

Evaluation of Physicochemical & Phytochemical Parameters of *Trichosanthes dioica* Roxb

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Abstract

The current study was carried out to provide requisite phytochemical detail about the plant *Trichosanthes dioica* Roxb (fruits). For phytochemical screening, different type of extracts were prepared and tested for the presence of secondary metabolites and various physico-chemical parameters. The results revealed the presence of flavonoids, carbohydrates, tannins and alkaloids in the plant.

Keywords: Phytochemical screening, *Trichosanthes dioica*, Total ash

Introduction

Trichosanthes dioica Roxb (family- Cucurbitaceae) is a dioecious perennial plant commonly known as Parval in Hindi, Patol in Bengali and Pointed gourd in English. The leaves are 7.5 by 5cm, ovate-oblong, cordate, acute, sinuate-dentate, rigid and rough on both surfaces. The stems are slender, extensively climbing and scabrous. The seeds are compressed and corrugated on the margin. The fruits are 5-9cm, oblong or nearly spherical acute and smooth (Kirtikar and Basu, 1956). The fruits are an affluent source of protein and minerals and are used in conventional system of medicine since ancient times (Sharma *et al.*, 1989; Singh, 1989). The plant has been claimed in traditional literature to be valuable against a wide variety of diseases.

In India traditional communities like tribal and rural populations are frequently using the crude extracts of local plants for medicinal and other purposes. Crude extracts and medicines manufactured on the principles of natural compounds even by pharmaceuticals companies, may lead to large-scale exposure of humans to natural products. The first step towards this goal is the biological and phytochemical screening of plant extracts from traditional preparations used in popular medicine (Alonso *et al.*, 1995; Sohni *et al.*, 1995). Thus, the present study is a preliminary attempt to identify some of the chemical constituents as well as the physicochemical parameters using standard techniques.

Materials and Methods

Plant material

The fruits of *Trichosanthes dioica* Roxb were identified and collected from the local market of Bhopal. Dr. A.S. Yadav, Professor, Department

of Botany, MVM College Bhopal, authenticated the fruits, where a voucher specimen is deposited. The fruits were washed, shade dried, pulverized into moderately coarse powder and stored in airtight container for further use.

Extraction of plant drug

The powdered plant material was subjected to hot continuous extraction in a soxhlet apparatus.

The powdered plant drug was successively extracted with petroleum ether, chloroform, methanol, ethanol and water as solvent. The liquid extracts were collected in a tarred conical flask. The solvent was removed by distillation. Last traces of solvent being removed under vacuum. The extracts, obtained with each solvent, were weighed to a constant weight and percentage of yield (w/w) was calculated.

Phytochemical screening

Phytochemical screening means to investigate the plant material in terms of its active constituents. In order to detect the various constituents present in the different extracts of *Trichosanthes dioica*, these were subjected to the qualitative test analysis using standard methods (Harborne, 1998; Kokate 1994).

Physicochemical parameters (Ansari 2001; Pradhan *et al.*, 2010)

Total ash

About 2 gm accurately weighed powdered drug was incinerated in a silica dish at a temperature not exceeding 450°C until free from carbon. It was then cooled and weighed. The % w/w of ash with reference to the air-dried drug was calculated.

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Acid insoluble ash

Ash is boiled with 25 ml dilute HCL (6N) for five minutes. The insoluble matter collected on an ash less filter paper, washed with hot water and ignited at a temperature not exceeding 450°C to a constant weight.

Water-soluble ash

Ash is dissolved in distilled water and the insoluble part collected on an ash less filter paper and ignited at 450°C to constant weight. By subtracting the weight of insoluble part from that of the ash, the weight of soluble part of ash is obtained. Percentage of water soluble ash was calculated with reference to the air dried drug.

