

Research Article

Pharmacognostic, Phytochemical and Physiochemical Study of *Evolvulus nammularius (convolvulaceae)*.

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ABSTRACT

The aim of this study is to focus on the ethnomedicinal importance of the plant *Evolvulus nummularius* (L) belonging to the family Convolvulaceae. The investigation carried out by us was on the Pharmacognostical, Phytochemical and Physiochemical study of the aerial part of the plant. During the course of the experimental work the aerial part showed the presence of various phytoconstituents like flavonoids, tannins, protein, phytosterol, alkaloids, saponin etc. The ethnomedicinal documentation confirms about the potent activity of the aerial part of *Evolvulus nummularius*. The physicochemical, morphological and histological parameters carried out as per WHO guidelines of quality control methods for medicinal plant materials.

Keywords: Ethnomedicinal, sclerenchymatous fibres, Fluorescence Analysis, extractive value, ash value.

INTRODUCTION

The plant *Evolvulus nummularius* (L) belonging to the family Convolvulaceae- Morning-glory family is a annual herb. The plant shows various medicinal properties and its phytochemical analysis shows that it has various phytoconstituents like alkaloid, saponin, phytosterol, flavonoids, tannins and phenolic compounds, carbohydrates etc. The Plant is applied for treatment of wound healing, hysteria, convulsion, poor sedative. *E. nummularius* has been pharmacologically reported to possess antihelminthic activity, to cure burn, fever, cuts, wounds and scorpion stings. In Nepal, the paste of the plant is used to treat scabies. Originally from the tropics of Central and South America. *Evolvulus* is a genus of about 100 species, almost all of which are found only in the Americas.

MATERIALS AND METHODS

Plant Material: The whole plant *Evolvulus nummularius* was collected from Sambalpur district Orissa, in the month of July-Aug 2010. The best time for the collection of plant is morning time. It was further identified and authenticated by the Botanical Department, Government Women's College, Sambalpur, Orissa. Some voucher specimen numbers were submitted to the authority for future references.

Extraction Procedure: The whole plant parts were dried in shade and powdered to get a coarse powder. About a significant amount of dry coarse powder was extracted with ethanol (40-60 °C) by continuous hot percolation using Soxhlet apparatus for 72 hrs. The ethanol extract was filtered and concentrated to a dry mass by using vacuum distillation.[4] A deep green waxy residue is obtained

having characteristic odour. Further the solvents were evaporated to dryness.

Macroscopic study: The fresh plant was taken for various macroscopic organoleptic evaluation like colour, odour, size, shape, taste, appearance, texture, fracture etc.

Microscopy Study: Qualitative microscopic evaluation was carried out by taking transverse sections of fresh leaf of *Evolvulus nummularius*. The thinnest section was selected and cleared by boiling with chloral hydrate solution for 20 mins and then carefully stained with phloroglucinol and HCl(1:1). Then mounted on a slide and a cover slip was placed over it and observed the different histological characters.

Physicochemical parameters: The determination of various physicochemical parameters such as total ash, acid insoluble ash, water soluble ash, water soluble extractive value, alcohol soluble extractive value, swelling index, foaming index, moisture content, ash value, pH were calculated as per Indian Pharmacopoeia.

Preliminary phytochemical screening of leaf extract of *Evolvulus nummularius*: For preliminary phytochemical screening, 100 g of powder drug was extracted with Ethanol. The mother extract obtained from successive solvent extraction were then subjected to various qualitative chemical tests to determine the presence of various phytoconstituents like alkaloid, tannins,

Table 1: Organoleptic Evaluation of powder drug of *Evolvulus nummularius*

S.No.	Organoleptic Parameters	Result
1.	Colour	Green
2.	Odour	Characteristic
3.	Taste	Slightly Bitter

