

TRICHOSANTHESDIOICA ROXB: A PHARMACOGNOSY**AND PHYTO - PHARMACOLOGICAL REVIEW****Senthamil Kavitha^{1*} and Kumudavalli²**¹Department of Pharmacy, Thanjavur Medical College,
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College of Pharmacy, Salem- 636 008, Tamil Nadu, India.**ABSTRACT**

Medicinal plants have a major role to protect human healthy life. The family cucurbitaceae contains nearly about 95 genera and 965 species. Generally they are the vine plants. Amongst all, the *Trichosanthes DioicaRoxb* has high traditional and medicinal value for maintaining the healthy life. Traditionally the plant is used as highly effective in skin disease, such as Bacterial skin infection, fungal infection, wound healing It is also effective agents in purgative, leprosy, jaundice, fever, diabetes, expectorant, aphrodisiac, appetizer, febrifuge, anthelmintic, stomachic, cancer-like conditions. It is a good antioxidant and blood purifier. This activity of the plant contains due to various phytochemical constituents present in *Trichosanthesdioica* are vitamin A, vitamin C, tannins, and Saponin. Seeds of *Trichosanthesdioica* also contain lectin, a carbohydrate (specifically galactose) & large amount of peptides. Root contains amorphous saponin, hentriacontane, essential oil, fixed oil. The aim of this article is to explain the details of phyto-pharmacological properties of *Trichosanthes DioicaRoxb* for the future research work.

Keywords: *Trichosanthesdioica* Roxb, Pharmacognosy, Phytochemical constituent and review.

INTRODUCTION

Herbal medicines are plant derived materials and preparations with therapeutic (or) other human health benefits. Which container either raw (or) processed ingredient from one (or) more plants, inorganic materials or animal origin. Herbal medicine preparations are developed drugs created by the modern pharmaceutical industry. Now a day, they are manufactured and sold. than 80,000 are medicine. India is one of the world's 12 biodiversity centers with the presence of over 45,000 different plant species, one of them is *TrichosanthesdioicaRoxb*, Family: Cucurbitaceae and commonly known as Kambupudalai (Tamil), Parwal (Hindi), Thondekaye (Kannada), Potal (Telugu) Patolam (Malayalam), Potol (Sanskrit), Parora (Urdu), Potala (Odia). The plant is an important vegetable-grown extensively in Sambalpur, Orissa.

MORPHOLOGY^{2,57}

The plant is a perennial, dioetious, and grows as a vine. Vines are pencil thick in size with dark green cordate, ovate, oblong, not lobed, rigid, leaves. Roots are tuberous with long tap root system. Flowers are tubular white with 16-19 days initiation to anthesis for pistillate flowers and 10-14 days for staminate flowers. Stigma remains viable for approximately 14 hours and 40-70% of flowers set fruit based on shape, size, and striation, fruit can be grouped in to four categories long, dark green with white stripes, 10-13cm long thick, dark green with very pale green stripes, 10-16 cm long roundish, dark green with white stripe, 5-8 cm long tapering, green and striped, 5-8 cm long.

HABITAT^{2,57}

Trichosanthes dioica, a genus of family cucurbitaceae, is an annual (or) perennial herb distributed in tropical Asia, Polynesia, and Astralia. It is cultivated throughout the plain of

North India. (Fig.1: Plate No.443
Trichosanthes dioica Roxb).

Biological Source and Family

Trichosanthes dioica (Cucurbitaceae)

Synonym

Pointed Gourd, Parwal.

Scientific classification:²

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Cucurbitales
Family : Cucurbitaceae
Genus : Trichosanthes
Species : Dioica

MORPHOLOGY STUDIES

The crude drugs used in the formulation Patoladikwathachurna are viewed macroscopically through the naked eyes and the results are tabulated as follows (Table 1: Results of Macroscopical Studies)

POWER MICROSCOPY

The individual crude drug powders used in the formulation are viewed microscopically and the following features are noted (Fig. 3: Characters from Patola-*Trichosanthes dioica* Roxb.– leaf).

Quantitative physico-chemical analysis of *Trichosanthes dioica* roxb. Foreign organic matter

The foreign organic matter present in the raw materials was removed by mechanical method and the results were tabulated. It was found to be within the limits as per API. (Table 2: determination of foreign organic matter).

