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ANTIBACTERIAL ACTIVITY OF PLANT EXTRACT OF *AMARANTHUS SPINOSUS*

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ABSTRACT

Leaves of Plant Amaranthus spinosus Linn. were reported to possess good medicinal value in traditional system of medicine, the present investigation deals antibacterial activity against three bacterial strains using the agar -well diffusion method .Wide range of phytochemicals have been isolated like flavanoids, tannins, phytosterols, phenol, glycoseides, fatty acids, galacto-glycerolipid and volatile oil. It is concluded that the plants studied may be a source of antibacterial agents and indicate that herb should be studied more expensively for its therapeutic benefits.

KEYWORDS: Medicinal Plants, Antibacterial activity, Amaranthus spinos

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. Several herbs were known to possess medicinal value including anti-microbial properties. Even though pharmacological industries have produced a number of new antibiotics in the last three decades, resistance to these drugs by microorganisms has increased (Chandrakar *et al.* 2013) 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). Different extracts from traditional medicinal plants have been tested to identify the source of the therapeutic effects. As a result some natural products have been approved as new antibacterial drugs, but there is still an urgent need to identify novel substances that are active towards pathogens with high resistance (Cragg *et al.,* 1997). *Amaranthus spinosus* is an annual weed that is widely distributed in the humid zone of the tropics. It is used in tropical and subtropical countries for human nutrition both as vegetables and grains and also as animal feed (Berghofer and Schoenlechner, 2002; Miralles *et al.*, 1988). The weed has been reported to have some pharmacological properties (Ayethan *et al.*, 1996). It is used to treat several ailments such as malaria, hepatic disorders, jaundice, and scanty urine and to cure wounds (Berghofer and Schoenlechner, 2002; Samy *et al.*, 1999; Srivastava *et al.*, 1998). *Amaranthus* derived from the Greek word "amarantos" which means "unfading", a reference to the persisting color of certain *Amaranth* flowers. Ethnomedicinally the plant is used as a source to treat several disorders such as the leaves are used as a laxative and applied as an emollient poultice to abscesses, boils and burns (Manandhar 2002)

METHODS AND MATERIALS

Collection of Plant Material

The leaves of *Amaranthus spinosus* were collected from Bhilai C.G., India. A herbarium sheet was prepared. The leaves were dried in shade and made into a coarse powder by using a grinder.

Preparation of Extract

The powdered leaves of *Amaranthus spinosus* were subjected to soxhlet extraction (Continuous Hot Extraction) using Ethanol as solvent.

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Phytochemical Screening of Extract

Phytochemical Screening (Khandelwall, 2009) was performed.

Bacterial Strains

The various organisms used in the present study include *Escherichia Coli, Staphylococcus aureus* and *Salmonela typhae*

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 extract. The test solution was prepared in Di methyl sulfoxide (DMSO).

Inoculated the different culture on Nutrient agar plate. The wells formed were filled with different concentrations of the extract which were labeled accordingly; 50mg/ml, 37.5mg/ml, 25mg/ml, 12.5mg/ml. (Pandey *et.al.,*2014) 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 DISCUSSION

Qualitative Photochemical Screening

Table 1: Qualitative Photochemical Screening of Extracts

S No	Phyto chemicals	Ethanol Extract	Methanol Extract	Petroleum Ether Extract
1.	Alkaloids	-	-	-
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 ethanol extracts. Further phytochemical analysis of extract (Harborne, 1992) revealed that the antibacterial activity of extract is due to the presence of phenolic compounds.

Antibacterial Activity

Amaranthus spinosus show antibacterial activity against all tested strains.(Pandey *et.al.,*2014) 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).

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**
Staphylo-coccus aureus	13.25±2.05	18.11±1.52	11±1.72	7.95±0.34
Salmonela typhae	7.76±1.60	7.25±1.04	7.45±1.31	6.95±0.48
E.coli	6±0.6	6.37±0.46	7.52±0.41	8.5±0.40

Staphylococcus aureus shows higher zone of inhibition in 25mg/ml. *Salmonela typhae* shows higher zone of inhibition in 12.5mg/ml. and *E. Coli* shows higher zone of inhibition in50mg/ml. *oxalis corniculata* highly inhibit *Staphylococcus aureus* and lowest inhibit the *Salmonela typhae*.

