Antibacterial activity of Amaranthus viridis L.

[1]Antony Leema Rose J, [2]Mabel Starlin N, [3]Irene Wilsy J and [4]Reginald Appavoo M
[1]Research Scholar, [2]Associate Professor, [3]Associate Professor, [4] Associate Professor
[1,3,4]Department of Botany and Research Centre, Scott Christian College (Autonomous) Nagercoil,
[2]Department of Botany and Research Centre, NMCC College, Marthandam
Kanyakumari District- 629 003, Tamilnadu, India
(Affliated to Manonmanium Sundaranar University, Tirunelveli).

Abstract **- Amaranthus viridis leaf and stem extract in different solvents Ethanol, Petroleum Ether and Aqueous were investigated for their antibacterial potentiality against E.coli, Staphylococcus aureus, Proteus mirabilis, Klebsiella pneumoniae and Pseudomonas aeruginosa bacteria. Based on results supported by different studies, it was found that the ethanol and Petroleum ether extract of stem and leaves showed greater antimicrobial activity than Aqueous. This trial showed that the plant extracts have potential antibacterial activity against pathogenic bacteria.**

Index Terms **- Antibacterial Activity, Amaranthus Viridis.**

I.INTRODUCTION

The plant Amaranthus viridis L. belongs to the family Amaranthaceae and is known for various medicinal uses. Plants have natural potential to synthesize secondary metabolites related to defense mechanism which have ability to eradicate microbial life such as pathogenic bacteria (Barbosa, 2004). In these plants. In these plants there are important oils that are being secreted from different parts of plants have potential against pathogenic microorganisms (Batish, et al., 2007). These herbal plants are being studied in medical research (Sinclair, 1998). Various studies have suggested that they possess bioactive components. Due to physiological and clinical achievement there are better results and are effectively important (Merken, et al., 2001). These antimicrobial agents can be used to treat many diseases (Holm, et al., 2001).

Leaves of Amaranthus viridis are used for treating eczema, psoriasis and rashes, constipation, inflammation, bronchitis, anemia and leprosy. It inhibits enzymes, plays regulatory role on different harmones and is used for anticancer, antithepatotoxic and protection of cardio vascular system (Veeramuthu, et al., 2006). The plant is antidiabetic antihyperlipidemic and antioxidant (Ashok, et al., 2010).

In the present study, the antibacterial activity of Amaranthus viridis against the bacterial pathogens using solvent extracts Ethanol, Petroleum ether and Aqueous. The selected pathogens were E.coli, Staphylococcus aureus, Proteus mirabilis, Klebsiella pneumoniae and Pseudomonas aeruginosa.

II.MATERIALS AND METHODS

A.Collection of Plant Material

Fresh leaves of Amaranthus viridis was collected from Ottayalkudy, near Asaripallam, Kanyakumari District during the month of July in the year 2020.

B.Preparation of Extract

The plant materials were shade dried and ground into powder using electric blender. The fine powder (50g) was suspended in 100ml of ethanol and distilled water respectively. Then the extract was kept boiled in 60°C for 3 hours and kept overnight in 37°C and then filtered with what man No.1 filter paper. The extracts are dried and stored at -20°C and used for bioassays.

C. Test Organism:

The test microorganisms used for antibacterial analysis E.coli (MTCC 1687) Staphylococcus aureus (MTCC 737), Proteus mirabilis (MTCC 3310), Klebsiella pneumonia (MTCC 7162) and Pseudomonas aeruginosa (MTCC 1688) were purchased from Microbial Type Culture Collection and Gene Bank (MTCC) Chandigarh. The bacterial strains were maintained on Nutrient Agar (NA).

D. Disc Diffusion Method:

The disc diffusion method was used to screen the antibacterial activity (Bauer et al., 1966). The sensitivity test of the chloroform, N-butanol and aqueous extract were determined using agar – disc diffusion method. Media were prepared using Muller Hinton Agar poured in petridishes and inoculated with test organisms from the broth using cotton swabs. Disc impregnated with the plant extract were placed on the swabbed plate. The plates were incubated overnight at 37 c. for 24 hours. Amikacin was used as positive reference standard. After incubation, the clear zone around the disc were measured and expressed in mm as a measure of their antibacterial activity.

III. RESULTS AND DISCUSSIONS

The result on Antibacterial activity of Amaranthus viridis using different solvent extracts showed that the Ethanol extract was found to be effective against all tested pathogenic bacteria. The maximum inhibitory zone was observed against the pathogen Klebsilla Pneumonia ((16mm), Proteus mirabilis (16mm), and Pseudomonas aeruginosa (15mm), E.coli (14mm) and lowest zone of inhibition against the pathogen Staphylococcus aureus (6mm).

The Petroleum ether extract of Amaranthus viridis found maximum activity against the Pathogen Proteus mirabilis (16mm), Klebsiella Pneumonie (19mm), E.coli (15mm) and minimum activity was found against the pathogen Psedomonas aeruginosa (8mm), Staphylococcus aureus (7mm).

