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Pharmacognostical and physico-chemical studies on the leaf of *Glinus oppositifolius* L.

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ABSTRACT

Glinus oppositifolius is an important medicinal plant which belongs to family Molluginaceae, used traditionaly in the treatment of skin disease, increase appetite, cures vata, kapha, piles, leucoderma, tonic to intestine, urinary infections, fever, cough, liver problem and also used as antioxidant due to its excellent properties and potent phytoconstituents The present study provides taxonomical, pharmacognostical and physico-chemical details helpful in laying down standardization and pharmacopoeial parameters. The important parameters studied are microscopical study, Behaviour of powdred materials, histochemical studies, behavior of powder with different chemical reagent & fluorescence analysis. Physico-chemical studies revealed total moisture content (8%), total ash (16.10 %), watersoluble ash (12.5%), acid insoluble ash (10%), sulphated ash (25.5%), petroleum ether extractive (0.4%), chloroform extractive (1.8%), acetone extractive (3.4%), ethyl acetate (2.4%), methanol extractive (9.8%) and water extractive (18.5%). Inorganic element showed the presence of iron, sulphate, chloride and nitrate.

Key words: microscopical character, physico-chemical analysis, inorganic element analysis, fluorescence analysis, *Glinus oppositifolius*

INTRODUCTION

Glinus oppositifolius belongs to family Molluginaceae [1], is an annual or perennial sub shrubs, or shrubs, rarely dioecious, glabrous or rarely hairy; Stems erect or prostrate; Stem simple, alternate, rarely opposite; Flowers bisexual, Petals absent or few to many, white, pink, or purple. Fruit usually a loculicidal capsule rarely breaking into 2 nutlets; Seeds with embryo curved around a hard, starchy perisperm [2]. Traditionaly *Glinus oppositifolius* is used in the treatment of skin disease, increase appetite, cures vata, kapha, piles, leucoderma, tonic to intestine, urinary infections, fever, cough, liver problem and also used as antioxidant due to its excellent properties and potent phytoconstituents [3]. Activities like Free radical scavenging and Antioxidant activities of the ethanol extract [4]. Hepatoprotective effect of a methanolic extract of root [5]. Antiprotozoal activity of aerial part [6]. Immunomodulating activity of aerial part of *Glinus oppositifolius* [7]. It has been reported, an amino acid derivative, L-(−)-(*N-trans*-cinnamoyl)-arginine, was isolated from the whole plant of *Glinus oppositifolius* (L.) Aug. DC. along with kaempferol 3-*O* galactopyranoside, is orhamnetin3-*O*-â-Dxylopyranosyl-(1→2)-â-D-galactopyranoside,vitexin, vicenin-2, adenosine and L-phenylalanine was reported[8]. The present study was evaluated for the pharmacognostical and physico-chemical study of aerial part of *Glinus oppositifolius* L.

MATERIALS AND METHODS

Pharmacognostical evaluations like microscopical studies are carried out by taking free hand sections. The section were stained with safranin and fast green [9,10,11]Powdered materials of root part were cleared with NaOH and mounted in glycerin medium after staining different cell component were studied and measured. Photographs of different magnifications were taken with Sony digital camera. For normal observation bright field was used. Powder of the dried leaf was used for microscopical study, physico-chemical studies , behaviour of powder drug towards different chemical reagent, fluorescence analysis were carried out [12,13,14,15,16,17].

RESULTS AND DISCUSSION

MICROSCOPIC CHARACTER

TRANSVERSE SECTION OF LAMINA OF LEAF

Lmina is dorsiventral in nature. Lamina consist of upper epidermis and lower epidermis. The upper epidermis are larger than lower epidermal cells. The upper epidermal cells are measured about 49.98µ to 166.6µ. the lower epidermal cells are polygonal and arranged in a single layer. Both upper and lower epidermis contain anomocytic type of stomata. Mesophyll comprises elongated palisade cells, spongy parenchyma, vascular bundle and aerenchyma. The palisade cells are filled with chloroplast. Palisade cells are columnar and single layered. Spongy parenchyma is about 6-7 layres, cells are irregular, thickened wall and encloses air spaces. Xylem vessels are present in spongy parenchyma.

FIG-1: T.S. of lamina
FIG-1(a): T.S. of lamina showing palisade cells, xylem vessels, spongy parenchyma, arenchyma, upper and lower epidermis.
FIG-1(b): T.S. of lamina showing spongy parenchyma and arenchyma.

POWDER MICROSCOPY OF LEAF

Vessel- The fragment of lignified fibro vascular tissue composed of small, thin walled fibres with spiral vessel.

Crystal-Squarish and prismatic crystals are very abundant. Larger prisms are found scattered. Few cluster crystals which are small in size are found. Acicular crystals are found in few numbers.