The various ash value such as total ash, acid-insoluble ash and water soluble ash are determined and the results were tabulated. It was found to be within the limits as per API. (Table 3: Ash value)

The various extractive values such as water soluble extractive, alcohol soluble extractive and results were tabulated. The results obtained are found to be within the limits as per API. (Table 4: determinations of extractive values)

Phytochemical constituent^{1,14}

The preliminary phytochemical study of *Trichosanthes dioica* Roxb revealed the presence of a steroidal saponin, 24- α -ethyl-20-one-7-hydro-stigmast-8 β , 14 β -di-3-O- β -D-xylofuranoside has been isolated from the

leaves. Root contains-Amorphous saponin, hentriacontane, colocynthin, trichosanthin, essential oil, fixed oil. Seeds of *Trichosanthes dioica* also contain lectin, a carbohydrate (specifically galactose) & large amount of peptides linoleic, oleic, oleostearic acids. Nicotinic acid, riboflavin, vitamin C, thiamin, 5-hydroxytryptamine has been isolated from the fruits. Cucurbita-5, 24-dienol also in mature plant (Table 5: Preliminary Phytochemical Screening of powdered raw material of *Trichosanthes dioica* Roxb. (leaf)).

TLC studies of raw material & patoladikwathachurna

Apiumleptophyllum

Mobile phase - Toluene : Ethyl acetate (9.3:0.7)

Stationary phase - Silica gel 60 F₃₆₆ nm

Detecting agent - UV₃₆₆ nm

Solvent front - 10 cm

PHYTO-PHARMACOLOGY

Antidiabetic activity⁹

The aqueous extract of *Trichosanthes dioica* fruits by given dose of 1000 mg / kg body weight daily once for 28 days, it has reduced the levels of fasting blood glucose, postprandial glucose, aspartate amino transferase, alkaline phosphatase, creatinine, urine sugar, and urine protein where as total protein and body weight was increased. No toxic effect was observed during LD50. Thus *Trichosanthes dioica* is a potent phytomedicine for diabetes

Anxiolytic activity¹⁰

The anxiolytic activity was evaluated by using Elevated plus and behavior models. The efficacy of the given aqueous extract *Trichosanthes dioica* was 100 and 500 mg / kg compared to the standard anxiolytic drug Diazepam 2 mg / kg. The result has shown the aqueous extract significantly increased the number of entries and time spent in the open arm and in the elevated plus maze. The aqueous extract showed the conformation of significant anxiolytic activity.

Haemolytic anaemia activity¹¹

The aqueous extract of *Trichosanthes dioica* fruits were tested for their effects on the hemoglobin concentration (Hb), red blood cell count (RBC), reticulocyte count, packed cell volume, cell shape, morphology and osmotic resistance in the phenyl hydrazine induced haemolytic anemia model in albino rats. The recovery study revealed that after 16 days, and the group of anaemic rats treated with the aqueous extract of *Trichosanthes dioica* fruits

exhibited significantly ($P \leq 0.01$) improvement in haemoglobin concentration, red blood cell count, packed cell volume (mean values are being 14.15 gm / dl, 7.66 106/1, 0.75%, 48.4% respectively) when compared to group of anaemic rats left untreated (mean values are 8.54gm / dl, 4.16 106/1, 1.316%, 39.16%). Thus the aqueous extract of *Trichosanthes dioica* fruits significantly altered values and most of the parameters associated with haemolytic anemia.

Antioxidant, anti-inflammatory and antipyretic activity¹²

The Methanolic extract along with organic soluble fraction of the fruits of *Trichosanthes dioica* Roxb was designed to investigate the antioxidant, anti-inflammatory, & antipyretic potential. Antioxidant activity was evaluated by DPPH (1,1-diphenyl-2-picrylhydrazyl) and nitric oxide scavenging assay method. Anti-inflammatory activity was assessed by carrageenan induced paw edema in rats and anti-pyretic activity was studied for (Brewer's yeast-induced pyrexia) at a dose level of 100, 200, and 400 mg / kg body weight for Methanolic extract. MeOH extract showed a dose dependent & significant ($p \leq 0.005$, $p \leq 0.05$) anti-inflammatory & antipyretic effect. Dichloromethane fraction and ethyl acetate fractions were exhibited similar activity using a dose of 200 mg / kg body weight in these models. The pharmacological activities of the dichloromethane fraction were lesser than that of the Methanolic extract and other fraction. The methanolic extract or *Trichosanthes dioica* & its ethyl acetate fraction given potent antioxidant, anti-inflammatory, & antipyretic agent.

