Research Article

Phytochemical and In Vitro Evaluation of Antimicrobial Activity of *Trichosanthes cucurmena* L.

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ABSTRACT

A large number of medicinal plants have been used for years in daily life against diseases, whole over the world. Presently herbs are used as important materials in the health care system, create an herbal regeneration, spread with a superior speed throughout the world. The herbal products today used for safety in contrast to the synthetic drugs that are regarded as unsafe to human environment. In Our current rework is leaves of pet ether and ethanol extract of *Trichosanthes cucurmena* L (PETC) and (EETC) of family Cucurbitaceae were tested positive for presence of phytochemicals like Phenols, tannin, saponin, flavonoids, alkaloids, anthraquinone, triterpenoids and steroids, etc. in EETC. But PETC shows absence of alkaloids, glycosides, steroids and flavonoids. Both PETC and EETC were subjected to antimicrobial activities. Both extracts showed antimicrobial activities against *Staphylococcus aureus, Escherichia coli* and *Bacillus cereus*.

Keywords: *Trichosanthes cucurmena* L., Antimicrobial, Phytochemical, *Escherichia coli* and *Bacillus cereus.*

INTRODUCTION

Nature is the seventh heaven of medicinal principles offers to the humanity through plants which act as richest source of phytochemicals. An inspiring number of modern drugs have been isolated from the forest resources; many being strike basing on their use in the treatises of traditional medicines[1].The various living systems bear a rich biodiversity in nature. Since the earliest era before scientific knowledge would change plants performed important functions of the biosphere[2].

Medicinal plants play a significant role in the production of novel and valuable drugs used in modern medicine. Today we have a number of useful and life saving drugs and also drugs which can provide immediate therapeutic benefit[3].

Over 2000 plant species are found to have medicinal value and are used for medicinal purpose in different forms. Many common plants available in the kitchen gardens or in the forests are used by the tribe as medicines[4].

The herbal products today symbolize safety in contrast to the synthetic drugs that are regarded as unsafe to human environment. The conventional systems of medicine continue to be generally practiced on many accounts even at present.

Population rise, insufficient supply of drugs, excessive cost of treatments, side effects of a number of allopathic drugs and development of resistance to currently used drugs for infectious diseases, have led to enlarge emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments.

India has been known to be a rich depository of medicinal plants. The forest in India is the principal repository of number of medicinal and aromatic plants, which are largely used as raw material for manufacture of drugs and allied products.

Ayurveda is gaining momentum and prominence as the natural system of health care all over the world. Perusal of literatures reports the medicinal properties of most of the plants posture biological activity one of such species is *T. cucumerina* (F. Cucurbitaceae) which has been exploited for many traditional medicinal uses.

The plant extract also showed gastro protective activity. The inhibiting effects on formed protein non-enzymatic glycation an end product was studied from the ethanolic leaf extract.

The diversity of pathogenic bacteria is general and so is the variety of diseases caused by them. Despite the survival of many potent antimicrobial agents[5], multi-resistant pathogenic strains are continuously emerging, imposing the need for a continuous search and development of new drugs[6].

Most drugs hold many severe side effects. Many medicines of natural foundation had been used since long time without any severe adverse effects, however, several synthetic antimicrobial and drugs are commercially available, natural products still substitute most of the chemical agents.

In the present study, solvent extracts such as PETC and EETC were evaluated for the qualitative phytochemical analysis and *in vitro* antimicrobial activity which may lead to the finding of more effective agent for the management of diseases and effective potential source of

natural antimicrobials that may help in preventing various diseases.

Preparation of the Extract (EETC and PETC)

Plant material of *T. cucumerina* leaves were washed with distilled water and shade dried.

The dried leaves was ground together to a fine powder using blender. The coarsely powdered sample (50 g) was filled in the thimble and extracted with petroleum ether and ethanol using a Soxhlet extractor.

The filtrate was evaporated to dry under reduced pressure using a rotary vacuum evaporator. The extracts were stored in ambient containers until further use[7].

Table 1: Qualitative Chemical Analysis of EETC and PETC

S. No	Test	Petroleum ether Extract	Ethanol Extract
1.	**Carbohydrates test**		
	a) Molisch's test	+	+
	b) Fehling's test	+	+
2.	**Proteins & Aminoacids**		
	a) Ninhydrin test	+	-
	b) Biuret test	+	-
	c) Tannic acid test	-	-
	d) Xanthoprotein test	+	-
3.	**Alkaloids**		
	a) Wagner's test	-	+
	b) Dragendorff's test	-	+
	c) Mayer's test	-	+
4.	**Saponins**		
	a) Foam test	-	-
5.	**Flavonoids**		
	a) Ferric chloride test	-	+
	b) Shinoda test	-	+
	c) Alkali & acid test	-	+
6.	**Tannins & phenolic compounds**		
	a) Ferric chloride test	-	+
	b) Heavy metals test	-	+
7.	**Glycosides**		
	a) Modified Borntrager's test	-	+
8.	**Phytosterols**		
	a) Libermann- Burchard's test	-	+
		+	+
	b) Terpenoids		
	i) 2, 4-DNPH test	-	+
	c) Anthraquinones		
	i) Borntrager's test	-	+
	d) Steroids		
	i) Salkowski's test	+	+

Preliminary Phytochemical Screening

The freshly prepared crude PETC and EETC were qualitatively tested for the presence of phytochemical constituents such as alkaloids, flavones, terpenoids, steroids, tannins etc., by standard methods[8,9].