The aqueous extract of Amaranthus viridis showed the zone of inhibition against the pathogen Klebsiella Pneumoniae (10mm), Psuedomonas aeruginosa (10mm), E.coli (9mm) and minimum activity was against the Pathogen Staphylococcus aureus (8mm), Proteus mirabilis (8mm).

All three solvent extracts of Amaranthus viridis showed the maximum zone of inhibition in Klebsiella Pneumoniae and Proteus mirbilis in Petroleum ether and ethanol extract. The minimum zone of inhibition was observed in St7162aphylococcus aureus in ethanol extract.

Balakrishanan et al., (2003) reported that Amaranthaceae family comprises many species with biological activities, which are used in nutrition and alternative medicine. Chopra and co-worker reported its emollient and vermifuge properties (Chopra, et al., 1986), while its antioxidant properties have been eported by various workers (Amin, et al., 2006). Amaranthus viridis ethanolic extract has been reported against Bacillus subtilis and E.Coli (Balakrishnan, et.al., 2003).

IV. CONCLUSION

Present work proved that Amaranthus viridis showed antibacterial activity in Petroleum ether and Ethanol solvents against the E.coli, Staphylococcus aureus, Proteus mirabilis, Klebsiella pneumoniae and Pseudomonas aeruginosa. Further research needs to standardize drug for mankind.

V.ACKNOWLEDGEMENT

The authors are thankful to the Principal, Head of the Department of Botany and the Management of Scott Christian College (Autonomous), Nagercoil for providing laboratory facilities, during the period of this study.

REFERENCES

[1] Chopra, R.N., Nayar S.L. and Choprale, L.E. (1986). Glossary of Indian Medicinal Plants very tersdetails of medicinal uses of plants with wide range of references and details of research into the plants chemistry. Plants for a Future. 58, 266. Hecker, E. (1971).

[2] Ashok Kumar BS, Lakshman K, Narayan Swamy VB, ArunKumar PA, Sheshadri Shekar D, Manoj B, Vishwantha GL Hepatoprotective and Antioxidant Activities of Amaranthus viridis Linn. Macedonian Journal of Medical Sciences. 2011Jun 15;doi:10.3889/MJMS.1857-5773.2011.0163 Basic Science. 4(2):125-130.

[3] Amin, I., Norazaidah, Y. and Hainida, K.I.E. (2006). Antioxidant activity and phenolic content of raw blanched Amaranthus species. Food Chemistry. 94(1), 47-52.

[4] D.Veeramuthu, A.Muniappan, I.Savarimuthu, "Antibacterial activity of some ethnomedicinal plants used by Paliyar tribe from TamilNadu, India, India BMC complement", Altern Med, vol. 6,pp 35-38, 2006.

[5] Barbosa, L. C. A. (2004). Pesticides, the man and the environment.Journel of Medical BiotechnologyVicosa,5: 21.

[6] Bauer, A.W., Kirby, W.M.M., Sherris J.C. and Turck,M.(1966). Antibiotic Susceptibility testing

by a standardized single disk method Am.,J.Clin.Pathol.,45:493- 496

[7] Batish, D. R., Lavanya, K., Singh, H. P. and Kohli, R. K. 2007. Phenolic allelochemicals released by Chenopodiummurale effect the growth, nodulation and macromolecule content in chickpea and pea. Plant Growth Regulation,51: 119-128.

[8] Sinclair, S. (1998). Chinese herbs: a clinical review of Astragalus, Liguisticum and Schizandrae. Altern.Med. Rev. 3:338-344.

[9] Merken, H. M., Merken, C. D. and Beecher, G. R (2001).Kinetics method for the quantitation of athocyanidins,flavonols and flavones in food.J.Agricult Food chem.49: 2727-2732.

[10] Holm, G., Herbst, V. B. 2001.Brogenkunde. IN: PlantaMedica, 67:263-269.

[11] B.R.Balakrishnan, S.Sangameswaran, B. Arul B, V.H.Bhaskar, "Antibacterial activity of aerial parts of Achyranthes bidentata Blume", Indian J Pharmaceutical Sci,col.65(2),pp.186-188,2003;

Table:1 Antibacterial activity of Amaranthus viridis against bacterial pathogens

No.	Bacterial pathogens	Zone of Inhibition (mm)			
		Amikacin	Ethanol	Petroleum Ether	Aqueous
1.	*E.coli* (1687)	19mm	14mm	15mm	9mm
2.	*Staphylococcus aureus* (737)	23mm	6mm	7mm	8mm
3.	*Proteus mirabilis* (3310)	20mm	16mm	16mm	8mm
4.	*Klebsiella pnumoniae* (7162)	20mm	16mm	19mm	10mm
5.	*Pseudomonas aeruginosa* (1688)	20mm	15mm	8mm	10mm

Standard Disc size = 6mm

Values were taken after substracting the Standard disc value = 6mm

Plate 1 : Inhibition Zone in Amaranthus viridis using different solvent extracts using Disc Diffusion Method