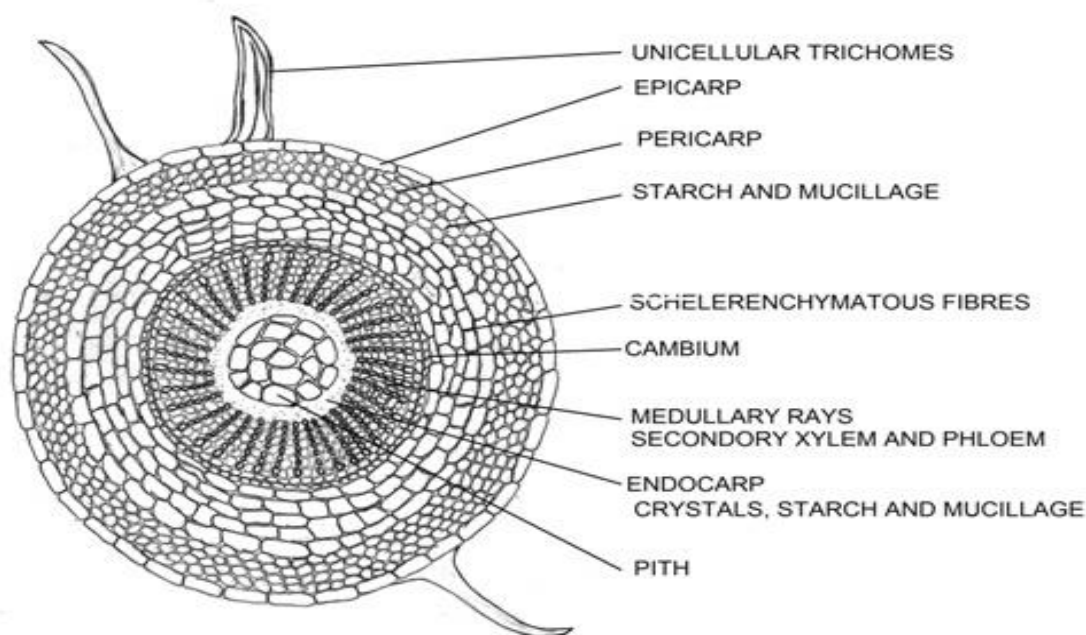


Fig 1: T.S. of stem

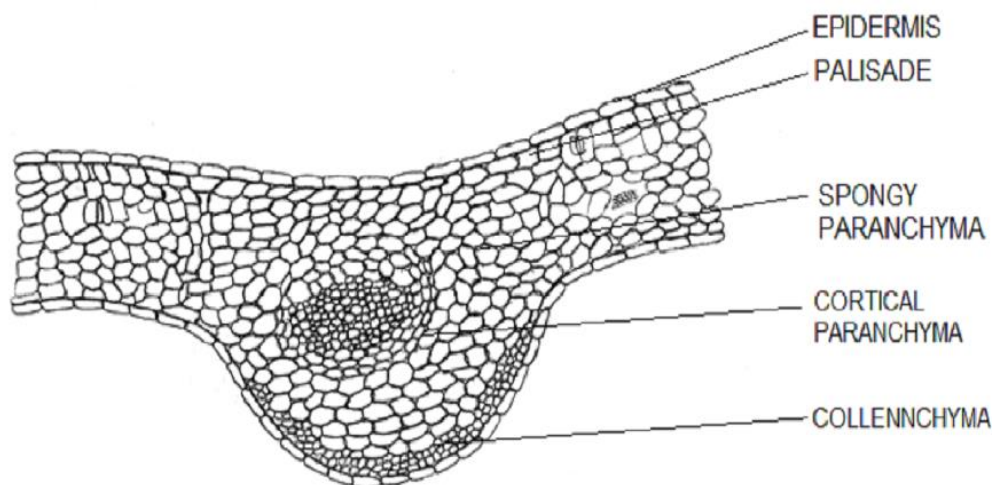


Fig 2: T.S. of leaf

phytosterols, carbohydrates, proteins and amino acids, flavonoids, saponins etc.

