

Original Research Article

Volume 12 Issue 2

March-April 2023

ESTIMATION OF ANTI-MICROBIAL ACTIVITY OF *CISSUSS QUADRANGULARIS* AQUEOUS EXTRACT

Kavitha Andugula*, Narendra Babu Ankem

Department of Pharmacology, Chalapathi Institute of Pharmaceutical Sciences, Lam,
Guntur - 522 034, Andhra Pradesh, India.

*Corresponding author's E-mail: kavithaandugula321@gmail.com

Abstract

The *Cissus quadrangularis* is having anti-microbial activity and every part of this plant is important in medicine and various preparations in indigenous system of remedy for *Cissus quadrangularis* is used for diabetes, obesity, high cholesterol, bone fractures, allergies, cancer, stomach upset, painful menstrual periods, vaginal infections, asthma, malaria, wound healing, peptic ulcer disease, osteoporosis. In this study the in vitro anti-microbial activity of aqueous extract is tested against gram-positive, gram-negative organism's and fungi strains by agar disc diffusion method. The crude extract showed a broad spectrum of anti-microbial activity by inhibiting both the gram positive, gram negative, fungi groups. The anti-microbial activity of *C. quadrangularis* plant extract using solvents such as water was evaluated against the gram-positive strains such as *St. aureus*, *B. subtilis* and in gram negative strains such as *E. coli* (ETEC), *P. aeruginosa* and fungi such as *Saccharomyces cerevisiae* (Yeast), *Candida albicans*. Each test organism was also studied by observing their growth in presence of the aqueous extract at various incremental levels, equivalent to 25µg/mL- 800µg/mL. The highest activity was observed in aqueous extract against gram positive and gram-negative organism's and fungi with an inhibitory concentration < 50 µg/ml. The significance of the study was conducted to examine the in vitro anti-microbial activity of *C. quadrangularis* plant and to evaluate their medicinal properties.

Keywords: Anti-microbial, *Cissus quadrangularis*, disc plate method, Minimal inhibitory concentration (MIC)

Introduction:

C. quadrangularis of the family Vitaceae is distributed in tropical Asia, Africa and also originate in India and Srilanka etc... *C. quadrangularis* is a perennial plant of the grape family. The Stem of *C. quadrangularis* is used as (a) vegetable when green and every part of this plant is valuable in medicine and various preparations have been mentioned in indigenous system of medicine for diabetes, obesity, high cholesterol, bone fractures, allergies, cancer, stomach upset, painful menstrual periods, asthma, malaria, wound healing, peptic ulcer disease, weak bones, weak bones (osteoporosis) and as body building supplements as an alternative to anabolic steroids¹. The plant is used in decoction for gonorrhoeae, vaginal infections, diabetes and also useful in dropsical condition, pyelitis, cystitis, strangury, snake bite, urinary gravel and calculi. It is also useful to induce perspiration in fever and cures sores in the tongue. It has antilithic, hypolipidemic, antimutagenic and hypoglycemic activities. The present study was undertaken to evaluate the anti-microbial activity of *C. quadrangularis* extract.

Materials and Methods

Collection of plant material:

C. quadrangularis, leaves and stem were collected from the fields of Nandigama, Andhra Pradesh, India, in the month Jun- Aug 2017. Herbarium of the plant was prepared authenticated form Department of Botany, ANU, Guntur, Andhra Pradesh, India. After collection of the required quantity of the plant material, it was then carefully segregated, cleaned and dried in preset oven for few days at 45°C. The completely dried plant material free of moisture was powdered and sieved through a BSS mesh No. 85 sieve and then stored in an airtight plastic container. Further air-dried powder (30g) was extracted with water for three days by using Sox let apparatus. After that the extracts were concentrated with rotary evaporator and dried in vacuum. The extract washed with 3N HCl and fractions were taken for study.

Anti-Microbial activity:

The anti-bacterial activity was executed by disc diffusion technique. All the bacterial cultures were obtained from the Microbiology department, Chalapathi institute of pharmaceutical

sciences, Guntur. The 6 mm sterile discs prepared from Whatman's filter paper (No.3) were used for absorbing of the plant extract samples. The positive control used in this study includes the standard reference anti-microbial discs of ciprofloxacin (5 µg/ml) for bacteria and Ketoconazole (10 µg/ml) for fungi were used³. Antibiotics diffuse from a confined source through the nutrient agar medium, Sabouraud dextrose broths and create a concentration gradient, Dried and sterilized filter paper discs (6mm diameter) containing the test samples. The isolated cells were spread over the Muller-Hinton agar and Sabouraud's dextrose agar medium. The discs with plant extract (25 µg- 800 µg) placed using sterile forceps were mounted on top layer of the inoculated plates. These plates were then inverted and incubated at 37 °C for 18-24 hours for optimum growth of the organisms. The test materials having antimicrobial property inhibit microbial growth in the media surrounding the discs and thereby yield a clear, distinct area defined as zone of inhibition. The antimicrobial activity of the test agent was then determined by measuring the diameter of zone of inhibition expressed in millimeter and compared with the control³.

