



EVALUATION OF ANTIMICROBIAL ACTIVITY OF OXALIS CORNICULATA

Anusha Govindula*, Nabeela Midhath, Syedahafsa Aqueel, M. Sowmya and K. Sandhya

*Assistant Professor, Department of Pharmacology, Vaageswari College of Pharmacy.
Students, Department of Pharmacology, Vaageswari College of Pharmacy.

*Corresponding Author: Anusha Govindula

Assistant Professor, Department of Pharmacology, Vaageswari College of Pharmacy.

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ABSTRACT

The aim of present study is to investigate the Antimicrobial activity of *Oxalis Corniculata* belonging to the family-*Oxalidaceae*. The leaves of this plant are edible, with tangy taste just like lemons. This herb is richest source of Vitamin C, Vitamin B, Potassium and Oxalic acid. The review reveals that wide ranges of phytochemical constituents have been isolated from the plant like flavanoids, tannins, phytosterols, phenol, glycosides, fatty acids, galacto-glycerolipid and volatile oil. In early twentieth century, the discovery of antibiotics provide a tool against the microbial infections but due to multiple drug resistance and adverse effects on host including hypersensitivity, immune suppression and allergic reactions shown by antibiotics creates a need of natural medicines with safe and better therapeutic effect. The present study provides new avenues for the improvement of medicinal uses of *Oxalic Corniculata*. The leaves are selected for anti-microbial activity. The ethanolic extract of leaves of *Oxalis Corniculata* were assessed for its Anti-microbial activity against E.Coli and Lactobacillus organisms by agar cup plate method exhibited an excellent antimicrobial activity.

KEYWORDS: Antimicrobial activity, Agar cup plate method, Ecoli, Lactobacillus, Minimum inhibitory concentration.

INTRODUCTION

According to World Health Organization (WHO) more than 80% of the world's population relies on traditional medicine for their primary healthcare needs. Plants, as the source of medicine, have been playing an important role in the health services around the globe.^[1] Use of herbal medicines worldwide represents a long history of human interactions with the environment. Plants used in traditional medicine contain a wide range of ingredients that can be used to treat chronic as well as infectious diseases. Human body is very prone to viral, bacterial and fungal infections. The discovery of antibiotics in the early twentieth century provided an increasingly important tool to combat bacterial diseases. But due to the indiscriminate use of commercial antimicrobial drugs commonly used in the treatment of infectious diseases multiple drug resistance has been developed.^[2,3] In addition to this problem, antibiotics are sometimes associated with adverse effects on the host including hypersensitivity, immune suppression and allergic reactions.^[4] This creates a need of new effective and safe antimicrobial therapeutic agents. In this regard naturally occurring medicinal plants having active constituents which show the antimicrobial activity may provide the wide area of research. Antimicrobials of plant origin have enormous therapeutic potential. They are effective in the treatment of infectious diseases while

simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials. Patients with infections caused by drug-resistant bacteria are at increased risk of worse clinical outcomes and death, and consume more health-care resources than patients infected with non-resistant strains of the same bacteria. Resistance in *E. coli* to one of the most widely used medicines for the treatment of urinary tract infections (fluoroquinolone antibiotics) is very widespread. There are countries in many parts of the world where this treatment is now ineffective in more than half of patients.^[5,6]

MATERIALS AND METHODS

The study was conducted as a part of Academic research in Vaageswari College of Pharmacy from December 2017 to April 2018.

Collection of plant materials

The leaves of *Oxalis corniculata* were collected from the wild growing tree in the botanical garden Vaageswari College of Pharmacy, Thimmapur, Karimnagar and Telangana, India. The collected plant material was made thoroughly free from any foreign organic matter. Leaves were separated, shade dried and powdered with laboratory mixer and sieved.

Drugs and chemicals: Ciprofloxacin (Piramal healthcare limited), ethanol (Merc life sciences (p)Ltd.), Agar medium (Himedia laboratories pvt.Ltd), Broth(Central drug house Pvt.Ltd) was used during the experiment.

Selection of bacterial strains

Medically important bacterial strains used in this study were *E.coli*, *Lactobacillus* which were produced from MTCC (IMTEC11), Chandigarh, India.

Preparation of extracts

Ethanol extracts of oxalis *Corniculata* leaves were prepared by both Soxhlation and maceration methods at suitable temperature. 50gms of powder of leaves is dissolved in 200 ml of solvent. Soxhlation process was carried out for about 7hrs. The extracts obtained were evaporated and dried in desiccators.

