Indian J.L.Sci. 5(1): 037-040, 2015 ISSN: 2277-1743 (Print)
ISSN: 2278-7879 (Online)

ANTIBACTERIAL ACTIVITY OF PLANT EXTRACT OF *Oxalis corniculata*

SANDHYA MADAN MOHAN[a1], BHAWANA PANDEY[b], BHAGYASHREE DESHPANDE[c] AND VARSHA CHANDRAKAR[d]

[a]Department of Home Science, Bhilai Mahila Mahavidyalaya,Hospital Sector, Bhilai Nagar, Chhattisgarh, India

[bcd]Department of Biotechnology and Microbiology, Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai Nagar, Chhattisgarh, India

ABSTRACT

***Oxalis corniculata* Linn. is a medicinally important plant indigenous to tropical and subtropical regions of the world. Its medicinal usage is reported in Indian pharmaceutical codex, the Chinese, British and the American pharmacopoeias different traditional system of medicines such as Ayurveda, Unani and Siddha. The review reveals that wide ranges of phytochemical constituents have been isolated from the plant like flavanoids, tannins, phytosterols, phenol, glycoseides, fatty acids, galacto-glycerolipid and volatile oil. The study deal with the antibacterial activity of aqueous, ethanol and ethyl ether extract of leaves of *Oxalis corniculata* through agar well diffusion assay against *Staphylococcus faecalis*, *Escherichia Coli, P. Vesicularis, Aeromonas hydrophilia, Stphylococcus cohni, Serratia ficaria and S. Typhi.* In Ethanol Extract Highest Zone of Inhibition against *P.vesicularis* and lowest in *E.coli*. In Methanol Extract Highest Zone of Inhibition against *E.coli* and lowest in *Aeromonas hydrophilia*. In Petroleum Ether Extract Highest Zone of Inhibition against *Aeromonas hydrophilia* and lowest in *Salmonela typhae* & *Serratia ficaria.* These reports are very encouraging and indicate that herb should be studied more expensively for its therapeutic benefits.**

KEYWORDS: Medicinal Plants, Antibacterial activity, *Oxalis corniculata*

Many higher plants accumulate extractable organic substances in quantities sufficient to be economically useful as pharmaceuticals/antibiotics. Species of higher plants are much less surveyed for antibacterial activity (Balandrin, M.F. *et al.* 1985) Plants have been a rich source of medicines because they produce wide array of bioactive molecules, most of which probably evolved as chemical defense against predation or infection. It is estimated that only one percent of 2, 65,000 flowering plants on earth have been studied exhaustively for their chemical composition and medicinal value (Cox and Balick 1994). *Oxalis corniculata* Linn. (Family: Oxalidaceae) is a well-known plant in India and is one of the most versatile medicinal plants having a wide spectrum of biological activity. It is commonly known as creeping wood sorrel, an excellent plant in the nature having composition of all the essential constituents that are required for normal and good health of humans (Kumar A. K. *et al*. 2010). *Oxalis corniculata* is widely used as a antibacterial, antifungal, anti-inflammatory, refrigerant antiscorbutic, jaundice, in stomach troubles, antiseptic, wound healing, anemia, dyspepsia, cancer, piles, dementia and convulsions (Sharma and Kumari 2014).

METHODS & MATERIALS

Plant material

The leaves of *Oxalis corniculata* were collected from Bhilai C.G., India. A herbarium sheet was prepared. The leaves were dried in shade to avoid the deterioration of phytoconstituents and made into a coarse powder by using a grinder.

Preparation of leaves Extract of *Pterospermum acerifolium*

The powdered leaves of *Oxalis corniculata* were subjected to soxhlet extraction (Continuous Hot Extraction) using Ethanol, Methanol and Petroleum ether as solvent.

Phytochemical Screening of extract

Phytochemical Screening (Khandelwall, 2009) was performed on all extract.

Bacterial Strains

The various organisms used in the present study include *Staphylococcus faecalis*, *Escherichia Coli, P. Vesicularis, Aeromonas hydrophilia, Stphylococcus cohni, Serratia ficaria and S. Typhi*. These organisms were maintained on nutrient agar slopes and the organisms were confirmed by biochemical test.