Bacterial Strains

Authenticated cultures of eight bacterias such as *Escherichiae coli* (MTCC 1687), *Klebsiella pneumoniae* (MTCC 7162), *Proteus mirabilis* (MTCC 9242), *Shigella flexneri* (MTCC 1457), *Streptococcus pyogenes* (MTCC 1926), *Streptomyces fulvissimus* (MTCC 7336), *Bacillus subtitis* (MTCC 736) and *Pseudomonus auruginosa* (MTCC 2488) were collected from Microbial Type Culture Collection and Gene Bank, Institute of Microbial Technology, Sector 39-A, Chandigarh, India.

Fungal Strains

Two fungi *Aspergillus niger* and *Candida albicans* were selected for screening.

Preparation of Inoculums

Bacterial and fungal inoculums were prepared from the 24 h old pure culture grown on nutrient agar media for bacteria and one week old culture on potato dextrose agar media for fungi.

Bacterial colonies were pre-cultured in nutrient broth medium and kept overnight, then centrifuged at 10,000 rpm for 5 min.

Pellet was dissolved in sterilized distilled water and the cell turbidity was assessed spectroscopically incomparable to that of the 0.5 McFarland standards (approximately 1.5 × 108 CFU/ml) whereas the fungal spores were scraped from the mother culture and dispensed with sterilized distilled water.

Then the spore density was adjusted spectrophotometrically to obtain approximately 105 spores/ml final concentration.

Then the inoculums were used for the antibacterial and antifungal assays[10].

Disc Diffusion Bioassay

The disc diffusion test was carried out as described by[11] at 0.5 ml standardized inoculum suspension of each bacterial strain was spread on nutrient agar plates with a sterile bent glass rod spreader.

Sterile 6-mm Whatman no. 1 filter paper discs were aseptically placed on plates.

PETC and EETC of standard concentrations (1mg/ml) were aseptically poured on the discs along with sterile double distilled water or 10% DMSO as negative and Oxytetracycline (1mg/ml) as positive controls.

Plates were allowed to stand for 30 minutes at room temperature prior to incubation at 35-37°C for 24 hours.

The inhibition zone diameters were measured three times and means were represented.

Table 2: Antibacterial activity measured as zone of inhibition at 1mg/ml of PETC and EETC (leaf) and standard antibiotics

Extract 1mg /kg	Solvent type	*E.coli*	*S. Flexneri*	*S. Pyogenes*	*S. fulvissimus*	*K. pneumonia*	*P. mirabilis*	*B. subtitis*	*P.auruginosa*
T.cucurmena	*EETC*	24 ± 1.1	17 ± 1.2	16 ± .23	16 ± 1.3	17 ± .1.5	19 ± 1.2	20 ± 1.4	20 ± .54
T.cucurmena	PETC	9 ± 1.5	6 ± .75	8 ± .45	11 ± .56	7 ± .52	11 ± 1.3	13 ± 1.2	7 ± .56
Standard	Oxye tetracyclin	25 ± 1.2	23 ± .62	21 ± .12	20 ± .24	17 ± .54	19 ± .52	24 ± .5	23 ± .16

RESULTS AND DISCUSSION

In the present study, preliminary chemical analysis of two different solvents viz. PETC and EETC revealed the presence of carbohydrates, proteins, and Sterols Phenols, flavonoids, alkaloids, Saponin, anthraquinone and Tannins are present in ethanol. But in PETC Alkaloids, saponin, steroids and flavonoids are absent (Table 1).

The disc diffusion assay revealed that the *T. cucumerina* extracts had different degrees of bacterial and fungal growth inhibition, depending on the microbial strains (Table 2).

Both extracts had shown similar antimicrobial activities against all tested strains. EETC was very effective against bacteria like *E. coli, P. mirabilis, B. subtitis, and P. auruginosa.* But Petroleum ether extract showed moderate antimicrobial activities against *S. fulvissimus, P.mirabilis, B. subtitis and P.auruginosa.*[12] The antimicrobial activity of EETC might be due the presence of secondary metabolites like tannin, alkaloids and anthraquinones which are known to have antimicrobial properties[13].

In the present study, EETC revealed the presence of carbohydrates, alkaloids, flavonoids, phytosterols, tannins and phenolic compounds which justifies the earlier findings of[14,15].

In the present investigation PETC and EETC against suggests its antimicrobial potential which has also been studied previously against various pathogenic bacteria.

CONCLUSION

The present investigation concludes that EETC exhibited maximum inhibition against Microbial strains. Crude extracts displayed significant antimicrobial activity, thus results obtained in the present investigation are promising enough for further isolation and characterization to reveal any novel metabolite of pharmaceutical importance.

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