Standard reference antibiotic

The reference antibiotic used is ciprofloxacin.

Preparation of broth culture: For the preparation of broth culture for bacteria, the liquid media was prepared as per given composition for broth culture. After the sterilization of media the bacterial strains were inoculated under laminar air flow. The incubation of inoculated media was carried out at 37°C for 48 hours.

Preparation and sterilization of media: The nutrient agar was taken in 500ml conical flask which is plugged with non absorbent cotton plugs and kept in autoclave (121°C, 15lbs pressure) to sterilize the media for an hour.

Plating the media

Molten media was poured on to the Petri dish (pre-sterilized in oven for 2 hours at 20°C in order to avoid contamination). The plated Petri dishes were kept on a plane surface to avoid non-uniform solidification of medium. All these options were performed on a sterile room which was fitted with laminar air flow.

Bacterial culture preparations: Bacterial cultures were inoculated in the freshly prepared nutrient broth (which are prepared prior and sterilized) and kept on rotary shaker for 24 hours and observed for growth (turbidity indicates the growth).one day old cultures are used for testing and determination of each extract.

Assay procedure

Table no 1: Antibacterial Activity of Ethanolic Extract of *Oxalis Corniculata*.

S. No	Type of bacteria	Diameter of zone of inhibition(mm)		Ciprofloxacin (standard)
		Ethanolic Extract		
		250µg/ml	500µg/ml	
1	<i>Lactobacillus</i>	12	20	22
		10	18	22
		Average	11	19
2	<i>E.coli</i>	10	19	22
		13	21	22
		Average	11.5	20

The assay procedure was carried out by disc diffusion method. The sterilized molten agar media was poured into Petri dishes, and kept aside for solidification. Then 100µl of broth culture of bacterial solution was spread over the solid agar plate. By the use of sterile borer small bores were made over the plate and it was filled with test solution, standard solution and diluting solution respectively for each bacterial plate. The plates were kept under incubation for 48hours at 37°C. The zone of inhibition was measured using scale in millimeters.

Antibacterial activity

The antibacterial activity of the extract was determined by the well diffusion method (Bauer et al., 1966). The test solution was prepared in Di methyl sulfoxide (DMSO). Nutrient agar medium was used for the test. Under aseptic conditions, in the laminar airflow chamber nutrient agar medium was dispersed into pre sterilized petri dishes to yield a uniform depth of 4mm. The media was allowed to solidify. The test microorganisms were seeded into media containing petri dished, by spread plate method 100µl with 24hours culturing of bacteria. The plates were kept for pre diffusion for 15mins before use. Wells were then punched with sterile cork borer(6mm diameter), and 50µl of the ethanol extracts by soxhlation (10mg, 20mg/ml in DMSO) were placed into each well. A negative control was maintained using 50µl of DMSO in a well and 50µl of standard antibiotic (*lactobacillus* at 10µ/ml) was the positive control. Tetraplicates were maintained for the extract. Finally the plates were incubated for 18-24 hrs at 37°C . The diameter of zone of inhibition was indicated by clear area which was devoid of growth of microbes was measured.

RESULTS

Antibacterial Activity of Ethanolic Extract of *Oxalis Corniculata*

Ethanol extracts of leaves of oxalic *corniculata*.(EEOC) was investigated for their in vitro antimicrobial property by agar disc diffusion method. The ethanolic extract of EEOC inhibited the growth of both Gram positive bacteria (*Lactobacillus*) Gram negative bacteria(*E.Coli*).

By the present study it was conformed the leaf extract of oxalis *corniculata* have antibacterial activity. The different concentrations of ethanolic extracts by soxhlation process showed antimicrobial activity against the test organisms *Lactobacillus*, and *E.Coli*. The results were furnished in the table no 1.

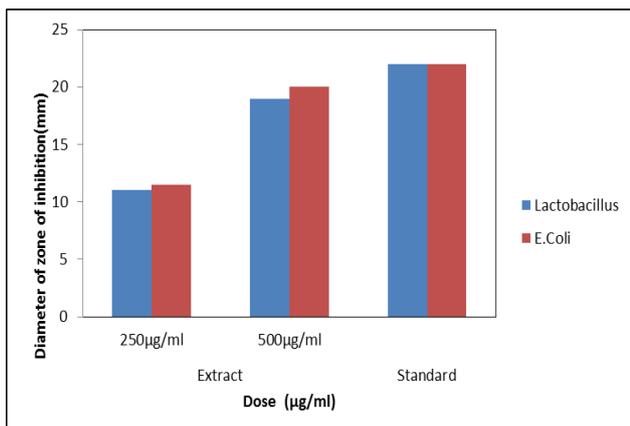


Fig. no. 1: Zone of Inhibition of Ethanol Extract of *Oxalis Corniculata*.

