Pharmacognostical and Preliminary Phytochemical Evaluation of \textit{Clitoria ternatea} leaves


1Department of Pharmacognosy, S.V.P.M’s College of Pharmacy, Malegaon (BK), Maharastra, India.
2Department of Pharmacognosy, S.U. College of Pharmacy, Kharadi, Pune, Maharastra, India.
3Department of Pharmacognosy, Dr H.S. Gour University, Sagar, M.P., India

*Correspondence to: Tel.: +91-09960464957; E-mail: dnyaneshtaur@gmail.com

ABSTRACT

\textit{Clitoria ternatea} L. (Family: Fabaceae) a perennial twining herb, steams are terete, more or less pubescent. Root is bitter in taste used to cure severe bronchitis, asthma. In Kokan root juice is given in cold milk to remove the phlegm in chronic bronchitis. \textit{C. ternatea} have reported number of pharmacological activities such as nootropic, anxiolytic, anticonvulsant, sedative, antipyretic, anti-inflammatory and analgesic. In present study pharmacognostic investigation of leaves was carried out by using morphological, microscopic and physicochemical parameters. It was found that leaves are odd pinnately compound, with obovate in shape, entire margin, Emarginate tip and symmetrical base, green in color, bitter in taste, with characteristic odor. Microscopic study reveals that presence of Upper and lower epidermis consists of single layer of cells covered with thick cuticle. Covering trichomes are present on both the surfaces. The upper and lower epidermis is followed collenchymatous cells. The upper epidermis consists of polygonal tabular cells, followed by layer of palisade cells, lignified xylem and paracytic stomata. The powder is green in colour and contains paracytic stomata, covering trichomes, fibres, wavy epidermal cells, covering trichomes and presence of starch grain in epidermal cell. Physicochemical parameter observed that 13.2 ± 3.49 total ash, 4.8 ± 2.16 acid insoluble ash and 5.3 ± 0.08 water soluble ash. The moisture content found to be 12.5±2.57. Water soluble and alcohol soluble extractive value found to be 25.2 and 18.4 respectively.

Keywords: \textit{Clitoria ternatea}, moisture content, ash value, extractive value.

INTRODUCTION

\textit{Clitoria ternatea} L. (Family: Fabaceae) a perennial twining herb, steams are terete, more or less pubescent. There are two varieties of \textit{Clitoria ternatea} white-flower and blue flower varieties. Root bark contain starch, tannin's & resins. Seed contain a fixed oil, a bitter acid resin, tannic acid, glucose. The roots have a sharp bitter taste and cooling, laxative, diuretic, anthelmintic, anti-inflammatory properties; they are useful in severe bronchitis, asthma and hectic fever. Stem and flower are recommended for treatment of snake bite. The seed are purgative, Cathartic and laxative in combination with ginger powder.\cite{1,2} The fatty acid content of \textit{Clitoria ternatea} seeds includes palmitic, stearic, oleic, linoleic, and linolenic acids.\cite{3-5} The seeds also contain a water-soluble mucilage, delphinidin 3, 3’, S’-triglucoside useful as a food dye\cite{6}; beta-sitosterol.\cite{7} \textit{C. ternatea} have number of pharmacological activities such as possessing nootropic, anxiolytic, antidepressant, anticonvulsant, sedative, antipyretic, anti-inflammatory and analgesic activities.\cite{8,9} Enhance memory, and increase acetylcholine content and acetylcholinesterase activity in rats.\cite{10,12} Ethanol and benzene extract of \textit{Clitoria ternatea} seeds at doses 75 mg/kg and 100 mg/kg inhibit clonidine induced catalepsy, milk induced eosinophilia and leucocytosis in mice.\cite{14,15}

Objective of present study was to perform pharmacognostic investigation and preliminary phytochemical screening on \textit{Clitoria ternatea} leaves.

MATERIAL AND METHODS

\textbf{Plant material}

Leaves of \textit{Clitoria ternatea} were collected from Baramati localities, Pune district (Maharastra), and dried in the
Pharmacognostical and Preliminary Phytochemical Evaluation of Clitoria ternatea leaves

shade at room temperature. Dried leaves were coarsely powdered in grinder and powder material was kept in air tight container for further study. The plant was identified and authenticated by Prof. R. B. Deshmukh Head Dept. of Botany, Shardabai Pawar Mahila Mahavidyalaya, Sharanagar, Baramati.