Fibre- The fairly abundant fibres, which usually occurs singly, they are thick walled and lignified with a small, somewhat uneven lumen.

Stomata- Anomocytic type stomata are found.

Epidermal cells- The epidermal cells which are elongated, yellowish and shows the presence of cluster of crystals.

PHYSICO-CHEMICAL ANALYSIS

Ash values

The total ash, water soluble ash, acid insoluble ash and sulphated ash of leaf were found to be 16.10 % w/w, 12.5%w/w, 10% w/w & 25.5% w/w (Table-1). Acid insoluble ash was found to be less than total ash, water soluble ash and sulphated ash. Sulphated ash was found to more than total ash, acid insoluble ash and water soluble ash. Ash value is a measure of the quality and purity of the drug.

Inorganic element

In organic element found in the ash of leaf are iron, sulphate, chloride and nitrate (Table-2).

Total extractive values

The extractive values were determined to find out the amount of soluble compounds. The petroleum ether, chloroform, acetone, ethyl acetate, methanol and water extractive values of leaf were found to be 0.4 w/w**,** 1.8 w/w, 3.4 w/w, 2.4 w/w, 9.8 w/w and 18.5% w/w. The leaf showed more amount of water soluble component than petroleum ether, chloroform, acetone, ethyl acetate and methanol extracts (Table-1).

Loss on drying
The moisture content of leaf 11w/w which was shown in (Table-1).

Behaviour of powdred materials towards some chemical reagents
The behaviour of the powdered leaf were treated with Picric acid, conc.sulphuric acid, con.hydrochloric acid, con.nitric acid, glacial acetic acid, 5% ferric chloride, sodium hydroxide (5N), potassium hydroxide (5%), Iodine/20 solution were observed and the results are present in (Table-3).

Fluorescence analysis
Fluorescence analysis of entire leaf has been carried out in daylight and under U.V light. The powders were treated with different organic solvents and solutions were again observed in normal daylight and under U.V. light and the observations are pooled in (Table-4).

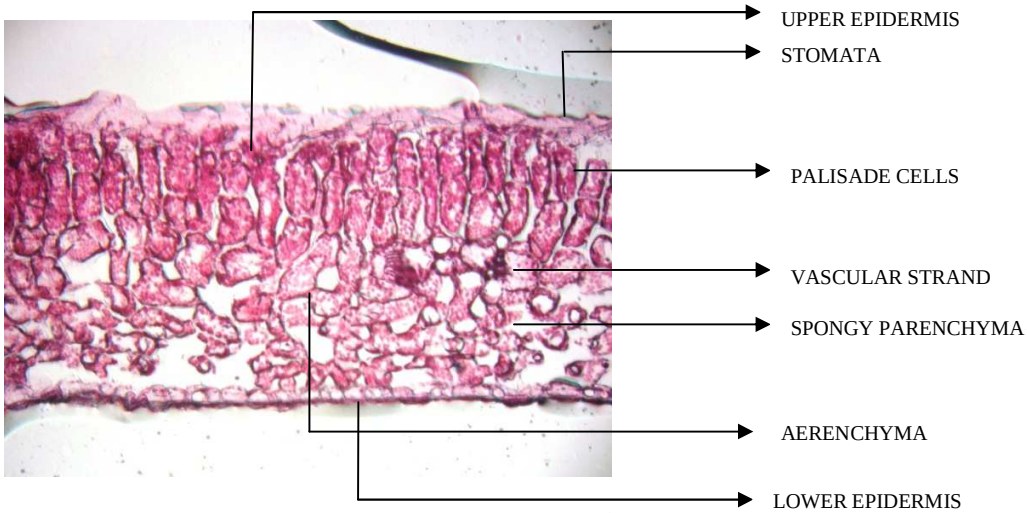

FIG-1

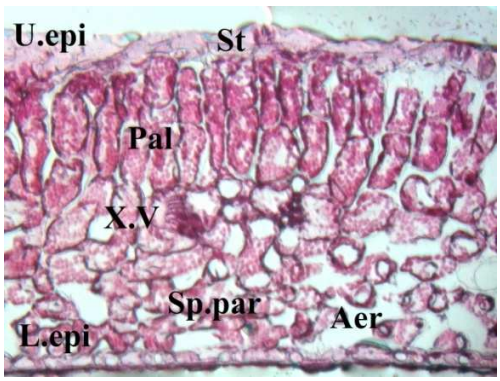

FIG-1(a)

FIG-1(b)

U.epi-Upper epidermis, St-Stomata, Pal-Palisade cells, X.V-Xylem vessels, Sp.par-Spongy parenchyma, Aer-Aerenchymatous cell, L.epi-Lower epidermis.

