



Research Article

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Pharmacognostical and phytochemical standards of *Cyclea peltata*.(Lam) Hook.f & Thomson Leaves

T. Shri Vijaya Kirubha, R. Senthamarai, P. Mariya and Praveen Mani*

Periyar College of Pharmaceutical Sciences, Trichy, Tamilnadu, India

ABSTRACT

Herbs are staging a comeback and herbal renaissance is happening all over the globe. The herbal products today symbolize safety in contrast to synthetic drugs that are regarded unsafe to the human and environment. *Cyclea peltata* (Lam) Hook.f.&Thomson a traditional medicinal plant has been valued for its benefits in the management of diabetes and urinary disorders. The juice of leaves is applied to abscesses and decoction is given in dysentery. The decoction of the plant acts against fever and used in the treatment of asthma. The current study was therefore carried out to provide requisite pharmacognostic details about *Cyclea peltata*.(Lam)Hook.f.&Thomson. Pharmacognostic evaluation included examination of morphological and microscopical characters; physicochemical properties and phytochemical analysis. The powder microscopy showed the presence of epidermal trichomes, abaxial epidermal fragments, adaxial epidermis. Phytochemical screening reported the presence of alkaloids, carbohydrates, glycosides, phyto sterols compounds and proteins and aminoacids. The present study will provide the information with respect to identification and authentication of this medicinal plant.

Keywords: *Cyclea peltata*.(Lam)Hook.f.&Thomson, Pharmacognostic evaluation, Phytochemical analysis.

INTRODUCTION

After decades of serious obsession with the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha and Unani. This is because of the adverse effects associated with synthetic drugs. Herbal drugs play an important role in health care programs especially in developing countries. Ancient Indian literature incorporates a remarkably broad definition of medicinal plants and considers 'all' plant parts to be potential sources of medicinal substance. In the last few decades there is an exponential growth in the field of herbal medicine. It is getting popularized in developing countries owing to its natural origin and lesser side effects. Nowadays, herbal medicines are being manufactured on a large scale in mechanical units. The manufacturers are facing many problems such as availability of good quality of raw material, authentication of raw material, availability of standards, proper standardization methodology of drugs and formulations, quality control parameters etc. *Cyclea peltata* (Lam) Hook.f.&Thomson.(Family-Menispermaceae) is a much-branched, climbing shrub found throughout South and East India and in the Andaman and Nicobar Islands. Roots tuberous; Leaves- peltate, hairy, 2-5 cm long, flowers- very small. Male flowers in panicles, very long. Fruit- drupe, reniform. The species of this plant are easily distinguished by the cup-shaped calyx and corolla. The plant *Cyclea peltata* is widely used in the treatment of cough, fever, kidney disorder, urinary disorder and snake poisoning. Powdered roots for the treatment of diabetes, tooth ache; decoction of the roots and leaves used for treating malaria and asthma.

EXPERIMENTAL SECTION

Fresh leaves of *Cyclea peltata* were collected from Nagerkovil, Kanyakumari in the month of July 2011. Care was taken to select healthy plants and normal organs, washed under running tap water and blotted dry for further studies. The leaves were shade dried for about one week, ground into powder and used for further analysis. Physicochemical constants such as the percentage of total ash, acid insoluble ash, water soluble ash and extractive values using ethanol and water.

RESULTS

Macroscopic Characters

A much-branched, climbing shrub and roots are tuberous; leaves peltate, hairy, leaves are 2-5 cm long, flowers- very small. Male flowers in panicles, very long. Fruit- drupe, reniform. The species of this plant are easily distinguished by the cup-shaped calyx and corolla.

Microscopic characters

T.S of the Leaves

The leaf is dorsiventral with prominent adaxial midrib with mesophyll differentiation. The midrib is planoconvex in sectional view with semicircular wide and thick abaxial part and more or less flat adaxial part. The ground tissue on the abaxial part consists of wide, angular, compact parenchyma cells with thick walls. On the abaxial part occurs a shell shaped bands of collenchyma beneath the epidermis.

The lamina is 200 μ m thick, adaxial epidermis of the lamina consists of wide rectangular and squarish cells with prominent cuticle. The abaxial epidermis includes narrow rectangular thin walled cells. The epidermal cells are upto 20-30 μ m thick.

The petiole is circular in sectional view measuring 900 μ in thickness. It consists of a distinct and thin epidermal layer of squarish cells with thick cuticle. The outer ground tissue includes three or four layers of thick walled compact cells. There is a thick and wavy closed cylinder of fibers which possess thick lignified walls. Sclerenchyma cylinder encloses six, collateral top shaped vascular bundles which are arranged in a ring.

Quantitative determination

The number of stomata, vein islet number and measurement of stomatal index and size of stomata of leaves were obtained with the help of calibrated ocular micrometer and results are tabulated in Table-1

Table 1: Quantitative leaf microscopy of *Cyclea peltata*

S.No	Parameter	Average value
1.	Vein islet Number	9.78
2.	Vein Termination Number	16.92
3.	Stomatal Number(Upper epidermis)	17.5
4.	Stomatal Number(Lower epidermis)	20.6
5.	Stomatal Index(Upper epidermis)	13.08
6.	Stomatal Index(Lower epidermis)	17.52
7.	Palisade ratio(Upper epidermis)	8.78

Table 2: Physicochemical Analysis of powdered leaf of *Cyclea peltata*.