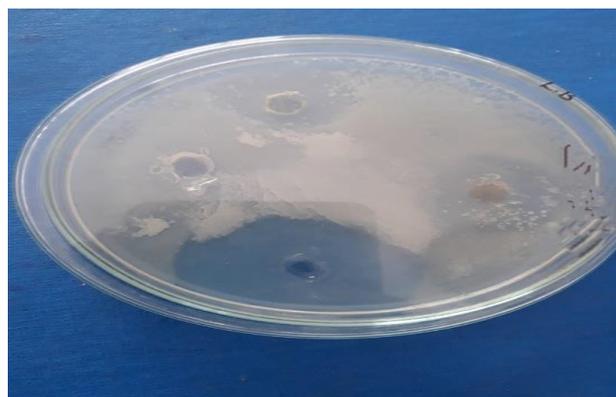
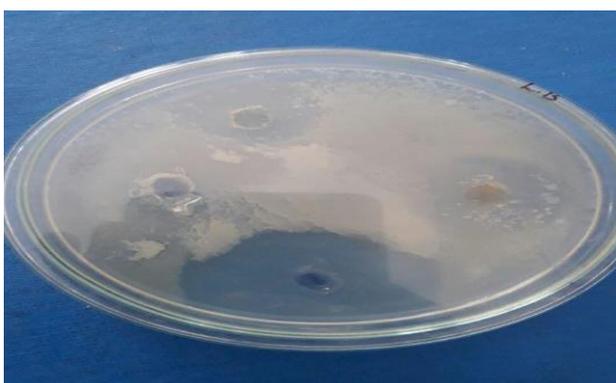


Fig. no. 2 Petri dishes of *Lactobacillus* showing zone of Inhibition.

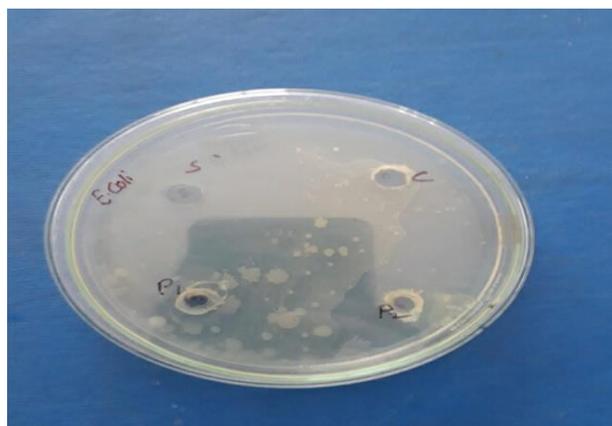


Fig. no. 3 Petri dishes of *E. coli* showing zone of Inhibition.

DISCUSSION

Antimicrobial agents of plant origin are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects associated with synthetic antibiotics. Presence of plethora of secondary metabolites effective as single entity or in combination underlines the beneficial medicinal effects of plant. In plants, prevalent compounds are mostly secondary metabolites such as alkaloids, steroids, tannins, phenol compounds, flavonoids, steroids, resins and fatty acids gums which are capable of producing definite physiological action on body. *Oxalis*, one of the most resourceful genus in terms of medicinal properties, belongs to the family *Oxalidaceae* with about 500 species, distributed in America, Africa, Europe and Asia. of a study has shown that the zone of inhibition of the methanolic and ethanolic extract of *O. corniculata* were 16.87mm and 13.39mm for *S. aureus* 1.00mm and 8.10mm for *E. coli* (Raghavendra et al 2006). Recently, much attention has been directed toward plant extracts and biologically active compounds isolated from popular plant species. The use of medicinal plants plays a vital role in covering the basic health needs in developing countries and these plants may offer a new source of antibacterial, antifungal and antiviral agents with significant activity against infective microorganisms The Antibacterial Activity in the present study was compared with ciprofloxacin taken as standard and the results were found to be effective.

CONCLUSION

In conclusion, the study provides a detailed insight on antibacterial action of *Oxalis corniculata* against pathogenic bacteria. Our findings may help in identifying *Oxalis corniculata* as a storehouse of potent bioactive compounds of medicinal value in *Oxalidaceae* family. The finding further warrants investigation to decipher the active ingredient underlying the antimicrobial action.

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