Hence, the last decade witnessed an increase in the investigations on plants as a source of human disease management (Aiyelagabe *et al.* 2000; Prashanth *et al.* 2001; Mouniswamy *et al.* 2002; Woldemichael *et al.* 2003) and not many reports are available on the exploitation of plants for the management of plant diseases (Satish *et al.* 1999; Bisignano *et al.* 2000). This is mainly due to lack of information on the screening/evaluation of diverse plants for their antibacterial potential. Therefore, in the present investigation *Amaranthus spinosus*an important weed was evaluated for its antibacterial potential for the first time against important pathovars of phytopathogenic microorganism (Sandhya Madan Mohan *et al.,* 2015) *Amaranthus spinosus*possess broad spectrum of activity and a high promotion of herbal medicines.

CONCLUSION

Scientists from divergent fields are investigating plants anew with an eye to their antimicrobial usefulness. Laboratories of the world have found literally thousands of Phytochemical which have inhibitory effects on all types of microorganisms in vitro. More of these compounds should be subjected to animal and human studies to determine their effectiveness in whole-organism systems, including in particular toxicity studies as well as an examination of their effects on beneficial normal micro biota. It would be advantageous to standardize methods of extraction and in vitro testing so that the search could be more systematic and interpretation of results would be facilitated. Also, alternative mechanisms of infection, prevention and treatment should be included in initial activity screenings. Attention to these issues could usher in a badly needed new era of chemotherapeutic treatment of infection by using plant-derived principles. *Amaranthus spinosus*leaves possess antimicrobial activity. This can explain the rationale for the use of the plant in treating infections in traditional medicine. The plant could be a veritable and cheaper substitute for conventional drugs.

REFERENCES

Aiyelaagbe. (2000). Fitoterapia. **72**: 544–546.

Ayethan W.M., Sein M.M. and Maybwin M., 1996. The effects of some medicinal plants on smooth muscle, AB Abstract, 1970/1979.

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

Berghofer E. and Schoenlechner R., 2002. Grain amaranth, In: Pseudocereals and Less Common Cereals. Grain Properties and Utilization Potential (Belton PS and Taylor

JR N, Eds.). Springer, Berlin D Heidelberg D New York, 219, D260.

Bisignano G., Sanogo K., Masino A., Aquino R., Angelo U.D., Germano M.P., De pasquale R. and Pizza C., 2000. Phytochemistry., **30**: 105–108.

Chandrakar V., Pandey B. and Bhattacharya C., 2013. Antibacterial activity of crude extract of leaves of *Pterospermum acerifolium.* Indian Jour, Science., **5**:14.

Cox P. and Balick M.J., 1994. Approach to Drug Discovery. Sci Amer., **270**: 60-65.

Cragg G.M., Newman D.J. and Snader K.M., 1997. Natural products in drug discovery and development. J. Nat. Prod., **60**:52-60.

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

Madan Mohan S., Pandey B., Deshpande B. and Chandrakar V., 2015. Antibacterial Activity of Plant Extract of *Oxalis Corniculata.* Indian J.L.Sci., **5**(1):037-040.

Manandhar N.P., 2002. Plants and People of Nepal. *Timber Press. Oregon*. 2:ISBN 0-88192-527-62.

Miralles J., Noba K., Ba A.T., Gaydou E.M. and Korn-probst J.M., 1988. Chemotaxonomy in Nyctagina-ceae family: sterols and fatty acids from the leaves of three *Boerhavia* species. Biochem System Ecol. **16**:475-478.

Mounissamy V., Davimani S. and Gunasegaran R., 2002. The Antiseptic. **99**: 81–82.

Pandey B. and Husain N., 2015. Antimicrobial Activity of *Mimosa Pudica* Linn. Against Some Microbes. Indian J. L. Sci., **5**(1): 058-061.

Pandey B. and Singh S., 2014. Evaluation of Antimicrobial Potential of *Eucalyptus camaldulensis* L. Journal of Pharmaceutical, Chemical and Biological Sciences., **2**(3): 166-171

Prashanth D., Asha M.K. and Amit A., 2001. Fitoterapia. **72**:171–173.

Samy R.P., Ignacimuthu S. and Raja D.P., 1999. Preliminary screening of ethnomedical plants from India. J. Ethnopharmacol. 66:235-240.

Satish S., Raveesha K.A. and Janardhana G.R., 1999. *Lett Applied Microbiol*. **28**: 145–147.

Srivastava R., Shukla Y.N. and Kumar S., 1998. Chemistry, Pharmacology and Botany of *Boerhavia diffusa* D a review. J. Med. Arom Plant Sci., **20**:762-767.

Woldemichael G.M., Wachter G., Singh M.P., Maiese W.M. and Timmerman B.N., 2003. J. Nat. Prod., **66**: 242–246.