Sulphated ash

2g of powdered samples are taken in crucibles and ignited at 450°C in a muffle furnace until the material gets thoroughly charred. The crucibles along with ash are taken out in desiccators and cooled. 1ml H₂SO₄ is added to each crucible in order to moisten the residue. Heat gently until white fumes was no longer evolved and ignites at 800°C until black particles were disappeared. The crucibles are removed from the muffle furnace to desiccators, cooled and weighed to give the sulphated ash content.

Foreign matter

The 50 gm drug sample was spread in a thin layer, and the pieces of foreign matter were sorted out by visual examination. The powder of foreign matter was sifted through a 250-micron sieve. All portions of the foreign matter were pooled and weighed.

Loss on drying

10 gm of the plant drug was weighed in a tarred evaporating dish. It was dried at 105°C for 5 hours and weighed. The drying and weighing was continuing at 1-hour interval until difference two successive weighing.

Results

Extractive values

Extractive values obtained from *Trichosanthes dioica* Roxb fruits using different solvents were recorded in table 1.

Solvent	Time of extraction	Colours of extract	Yield	% Yield
Petroleum Ether	09 hours	Brown	1.90g	1.52
Chloroform	24 hours	Black	1.70g	1.36
Methanol	12 hours	Orange - Black	16.35g	13.08
Ethanol	20 hours	Orange - Black	3.92g	3.13
Water	24 hours	Dark black	16.96g	13.56

Table 1. Extractive values obtained from *Trichosanthes dioica* Roxb using different solvents

Phytochemical screening

The results of phytochemical screening of different extracts of plant were reported in table 2. From this analysis, methanolic extract found to have more constituents compare to other extracts.

Phytoconstituents	Petroleum ether Extract	Chloroform Extract	Methanolic Extract	Aqueous Extract
Alkaloids	-	-	+	+
Amino-acids	-	-	-	-
Carbohydrates	-	-	+	+
Flavonoids	-	-	+	+
Glycosides	-	+	+	-
Proteins	-	-	-	+
Resins	-	-	-	-
Steroids	+	+	-	-
Tannins	-	-	+	-

(+) Present (-) Absent

Table 2. Preliminary phytochemical screening of various extracts of *Trichosanthes dioica* Roxb

Physical Parameters	Values obtained (%w/w)
Total ash	8.5%
Acid insoluble ash	2.0%
Water soluble ash	3.5%
Sulphated ash	5.5%
Foreign matter	0.5%
Loss on drying	0.25%

Table 3. Physicochemical parameters of *Trichosanthes dioica* Roxb fruits

Alkaloids, Flavonoids and Tannins are determined in methanolic extract while Carbohydrates and Steroids are determined in aqueous and petroleum ether extract respectively.

Amino-acids and Resins are found to absent in all the extracts.

Physico-Chemical Parameters

The physicochemical parameters were investigated and reported in table 3. The above studies enable the identification of the plant material for future investigation and form an important aspect of drug studies.

Discussion

Preliminary phytochemical screening revealed the presence of alkaloids, flavonoids, glycosides, tannins and steroids in different extracts of *Trichosanthes dioica* Roxb (fruits). These results expose that the plant has quite a number of chemical constituents, which may be responsible for the many pharmacological actions. Although their specific roles were not investigated in this study, it has been reported that most active principles in plants are frequently flavonoids, steroids, glycosides and alkaloids. These phytoconstituents may be responsible for the many pharmacological actions of the plant like wound healing (Shivhare *et al.*, 2010) cholesterol lowering (Sharmila *et al.*, 2007) and antidiabetic activity (Rai *et al.*, 2008). Further work could also be possible to investigate the specific phytoconstituents responsible for these activities. The physico-chemical evaluation of drugs is an important parameter in detecting adulteration or improper handling of drugs. It can serve as a valuable source of information and provide appropriate standards to establish the quality of this plant material in future study or application.

Conclusion

The present work was taken up with a vision to lay down standards which could be useful to detect the authenticity of this medicinally useful plant. Thus, it may be concluded that the plant *Trichosanthes dioica* could be a source of therapeutic agent.

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