[1]**Corresponding author**

Antimicrobial Activity of Extracts

Well diffusion method

The agar well diffusion method technique (Bauer *et al.,* 1966) was used to determine the antibacterial activity of the plant extracts. The test solution was prepared in Di methyl sulfoxide (DMSO).

Procedure

Inoculate the different culture on Nutrient agar plate. A sterile 5mm cork borer was used to punch holes after solidification of media. The wells formed were filled with different concentrations of the extract which were labelled accordingly; 50mg/ml, 37.5mg/ml, 25mg/ml, 12.5mg/ml. The plates were then left on the bench for 1 hour for adequate diffusion of the extracts and incubated at 37°C for 48hours in upright condition. After incubation, the diameter of the zones of inhibition around each well were measured to the nearest millimetres along two axis i.e. 90° to each other and the mean of the four reading were then calculated included 5mm well.

RESULTS AND DISSCUSSION

Qualitative Phytochemical Screening

Table 1: Qualitative Phytochemical Screening of Extracts

S.No.	Phytochemicals	Ethanol Extract	Methanol Extract	Petroleum Ether Extract
1.	Alkoloids	-	-	-
2.	Carbohydrate	+	+	-
3.	Saponins	-	-	-
4.	Glycosides	+	+	-
5.	Phenolic Compound	+	+	-
6.	Flavonoids	+	+	-
7.	Tanins	+	+	-
8.	Proteins & Amino Acids	+	+	-
9.	Volatile oils	+	+	-
10.	Gums and mucilage	-	-	-

Qualitative Phytochemical Screening

Phytochemical analysis of all the solvent extracts revealed the presence of carbohydrates and glycosides, phytosterols, phenolic compounds/ tannins, flavonoids, proteins and aminoacids and volatile oils in both methanol and ethanol extracts. Further phytochemical analysis of methanol extract (Harborne, 1992) revealed that the antibacterial activity of the methanol and ethanol extract is due to the presence of phenolic compounds.

Antibacterial Activity

All the extracts from *Oxalis corniculata* show antibacterial activity against all tested strains. Zone of inhibition were test for concentration ranging from 12.5mg/ml to 50mg/ml. (12.5mg/ml, 25mg/ml, 37.5mg/ml, 50mg/ml). Antibacterial activity tested for two methods such as well diffusion method and Disc diffusion method.

Table 2: Zone of Inhibition of Ethanol Extract

Microbial Strains	Ethanol Extracts Concentration			
	12.5 mg/ml	25 mg/ml	37.5 mg/ml	50 mg/ml
P.vesicularis	14.25±2.04	18.12±1.62	10±1.62	7.95±0.33
sterptococcus faecalis	7.25±0.5	7.5±1.35	6.75±0.64	8.9±0.66
Aeromonas hydrophilia	7.12±1.31	7.15±1.3	9.17±0.90	7.17±0.43
Salmonela typhae	7.75±1.70	7.25±1.04	7.45±1.31	6.95±0.49
Stphylococcus cohni	7.25±1.25	7.12±0.85	6.75±0.43	9.97±0.30
Serratia ficaria	10±1.63	7±0	14.1±0.95	15.02±1.48
E.coli	6±0.6	6.37±0.47	7.52±0.41	8.5±0.40
Salmonela typhae	10.25±1.25	7.37±1.25	7.8±0.31	9.02±0.86

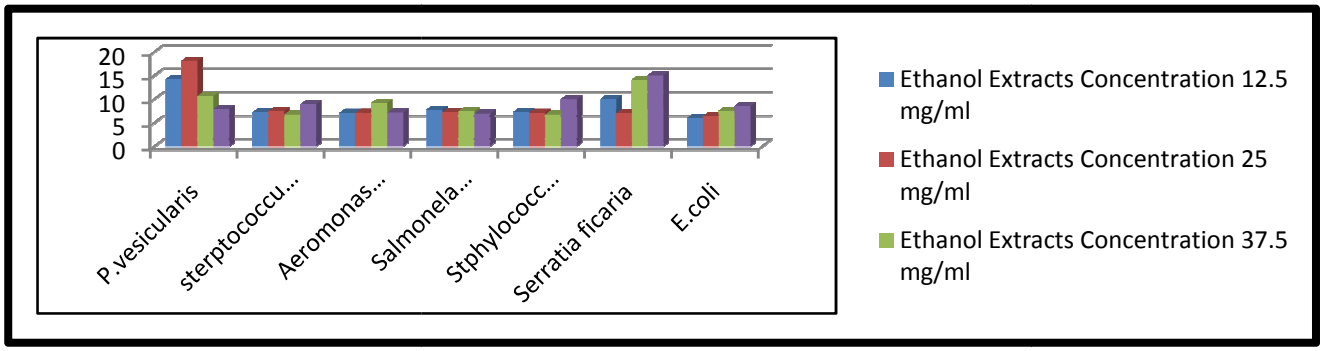
Table 3: Zone of Inhibition of Methanol Extract

