

Phytochemical Evaluation and Antibacterial Activity of *Trichosanthes tricuspidata* Root Extracts against Pathogenic Bacteria

Rajkishor Prasad

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ABSTRACT

Trichosanthes tricuspidata (CUCURBITACEAE), commonly called RED INDRAYAN is found growing at Gopalganj district of Bihar state as an extensive climber. Its root extract is used for curing asthma, fever, migraine diabetic carbuncles and other maladies. The present study was aimed to execute phytochemical screening and antibacterial activity of *Trichosanthes tricuspidata* root extract. The antibacterial activity of root extracts was tested against Gram +ve and Gram -ve bacteria (MTCC-1036; MTCC-432, MTCC - 96 and MTCC – 497. The ethanol, 50% ethanol and water extracts from mature root of this plant were screened for their chemical constituents and bacterial activity. The ethonolic extract showed the presence of alkaloids, carbohydrates, glycosides, saponins and triterpenoids.

1. Introduction

Man has always been dependent on the plants for fuel, food and medicines since ages. More than 80% of the World's population relies on traditional medicines for their primary health care needs (WHO, 2002). Plants used for traditional medicine to contain a wide range of substances that can be used to treat chronic as well as infectious disease (Samy RP and Ignacimuthu, S, 2002). It has now been established that the plants which naturally synthesise and accumulate some phytoconstituents eg. flavonoids, alkaloids, tannins and triterpenoids are source of medicine and stimulating opportunity for the expansion of modern chemotherapies against wide range of microorganisms (Lutterodt, GD, 1999); Marjori, MC, 1999). Historically, plants have provided a source of inspiration for bearing novel drug compounds and health care. (Iwu M, 1993). Today antibiotic is used to refer to almost any drug that attempts to ride our body from bacterial infection. Each species of pathogen has a characteristic spectrum of interactions with its hosts. Now a day, an increasing number of infections agents are becoming more resistant to commercial antimicrobial compounds (Handcock *et al.* 2012). The necessity to develop new drugs requires varied strategies like the bioprospection of secondary metabolites produced by medicinal plants (Dionisi *et al.* 2012). *Trichosanthes tricuspidata* (CUCURBITACEAE) is climber vine which is considered to be medicinally important in several traditional systems (Snehlata *et al.* 2008). It has been used for curing asthma, fever, migraine, diabetic carbuncles and other maladies. A number of pharmacologically important phytochemicals i.e. cucurbitacins, trichotetrol and octanorcucurbitane glycosides have been isolated from this plant

Kanchanapoom *et al.* 2002) Trichotetrol (Tetrahydroxy pentacyclic triterpene) isolated from its root extract contains palmitate, palmitic acid, suberic acid, spinasterol and D-glucose. The oil extracted from its root is used as pain killer (Brijesh K *et al.* 2012).

2. Materials and methods

Materials :

- Root of *Trichosanthes tricuspidata*
- Distilled water
- Incubator
- Petroleum ether
- Ethanol
- 50% ethanol
- Soxhlet apparatus
- Air oven
- Autoclave
- Muller Hinton Agar (MHA) media
- Culture tube

Methods :

- Preparation of root extracts freshly collected roots (1kg) of *Trichosanthes tricuspidata* were washed with distilled water, shade dried and powdered. The powder (200 gm) was defatted with petroleum ether. The defatted material was then extracted with the solvents of elutropic series i.e. ethanol, 50% ethanol and water (1:1 v/v) by using soxhlet apparatus while 'aqueous extract was prepared by refluxing sequentially. Each time before extracting with the next solvent of high polarity, the powdered roots were dried in air oven (= Incubator) below 50°C for 10 minutes. Each extract was then concentrated by distilling off the solvent, which was recovered subsequently. The concentrated extract were then evaporated to dryness and their percentages were calculated in terms of initial air - dried plant material (Table 1). The extracts obtained were subjected to phytochemical screening and antibacterial activity (Koklate, 1999).
- Phytochemical screening : The successive extracts were then subjected to various qualitative phytochemical tests for the identification of chemical constituents present in the root of *Trichosanthes tricuspidata*. The phytochemical screenings for chemical constituents were done by standard qualitative methods (Sofowora, 1993; Trease *et al.* 1989; Harborne, 1973).

- Microorganisms : The antibacterial activity for existing extracts was determined by Agar Well Diffusion method. Both Gram +ve and Gram -ve bacterial strains were used for the test. (MTCC-1036; MTCC – 432; MTCC-96; MTCC – 497).
- Preparation of media :
 - Nutrient broth - It was prepared by dissolving 40 gm medium in 1000 ml of distilled water. The medium was dispensed as desired and sterilized by autoclaving at 15 lbs pressure (=121°C) for 15 minutes.
 - Muller Hinton Agar Media – The dehydrated Muller Hinton Agar (MHA) media was prepared by dissolving 38 gm into 1000 ml of distilled water, boiled and dissolved completely. It was sterilized by

autoclaving at 15 lbs pressure and 121°C temperature for 15 minutes. Media poured into sterile petri dishes and allowed to set. Sterility check was done after the agar was solidified (Atlas RM, *et al.* 2006).

3. Results and discussion

Present study was conducted to investigate antibacterial properties of *Trichosanthes tricuspidata* powdered samples of plant roots were extracted in three different solvents i.e. ethanol, 50% ethanol and aqueous). Hence, total three extracts were tested against 4 different pathogens as per table - 3 (MTCC – 1036; MTCC - 432, MTCC - 96 and MTCC - 497).

Table : 1 Showing percentage yield of crude extract in different solvent.

Serial No.	Solvent	Weight of extract	% Yield of extract
1	Ethanol	2.08 gm	3.46%
2	50% Ethanol	1.72 gm	2.86%
3	Water	2.97 gm	4.91%

Table – 2 : Showing phytochemical analysis of ethanolic extract.

Serial No.	Name of Test	Ethanolic result
1.	Alkaloids :	
	•Hayer's Test	+
	•Wagner's Test	+
	•Dragendroff's Test	+
2.	Carbohydrate :	
	•Molish's Test	+
	•Fehling's Test	+
	•Benedict's Test	+
3.	Glycosides :	
	•Legal's Test	+
	•Baljet's Test	+
	•Borntrager's Test	+
4.	Flavonoid	
	•FeCl ₃ Test	+
	•Lead acetate Test	+
	•Gelatin Test	+
5.	•Saponins Test	+
6.	•Terpenoids Test	+
7.	•Tannins	+

The percentage yields after extraction from *Trichosanthes tricuspidata* root ranges from 2.86% to 4.91% (Table -1). The qualitative phytochemical screening of extract showed the presence of alkaloids, carbohydrates, glycosides, phenolic compounds, saponins and terpenoids. These compounds are known to be biologically active and therefore, aid the antibacterial activities of the plants. The various

phytochemical compounds detected are known to have beneficial importance in medicinal sciences. Alkaloids were used in treating malarial fevers and in managing heart diseases (Okwu, 2003). Plant phenolics possess biological properties like antioxidant, anti-inflammatory and estrogenic activities (Bawa *et al.* 2006). Glycosides play a critical role in defense mechanisms (Oomah, 2003).

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