RESULT AND DISCUSSION

Macroscopy of *evolvulus nummularius*: Roundleaf Bindweed is an annual herb, with creeping stems and small rounded leaves alternately arranged on the stems. In fact, the species name *nummularius* comes from *numulus* for money, which points to the coin-shaped laves. Leaves are 5-15 mm across. Small white flowers occur 1-2 per leaf axil. The flowers are tiny, only 7-8 mm across, five-petalled, typical morning glory form. The sanskrit name *Musakarni* means resembling rat's ears, probably referring to the leaves. Roundleaf Bindweed is native to North and South America.

Stems never twining. Leaves petiolate or sessile; leaf blade entire. Flowers 1 to few, pedicellate or sessile in leaf axils, or several in terminal spikes or capitula; bracts tiny. Sepals

free, equal or subequal . Corolla rotate, funnellform , or salverform ; Stamens included or exerted; pollen globose , rugate, not spiny . Disc cupular or absent. Ovary glabrous or pilose, 2-loculed; ovules 2 per locule. Styles 2, filiform , free or united basally, each 2-cleft; stigma filiform, terete or slightly clavate . Capsule globose or ovoid, usually 4-valved. Seeds 1-4, smooth or minutely tuberculate, glabrous.

Microscopy of T.S. of leaf and stem of *evolvulus nummularius*

T.S. Of Stem-[fig.1]

A transverse section of stem showed the presence of following histological characters.

- Xylem and xylem fibre were present.
- Sclerenchymatous Fibers were present.
- Pith are large rounded cells.
- Crystals are also present.
- Starch, mucilage

Table 2: Powder Analysis With Chemical Agents

Reagents	Colour observed
Powder as such	Brown
Powder + Concentrated HCL	Yellowish
Powder + Concentrated HNO ₃	Yellowish
Powder + Concentrated H ₂ SO ₄	Reddish Brown
Powder + Glacial acetic acid	Blackish green
Powder + 5% NaOH solution	Light Brownish yellow
Powder + 5% KOH solution	Light Yellowish
Powder+5% Ferric chloride solu.	Amber color
Powder + Picric acid	Yellow
Powder + Ammonia	Brownish green

Table 3: Fluorescence Analysis Of Powdered Drug.

Agents	Fluorescence Observed
Powder as such	Light Green
Powder + 1N NaOH in methanol	Faint Green
Powder + 1N NaOH in water	Brownish yellow
Powder + 50% Hydrochloric acid	Yellowish
Powder + 50% Sulphuric acid	Light Green
Powder + 50% Nitric acid	Yellowish
Powder + Petroleum ether	Colourless
Powder + Chloroform	Green
Powder + Picric acid	Yellowish
Powder + 5% Ferric chloride solution	Dark Amber
Powder + 5% Iodine solution	Reddish
Powder + Methanol	light Green
Powder + (HNO ₃ + NH ₃)	Yellowish

Table 4: Physical Evaluation Parameters

Sl. No.	Parameter	Values (%) (w/w)
1.	Loss on Drying	1.69
2.	Extractive Values	
	A. Water soluble extractive	1.9
	B. Carbinol soluble extractive	1.09
	C. PetEther soluble Extractive	0.019
	D. Benzene soluble Extractive	0.077
	E. Chloroform soluble Extractive	0.15
3.	Swelling Index	30.6
4.	Ash Values	
	Total ash	30.6
	Acid insoluble ash	16.3
	Water soluble ash	0.56

- Epicarp, pericarp, endocarp are shown.
 - Thick cambium were observed.
 - Secondary xylem region were also present.
 - T.S of Leaf- A transverse section of stem showed the presence of following histological characters. [Fig.2]
 - Vascular bundle
 - Epidermis
 - Palisade
 - Spongy parenchyma
 - Collenchymas
- Powder Microscopy Observations of *Evolvulus nummularius*

- Covering Trichomes were observed which are unicellular type.
 - Starch grains and Prismatic Calcium Oxalate crystals were seen.
 - Parenchymatous, and sclerenchymatous cells, phloem fibers were seen.
- Phytochemical Analysis of Extract of Aerial parts of *Evolvulus nummularius*: The powder drug with different chemical reagents show different color when seen on naked eye. The different colour observed shows presence of different type of phytoconstituents. Many drugs

Table 5: Report of Chemical Test of whole plant Extract of *Evolvulus nummularius*.