Microbial Strains	Methanol Extracts Concentration			
	12.5 mg/ml	25 mg/ml	37.5 mg/ml	50 mg/ml
P.vesicularis	6.87±0.62	6.95±0.31	8.1±0.2	8.9±0.66
sterptococcus faecalis	6±0	6±0	7.12±0.25	8.02±0.41
Aeromonas hydrophilia	6.175±0.20	6±0	6±0	6±0
Salmonela typhae	6.17±0.17	6.05±0.1	6±0	6.1±0.2
Stphylococcus cohni	7.97±0.57	9.87±1.03	6.82±0.55	6.9±0.62
Serratia ficaria	6±0	6.07±0.09	6.05±0.05	6.05±0.05
E.coli	9.1±0.75	10.45±0.61	12.05±0.05	10±0

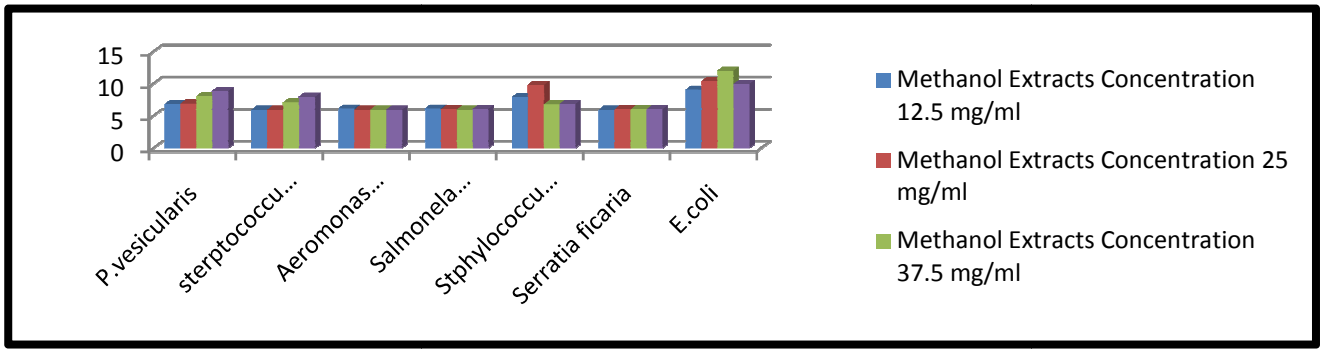
Table 4: Zone of Inhibition of Petroleum ether Extract

Microbial Strains	Petroleum Ether Extracts Concentration			
	12.5 mg/ml	25 mg/ml	37.5 mg/ml	50 mg/ml
P.vesicularis	1.3±0.4	1.366667±0.12	1.433333±0.04	1.833333±0.12
sterptococcus faecalis	1.166667±0.18	1.533333±0.16	1.6±0.0	1.6±0.0
Aeromonas hydrophilia	1.666667±0.12	1.766667±0.04	1.866667±0.04	1.933333±0.12
Salmonela typhae	0±0.0	0±0.0	0±0.0	0±0.0
Stphylococcus cohni	1.033333±0.04	1.233333±0.09	1.366667±0.04	1.5±0.14
Serratia ficaria	0±0.0	0±0.0	0±0.0	0±0.0
E.coli	0.633333±0.16	0.633333±0.04	0.833333±0.09	1.1±0.16