Wound healing activity¹³

The Methanolic extract of the *Trichosanthes dioica* Roxb fruit was evaluated for the wound healing potential. The incision of wounds were inflicted upon three groups of six rats each. Group I was treated with control (ointment base), Group II was treated with standard silver sulphadiazine (0.01%) cream. Group III was treated with Methanolic extract ointment. Parameters were observed such as, percentage of wound contraction, epithelialization period, hydroxyproline content, tensile strength including histopathological studies. Results-the Methanolic extract *Trichosanthes dioica* Roxb fruit ointment showed significant ($P \leq 0.01$) healing in both wound models when compared to control group.

Laxative activity¹⁴

To evaluate the laxative activity of the aqueous extract *Trichosanthes dioica* Roxb root in Swiss albino mice by given dose 100 and 200 mg / kg body weight. It was evaluated by excretory bowel activities in non-constipated & in drug loperamide induced constipation in mice. The gastrointestinal transit was measured in both non-constipated and in constipated mice. Castor oil (0.5 ml / mouse per ox) used as reference. The aqueous extract of *Trichosanthes dioica* Roxb root at 200 mg kg (-1) body weight was found and the results given most active, causing diarrhea in mice.

Gastric antiulcer activity¹⁵

The aqueous extract of *Trichosanthes dioica* Roxb leaves was evaluated as antiulcer activity against: (1) Aspirin plus pylorus ligation model, (2) Ethanol / HCl-induced ulcer in wistar rats. Using standard drug Ranitidine (100 mg / kg), compared with *Trichosanthes dioica* leaves aqueous extract. Only the aqueous extract *Trichosanthes dioica* Roxb (500 mg / kg) significantly ($p \leq 0.001$) increased the pH of gastric acid and reduced the volume of gastric juice, free and total acidities, reduced the ulcer index used in all models.

Antimicrobial activity¹⁶

In this study deals with the in vitro assessment of antimicrobial activity in different concentration and different parts of *Trichosanthes dioica* extract. Different bacterial strains were used in the disc diffusion method. Using parts of *Trichosanthes dioica* is leaves, fruits and seeds all three can be used as antibacterial agents. Only the leaves extract was active agent for all five strains and the highest zone of inhibition was observed against *Mycobacterium smegmatis* and also used for tuberculosis treatment.

CONCLUSION

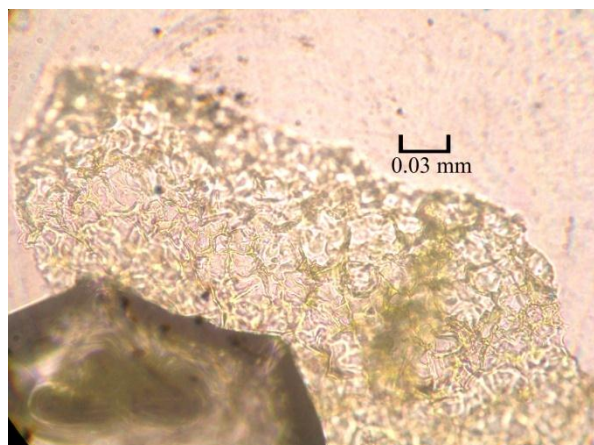
Trichosanthes dioica Roxb is a widely traditionally used and more potent medicinal plant among all the thousands of medicinal plants. The pharmacological activity was reported in the present review confirmed that the therapeutic value of *Trichosanthes dioica* Roxb is much more. The presence of phytochemical constituents and pharmacological activities proved that the plant has a potential leading capacity for the development of new good therapeutic efficacy drugs in the future.



