on it. The preliminary phytochemical investigation of ethanolic extract showed the presence of carbohydrate, glycoside, saponins, tannins, phenolic compounds, flavonids and triterpinoids. Where as triterpinoids and fixed oils were present in both ethanolic and pet ether extract. The rhizome of *Kyllinga nemoralis* (Hutch& Dalz) has constituents, which were found to be responsible for curing wide range of diseases and could be used as a drug in herbal formulations.

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Table No. 1. Ash values of rhizomes powder of Kyllinga nemoralis (Hutch& Dalz)

S.NO	Analytical parameter	Ash values % w/w
1	Total ash	18.9
2	Acid insoluble ash	3.8
3	Water soluble ash	4.20
4	Sulphated ash	3.95

Table No.2. Foaming index of rhizomes powder of Kyllinga nemoralis (Hutch& Dalz)

S.NO	Test volumetric flash (10 ml)	Height of foam (cm)
1	1	0.3
2	2	0.6
3	3	0.9
4	4	1.4
5	5	1.5
6	6	1.7
7	7	1.8
8	8	1.8
9	9	1.8
10	10	1.8

Table No. 3. Fluorescence analysis of rhizomes powder of Kyllinga nemoralis (Hutch& Dalz)

S. NO	Chemical treatment	Day light	UV light (245)
1	Powder as such	Light brown	Light green
2	Powder+1 N HCl	Yellowish brown	Light green
3	Powder+ petroleum ether 1N NaoH	yellow	dark green
4	powder+ alcoholic 1 N NaoH	Pale yellow	Yellowish green
5	Powder+ 50% HNO_3	Yellowish orange	Light green
6	Powder+50% H_2SO_4	Yellowish orange	Light green
7	powder+ methanol	pale yellow	emerald green
8	Powder+ 5% $FeCl_3$	Violet colour	Fluorescent green
9	Powder+ 5% I_2 solution	Bluish black	Dark brown

Table No. 4. Extractive values of rhizomes powder of Kyllinga nemoralis (Hutch& Dalz)

S.NO	Extracts	% (w/w)
1	Ethanolic Extract	12.4
2	Petroleum Ether Extract	13.7

Table No. 5. Preliminary phytochemical analysis of extract of Kyllinga nemoralis (Hutch& Dalz)

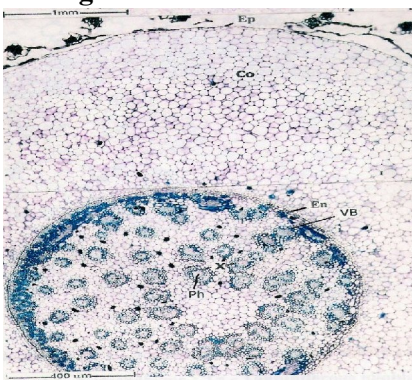
Phytoconstituents	Ethanolic extract	Petroleum Ether extract
Alkaloids	-	-
Saponins	+	-
Glycosides	+	-
Carbohydrates	+	-
Tannin,Phenolic compounds	+	-
Flavonoids	+	-
Steroids	-	-
Proteins and Amino acid	-	-
Triterpinoids	+	+
Fixed Oils and Fats	+	+
Gums and Mucilage	-	-
Lignins	-	-

+ Present: - Absent

Table No.6. Percentage yield of rhizomes powder of kyllinga nemoralis (hutch& dalz)

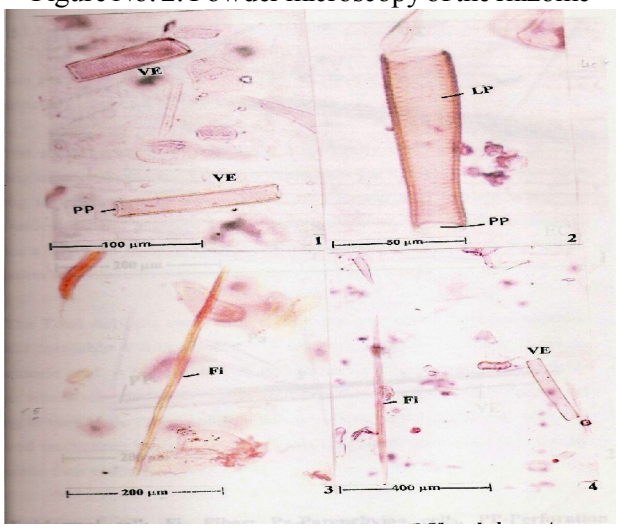
S.NO	Extracts	% Percentage Yield (w/w)
1	Ethanolic Extract	15.2
2	Petroleum ether Extract	16.5

Figure No.1. T.S of rhizome



Co - Cortex; Ep - Epidermis; En - Endodermis; Ls - Leaf Sheath; Ph - Phloem; St - Stele; Vb - Vascular bundle; X – Xylem.

Figure No. 2. Powder microscopy of the rhizome



1, 2 – Vessel Elements; 3, 4 – vessel Element and Fibers.
Fi - Fibers; LP - Lateral Pits; PP - Perforation plate; VE - Vessel Element.

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