Fig-a **Fig-b** **Fig-c**

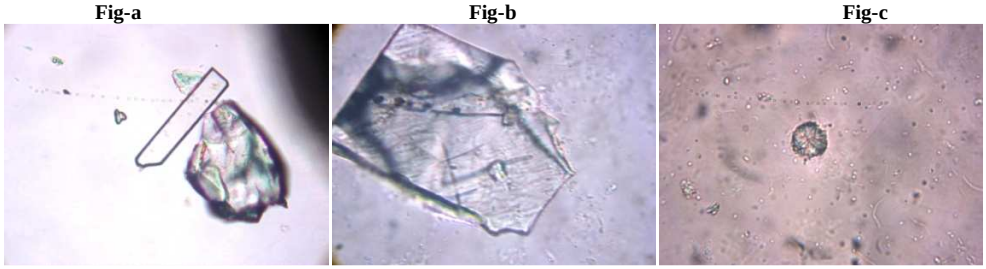

Fig-d **Fig-e** **Fig-f**

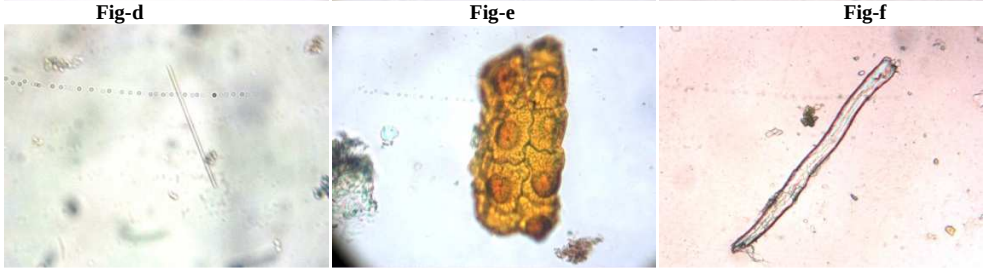

Fig-g **Fig-h** **Fig-i**

Fig-a: Part of vascular tissue.
Fig-b & c:Fragments of broken stomata.
Fig-d: Elongated crystal.
Fig-e: Squarish crystal.
Fig-f: Cluster of crystal.
Fig-g: Acicular crystal.
Fig-h: Epidermal cell shows cluster crystal.
Fig-i: Lignified fibre.

Table-1 Physico-chemical analysis

Tests	Results
Moisture content	11% w/w
Ash values	**%w/w**
Total ash	16.10
Water soluble ash	12.5
Acid insoluble ash	10
Sulphated ash	25.5
Extractive value	
Petrolium ether	0.4 w/w
Chloroform	1.8w/w
Acetone	3.4 w/w
Methanol	9.8 w/w
Water	18.5 w/w
Ethyl acetate	2.4 w/w

Table-2 Determination of inorganic elements

SL.NO	TEST FOR	INFERENCE
1	Calcium	-
2	Magnesium	-
3	Sodium	-
4	Potassium	-
5	Iron	+++
6	Sulphate	+++
7	Phosphate	-
8	Chloride	++
9	Carbonate	-
10	Nitrate	+

–Αβσεντ, +Πρεσεντ, ++Μοδερατε, +++Φρεθυεντ

Table-3 Behaviour of leaf powder with different chemical reagents

SL.No	Acid/Reagent	Observation
1	Powder as such	Dull green
2	Powder + Picric acid	Greenish yellow
3	Powder + Con.Nitric acid	Yellow
4	Powder + Con.HCL	Green
5	Powder + Con.H_2SO_4	Dark brown
6	Powder + Glacial acetic acid	Light green
7	Powder + 5% $FeCl_3$	Light yellowish green
8	Powder + NaOH(5N)	Yellowish green
9	Powder + KOH (5%)	Yellowish green
10	Powder + Iodine/20	Reddish green

Table-4 Fluorescence analysis of the root powder.

SL.No	Reagent	Day light	Short wave
1	Powder as such	Green	Green
2	Powder + 1N NaOH in methanol	Yellow	Dark green
3	Powder + 1N NaOH	Yellow	Green
4	Powder + Ethanol	Light yellow	Green
5	Powder + HNO_3+NH_3 solution	Yellowish green	Brown
6	Powder + 50%HNO_3	Light brown	Green
7	Powder + 1N HCL	Watery green	Very light green
8	Powder + HCL	Light brown	Green
9	Powder + H_2SO_4	Deep brownish black	Greenish black
10	Powder + 50% H_2SO_4	Green	Green
11	Powder + Glacial acetic acid	Light brown	Green
12	Powder + HNO_3	Yellowish brown	Light yellowish green

CONCLUSION

The present work focuses on the pharmacognostical and physico-chemical investigation of aerial part of *Glinus oppositifolius*. The pharmacognostical characters and physic-chemical studies help in the identification of the drugs and also in laying down pharmacopeial standards.

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