Morphological and microscopical studies
The morphology of the leaves was studied according to standard methods.\textsuperscript{[16–18]} Hand section of the leaf was taken, stained and mounted \textsuperscript{[18]} and representative photo of section were taken with the help of Digital microscope. The powder characteristics were studied according to standard methods. \textsuperscript{[18]}

Determination of physicochemical parameters
Physico-chemical parameters i.e. percentage of moisture content, percentage of ash values and extractive values were performed according to the official methods. \textsuperscript{[18,19]}

Preliminary phytochemical screening
The shade dried and coarsely powdered leaves were extracted with benzene, ethyl acetate, methanol and distilled water using decoction method. All the extracts were screened for the presence of various groups of phytoconstituents using different chemical tests.\textsuperscript{[18,20]}

RESULTS

Morphological Evaluation
Leaves are green, bitter and characteristic odour (figure 1). These are obviate shape, pinnatified, a Emarginate apex, symmetrical base and 6–11cm in length, 5–7cm in width.

Microscopical Evaluation
Transverse section of \textit{Clitoria ternatea} Linn leaf shows presence of covering trichomes on both surfaces (Figure 2). Upper and lower epidermis consists of single layer of cells covered with thick cuticle. The upper and lower epidermis is followed collenchymatous cells. The upper epidermis consists of polygonal tabular cells, followed by layer of palisade cells. The spongy mesophyll is represented by 3–5 layers cells, which are loosely arranged (figure 3). Calcium oxalate crystals are present in parenchyma cell. Vascular bundle is covered with a single layer of border parenchyma (bundle sheath) contain lignified xylem.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{clitoria.png}
\caption{Plant and leaves of \textit{Clitoria ternatea}}
\end{figure}
Pharmacognostical and Preliminary Phytochemical Evaluation of *Clitoria ternatea* leaves

Surface preparation showed presence of paracytic stomata, with wavy epidermal walls and presence of cicatrix (figure 5).

**Powder characters**

The powder is green in colour and contains paracytic stomata, covering trichomes, fibres, wavy epidermal cells, covering trichomes and presence of starch grain in epidermal cell (Figure 6).

**Physicochemical parameters**

Physicochemical parameter observed that 13.2 ± 3.49 total ash, 4.8 ± 2.16 acid insoluble ash and 5.3 ± 0.08 water soluble ash. The moisture content found to be 12.5±2.57. Water soluble and alcohol soluble extractive value found to be 25.2 and 18.4 respectively (figure 7).

**Preliminary phytochemical screening**

Preliminary phytochemical screening of different extracts revealed the presence of steroids, tannins, carbohydrates, flavonoids, proteins, amino acids, glycosides, saponin, tannins and alkaloids (Table 1).

**DISCUSSION**

Morphological and microscopic characters are used for identification of crude drug. Leaves of *Clitoria ternatea* are green, bitter and characteristic odour. Microscopical studies showed presence of covering trichomes on both surfaces, epidermal cells are polygonal tabular. Palisade are present below the upper epidermis, followed by spongy mesophylls. Covering trichomes are unicellular,
Pharmacognostical and Preliminary Phytochemical Evaluation of Clitoria ternatea leaves

Figure 5. Stomata of *Clitoria ternatea* leaves

Figure 6. Powder characteristic of *Clitoria ternatea* leaf
some are strongly waved. Cicatrix which is surrounded by epidermal cells showing characteristic arrangements and stomata are paracytic types. Physicochemical parameter are useful in determination of purity of drugs, and observed that 13.2 ± 3.49 total ash, 4.8 ± 2.16 acid insoluble ash and 5.3 ± 0.08 water soluble ash. The moisture content found to be 12.5±2.57. Extractive value gives idea about how much quantity of soluble phytoconstituents are present in solvent, water soluble and alcohol soluble extractive value found to be 25.2 and 18.4 respectively. Phytochemical studies revealed presence of Steroids, tannins, carbohydrates, flavonoids, proteins, amino acids, glycosides, saponin, tannins and alkaloids as phytoconstituents.
CONCLUSION

The various morphological, microscopical, physicochemical standards developed in this study will help for botanical identification and standardization of *Clitoria ternatea*. Further, the authentic plant material can be explored for its pharmacological and phytochemical potential.

ACKNOWLEDGMENT

The authors are thankful to the Management S.V.P.M’s College of Pharmacy, Malegaon (Bk), Baramati for providing necessary facilities and also to the Prof. R. B. Deshmukh Head Dept. of Botany, Shardabai Pawar Mahila Mahavidyalaya, Shardanagar for the authentication of the plant.

REFERENCES