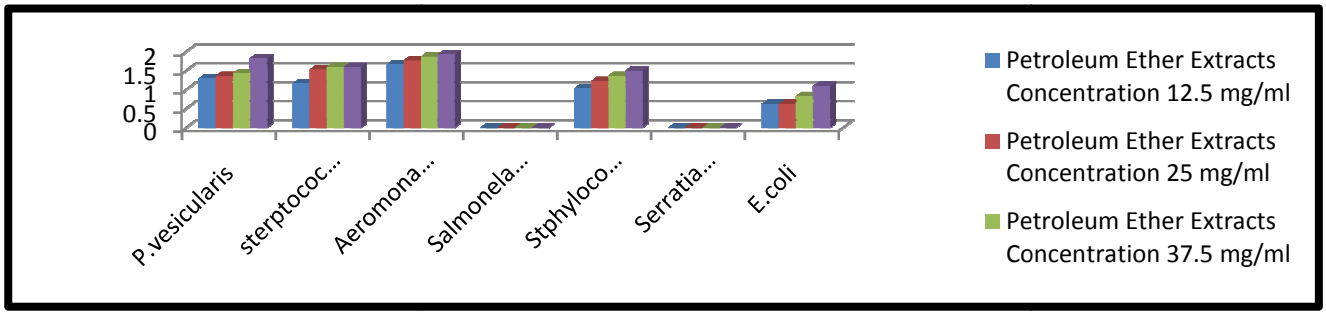
Graph 1: Zone of Inhibition of Ethanol Extract



Graph 2: Zone of Inhibition of Methanol Extract



Graph 3: Zone of Inhibition of Petroleum Ether Extract



In Ethanol Extract Highest Zone of Inhibition against *P.vesicularis* and lowest in *E.coli*. In Methanol Extract Highest Zone of Inhibition against *E.coli* and lowest in *Aeromonas hydrophilia*. In Petroleum Ether Extract Highest Zone of Inhibition against *Aeromonas hydrophilia* and lowest in *Salmonela typhae* & *Serratia ficaria.* The results 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* and 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 (Mun˜oz-Mingarro *et al* 2003and Coelho de Souza *et al* 2004). *Oxalis corniculata* possess broad spectrum of activity and a high promotion of herbal medicines (Tona *et al* 1998)

REFERENCES

Anil Kumar K, Kuntal Das, Joshipura M, Mandal N, 2010. *Oxalis corniculata* Linn. -The Plant of Indian subtropics. Herbal Tech Industry 7-11.

Balandrin M F, Klocke JA, Wurtele ES and Bollinger WH, 1985. Natural plant chemicals: sources of industrial and medicinal materials. Science, 228: 1154-1160.

Bauer AW, Kirby WM, Sherris JC and Turck M, 1966. Antibiotic susceptibility testing by a standardized single disk method. Am. *J. Clin. Pathol*. 45: 493-496.

Coelho de Souza G, Haas APS, Von Poser GL, Schapoval EES and Elisabetsky E, 2004. Ethnopharmacological studies of antimicrobial Phytomorphol., remedies in the south of Brazil. J. Ethnopharmacol., 90: 135-43.

Cox PA and Balick MJ, 1994. The ethnobotanical approach to drug discovery. Sci. Amer., 270: 60-65.

Khandelwall KR, 2009. Practical Book of Pharmacognosis. 19th Edition:149-156.

Mun˜oz-Mingarro D, Acero N, Llinares F, Pozuelo JM, Gala´n de A and Mera Vicenten JA, 2003. Biological activity of extracts from Catalpa bignonioides Walt. (Bignoniaceae). J. Ethonopharmacol., 87: 163-167.

Raghavendra MP, Satish S, Raveesha A, 2006. Phytochemical analysis and antibacterial activity of *Oxalis corniculata;* a known medicinal plant. *My Sci*. 1: 72-8.

Sharma R A and Kumari A, 2014. "Phytochemistry, Pharmacology And Therapeutic Application Of *Oxalis Corniculata* Linn. - A Review" *International Journal of Pharmacy and Pharmaceutical Sciences*, ISSN- 0975-1491 Vol 6, Issue 3.

Tona L, Kambu E, Ngimbi N, Cimanga K and Vlietinck AJ, 1998. Antiamoebic screening of some Congolese medicinal plants. J. isocytisoside and extracts of *Aquilegia vulgaris* L.Ethnopharmacol., 61: 57-65.