Fig.1: Plate No.443
***Trichosanthesdioica* Roxb**



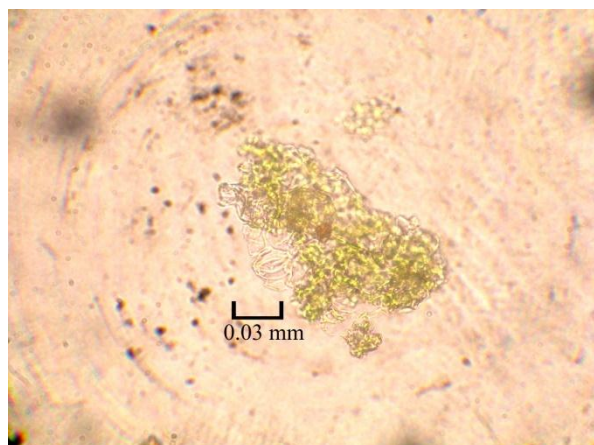
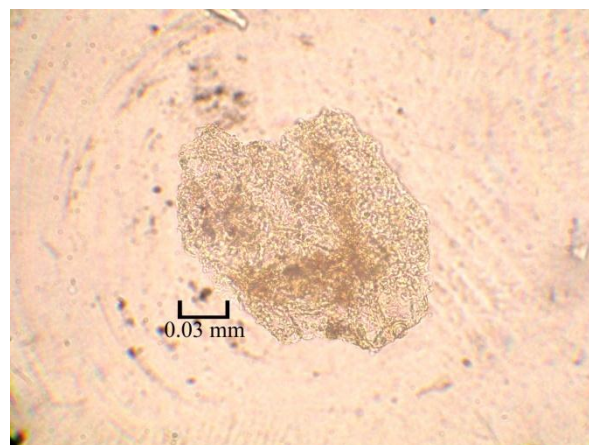
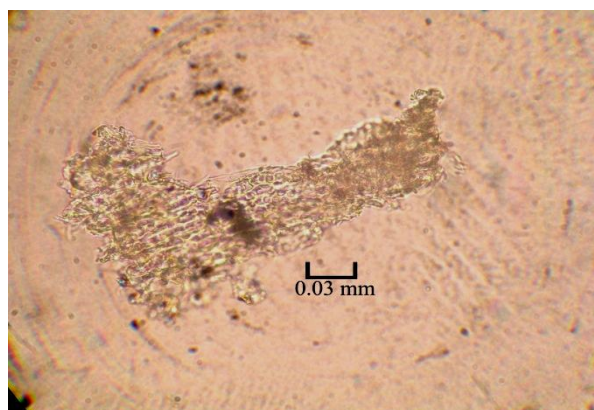
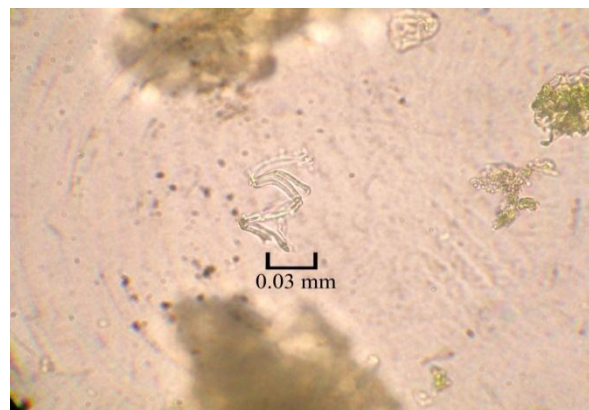
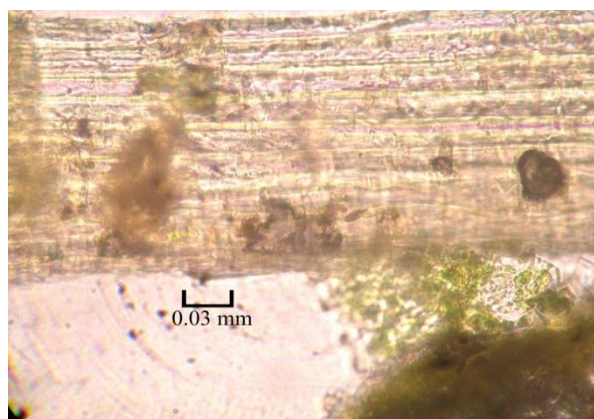
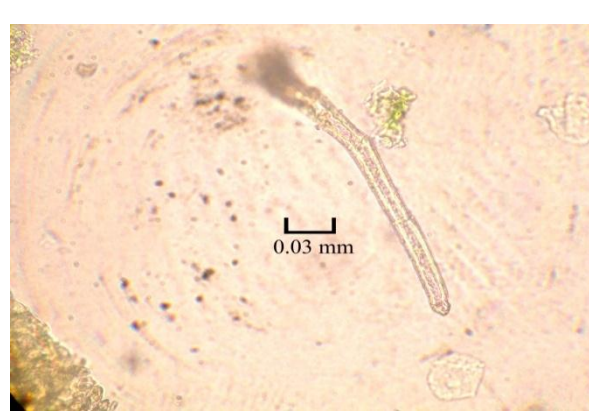
Fig. 2: Morphology and scaling of
***Trichosanthesdioica* Roxb**



Epidermal cells in surface view



Spongy parenchyma under epidermis

**Stomata****Epidermis of petiole with cicatrix****Fragment of phloem tissue****Vessel fragment****Fibre bundle****Trichome****Fig. 3: Characters from Patola- *Trichosanthes dioica* Roxb.- leaf**