Plant constituents test/reagent used	Powdered drug	Ethanollic extract
TEST FOR CARBOHYDRATES		
Molisch's Test	+	-
Fehling's Test	-	-
Benedict's Test	-	-
Barfoed's Test	-	-
Test for Starch	+	-
TEST FOR GUMS & MUCILAGE	+	+
TEST FOR PROTEINS & AMINO ACIDS		
Ninhydrin Test	-	-
Biuret Test	-	-
Millon's Test	-	-
Xanthoproteic Test	-	+
Tannic Acid (10% w/v)	-	-
TEST FOR FIXED OILS & FATS		
Spot Test	+	+
Saponification Test	+	-
Salkowski's test	+	+
Liebermann burchad's test	+	+
TEST FOR ALKALOIDS		
Dragendroff's Test	+	+
Mayer's Test ++	+	+
Wagner's Test	+	+
Hager's Test	+	+
Tannic Acid	+	+
TEST FOR GLYCOSIDE		
Legal's Test	-	-
Baljet's Test	-	-
Borntrager's Test.	-	-
Keller-Killiani's Test	-	-
TEST FOR PHYTOSTEROL		
Liebermann's burchad's test	+	+
Salkowski's test	+	+
Liebermann test	+	+
FeCl ₃ Test	+	+
Fluorescence Test	+	+
Reaction with alkali and acid	+	+
5% FeCl ₃ solution	+	+
Reaction with copper sulphate	+	+
Reaction with lead acetate	-	+
Reaction with Potassium dichromate	+	+
Drug + K ₃ Fe(CN) ₆ + NH ₃	+	+
Test for saponin		
Foam Test	+	+

fluorescence when their powder is exposed to ultraviolet radiation. It is important to observe all materials on reaction with different chemical reagents under U.V. light. The fluorescence characteristics of powdered drug were studied under U.V. light after treating with different chemical reagents are reported. The extract was subjected to different qualitative chemical tests. The presence of various phytoconstituents were observed during the test. These test were carried out over the aquaeous extract. The data obtained is specified in [Table no.2,3,5]

Physicochemical parameters: The determination of physico-chemical parameter is important in determination of adulterants and improper handling of drugs. Table- 4 shows the result of various physico chemical parameter of powdered drug carried out using standard methods.

Moisture content of drugs could be at minimal level to discourage the growth of bacteria, yeast or fungi during storage. Ash values used to determine quality and purity of crude drug. It indicates the presence of various impurities like carbonate, oxalate and silicate.

The acid insoluble ash consist mainly silica and indicate contamination with earthy material. The water soluble ash is used to estimate the amount of inorganic elements present in drugs. The extractive values are useful to evaluate the chemical constituents present in the crude drug and also help in estimation of specific constituents soluble in a particular solvent.

CONCLUSION

Evolvulus nummularius, also known as Roundleaf Bindweed. From a very long time it is being utilized as a herbal. Many researches have been done on this plant but much of the claims are inspired and based on traditional evidence instead of scientific studies. The potentiality embedded inside this plant by the nature is although surprising but still the exact and accurate combinations are needed for the correct detection of the plant and its utilization to its fullest. The investigation carried out by us led to certain findings about the pharmacognostical physiochemical and phytochemical features which no doubt can be proved beneficial and serve as scientific background for further isolationary steps to obtain the lead.

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