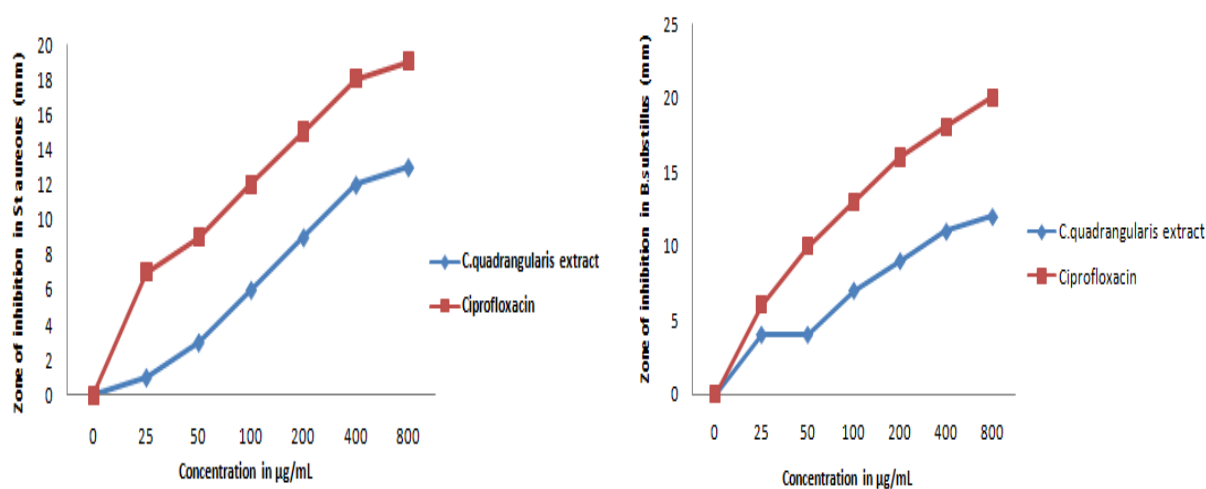
Results:

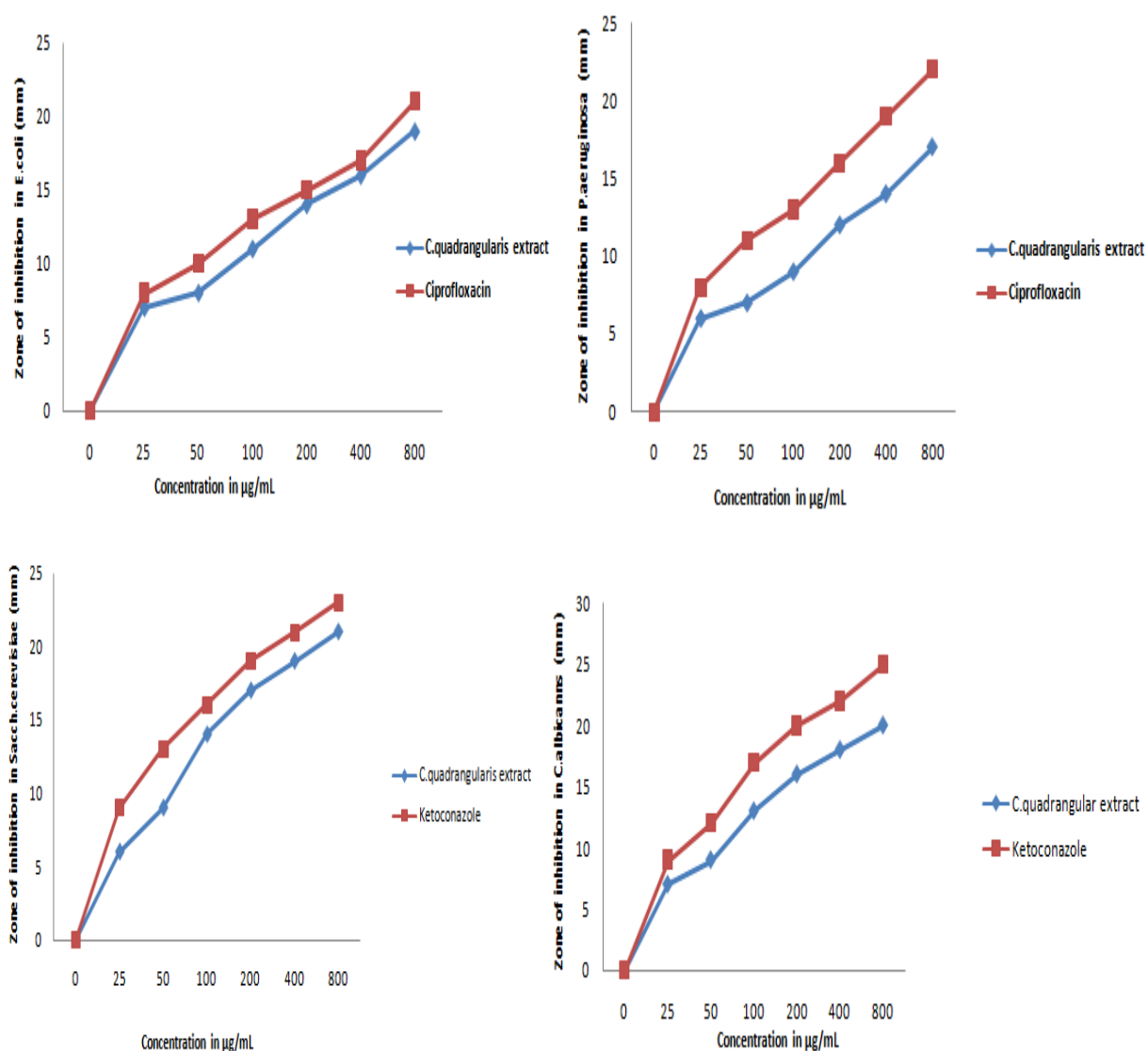
Table 1- Zone of inhibition in mm for *C.quadrangularis* extract:

Concentration (µg/mL)	C. quadrangularis extract (Zone of inhibition in mm)					
	<i>St.aureus</i>	<i>B.subtilis</i>	<i>E.coli</i>	<i>P.aeruginosa</i>	<i>Sacch.cerevisiae</i>	<i>C.albicans</i>
0	0	0	0	0	0	0
25	1	4	7	6	6	7
50	3	4	8	7	9	9
100	6	7	11	9	14	13
200	9	9	14	12	17	16
400	12	11	16	14	19	18
800	13	12	19	17	21	20

Table 2 - Zone of inhibition in mm for positive controls:

Concentration (µg/mL)	Ciprofloxacin (Zone of inhibition in mm)				Ketoconazole (Zone of inhibition in mm)	
	<i>St.aureous</i>	<i>B.substilis</i>	<i>E.coli</i>	<i>P.aeruginosa</i>	<i>Sacch.cerevisiae</i>	<i>C.albicans</i>
0	0	0	0	0	0	0
25	7	6	7	8	9	9
50	9	10	10	11	13	12
100	12	13	13	13	16	17
200	15	16	15	16	19	20
400	18	18	17	19	21	22
800	19	18	21	22	23	25

**Figure 1-6: Pictorial representation of Anti-microbial activity of C.quadrangularis extract and positive controls**



Discussion:

The present study was conducted to evaluate the in vitro anti-microbial activity of *C. quadrangularis* herb used by people of India. To estimate the medicinal uses, the aqueous extract treated against isolated microorganisms is shown appropriate results as per the tables and with respective figure 1-6. The highest zone of inhibition was observed for *E. coli* and *Sacch. cerevisiae* at the concentration of 800 µg/mL. The obtained results are close to the positive controls. Further investigation the plant extract be carried out with a view to

develop novel drugs for human consumption. The results are indicating that herbal preparations can be used to prevent and treat the diseases caused by the selected organisms.

Conclusion:

In the present study the anti-microbial activity has been observed in case *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus*, *Saccharomyces cerevisiae* (Yeast) and *Candida albicans*; It is evident from the results that aqueous extract acquires predominant anti-microbial property in comparison to positive controls.

Acknowledgement:

One of the Author is thankful to Professor Rama Rao Nadendla, principal, Chalapathi Institute of Pharmaceutical Sciences for providing required facilities to carry out the research work.

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