S.No	Physico chemical Constant	Observation(% w/w)
1.	Ash Values	
a)	Total ash	11.21
b)	Acid insoluble	2.2
c)	Water soluble	1.7
e)	Crude fiber content	11.26
2.	Extractive Value	
a)	Alcohol Soluble	13.28
b)	Water Soluble	12.82

Physicochemical parameters

In the physico-chemical evaluation, ash values viz., total ash, acid insoluble ash, water soluble ash and sulphated ash, extractive values viz., alcohol soluble extractive value and water soluble extractive values, and loss on drying were determined. Extracts obtained by exhausting crude drugs are indicative of approximate measures of certain chemical compounds they contain, the diversity in chemical nature and properties of contents of drug. The percentage w/w values were calculated with reference to the air-dried drug.

Preliminary Phytochemical Studies

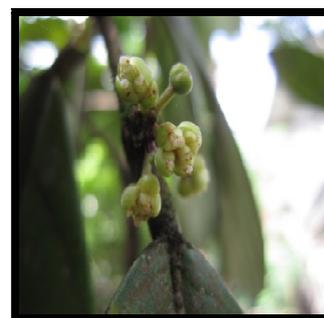
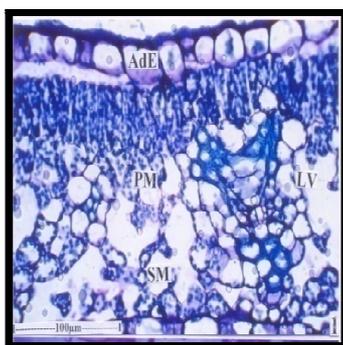
The leaf powder was extracted with various solvents viz. petroleum ether, acetone, chloroform, ethanol and water. These extracts were tested for presence of different phytoconstituents. The results of phytochemical analysis are tabulated in Table – 3.

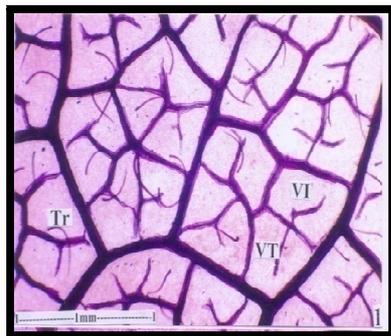
Table 3: Phytochemical Analysis of *Cyclea peltata* leaf extracts.

Phytoconstituents	Ethanol extract	Aqueous extract
Alkaloids	(+)	(+)
Carbohydrates	(+)	(+)
Glycosides	(+)	(-)
Flavonoids	(-)	(-)
Phytosterols	(-)	(-)
Fixed oils and Fats	(-)	(-)
Saponins	(+)	(-)
Phenolic compounds and Tannins	(+)	(+)
Lignins	(-)	(+)
Proteins and free Amino acids	(+)	(+)
Gums and Mucilage	(-)	(+)

(+) Positive

(-) Negative

**A****B****C****D****E****F**



G



H



I

A:Leaf of *Cyclea peltata*; B:Root of *Cyclea peltata*; C:Fruits of *Cyclea peltata*; D:T.S of midrib; E:T.S of Lamina; F:T.S of petiole G:T.S of Vein termination; H:T.S of Trichomes; I:T.S of epidermal cells

DISCUSSION

The standardization of a crude drug is an integral part of establishing its correct identity. For inclusion of a crude drug in Pharmacopoeia, pharmacognostic parameters and standards must be established. The results of these investigations could, therefore, serve as a basis for proper identification, collection and investigation of the plant

The leaf is dorsiventral with prominent adaxial midrib with mesophyll differentiation. The midrib is planoconvex in sectional view with semicircular wide and thick abaxial part and more or less flat adaxial part. The ground tissue on the abaxial part consists of wide, angular, compact parenchyma cells with thick walls. On the abaxial part occurs a shell shaped bands of collenchyma beneath the epidermis.

The lamina is 200µm thick, adaxial epidermis of the lamina consists of wide rectangular and squarish cells with prominent cuticle. The abaxial epidermis includes narrow rectangular thin walled cells. The epidermal cells are upto 20-30 µm thick.

The petiole is circular in sectional view measuring 900µ in thickness. It consists of a distinct and thin epidermal layer of squarish cells with thick cuticle. The outer ground tissue includes three or four layers of thick walled compact cells. There is a thick and wavy closed cylinder of fibers which possess thick lignified walls. Sclerenchyma cylinder encloses six, collateral top shaped vascular bundles which are arranged in a ring. Non-glandular trichomes are abundant in the powder. The trichomes are unicellular, unbranched and thick walled with narrow lumen.

CONCLUSION

The pharmacognostical and phytochemical evaluation of *Cyclea peltata* leaves can provide useful information for identification and authentication of plant. The leaves of *Cyclea peltata* used as a traditional medicine and can be well exploited for various pharmacognostical studies. The present investigation has stated important standardization parameters of macro and microscopical characters, ash and extractive values, phytochemical screening would be useful in authenticating *Cyclea peltata*. (Lam) Hook.f. & Thomson.

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