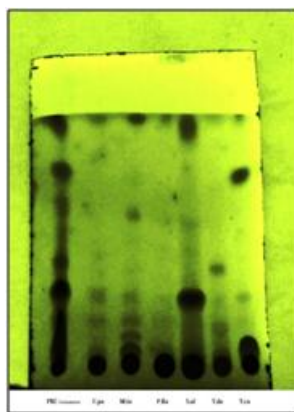


Fig. 4: TLC Identification of Six plants Extract Compared with PatoladiKwatha Churna Formulation

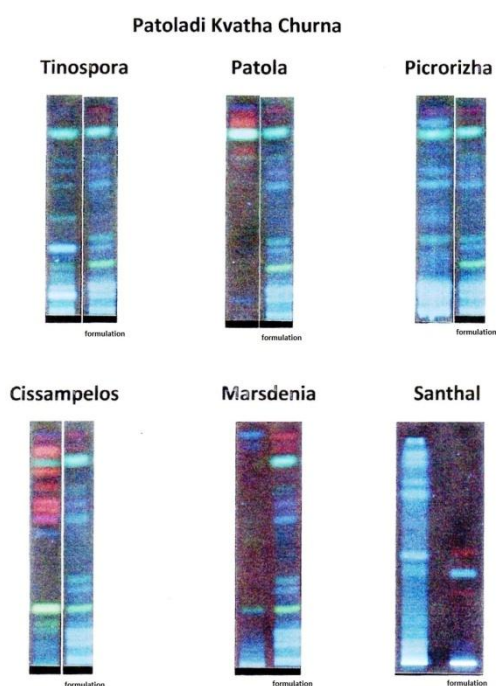


Fig. 5: HPTLC for patoladikvathachurna formulation (containing 6 plants) compared with individual plant extract especially *trichosanthes dioica* (patola)

Table 1: Results of Macroscopical Studies

S.NO	Plant name	Colour	Odour	Taste	Surface characteristics	Size and shape
1	<i>Trichosanthesdioica</i> Roxb	Upper surface green, lower surface dull green	Not specific	Slightly bitter	Both surfaces are very rough with rigid hairs. Sinuate and dentate margin, cordate base, acute to acuminate apex.	Ovate-oblong Cordate

Table 2: Determination of foreign organic matter

S.NO.	Plant name	Foreign organic matter	API Standard limit	Loss On Drying	PH
1	<i>Trichosanthesdioica</i> Roxb.	1.0%	NIL	7.8%	8.19

Table 3: Ash value

S.No.	Plant name	Determination of ash value (Total ash)	API Standard limit	Acid insoluble ash	API Standard limit	Water soluble ash
1	<i>Trichosanthesdioica</i> Roxb.	13.36%	NMT - 7%	3.14%	NIL	NIL

Table 4: Determinations of extractive values

S.No.	Plant name	Water soluble extractive	API Standard limit	Alcohol soluble extractive	API Standard limit
1	<i>Trichosanthesdioica</i> Roxb.	12.5%	NIL	2.1%	NIL

Table 5: Preliminary Phytochemical Screening of powdered raw material of *Trichosanthesdioica roxb. (leaf)*

S.NO.	Chemical Constituent	<i>Trichosanthesdioica</i> Roxb. (leaf)
1	Alkaloids	+
2	Glycosides	-
3	Carbohydrates	-
4	Steroids	+
5	Triterpenoids	-
6	Flavonoids	+
7	Tannins	-
8	Phenols	++
9	Saponins	-
10	Fixed oils and fats	-
11	Proteins & Free amino acids	-
12	Volatile oil	-
13	Mucilage, gums and resins	-
14	Terpenoids	+
15	Diterpenes	-

(+) indicates Present and (-) indicates Absent

Table 6: Identification of PatoladiKvatha Churna with *Trichosanthesdioica* Roxb.

No.	Name of the plant extract	No. of Spot	R _f Value	PKC Formulation		Name of the matching compound
				No. of Spot	R _f Value	
1	<i>Trichosanthesdioica</i> Roxb	4	0.15,0.3,0.4,0.5	1	0.3	Steroids
2	<i>Trichosanthesdioica</i> Roxb.(Patola)	3	0.86, 0.08,0.94	3	0.86,0.08, 0.94	0.86- orange colour- Flavonoids&Steroids 0.86-Brown colour- Tanins&Phenols,Aminoacids

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