

Antibacterial activity on *Citrullus colocynthis* Leaf extract

S. Shyamala gowri¹
S.Priyavardhini²
Dr.K.Vasantha³
M.Umadevi⁴

Abstract: Studies on the antibacterial activities of the leaf extract of *Citrullus colocynthis* (Cucurbitaceae), a medicinal plant used for the treatment of various ailments was carried out using agar disc diffusion technique. The results revealed that the crude acetone extract exhibited antibacterial activities against *Pseudomonas aeruginosa* with zones of inhibition measuring 14.0mm. The chloroform leaf extract exhibited no antibacterial activity against *Staphylococcus aureus*. The minimum inhibitory concentration for the chloroform extract was 4.0mm for *Escherichia coli*.

Keywords: *Citrullus colocynthis*, agar disc diffusion and antibacterial activity.

Introduction

Infectious diseases are the leading cause of death worldwide. The clinical efficacy of many existing antibiotics is being threatened by the emergence of multidrug-resistant pathogens¹. Bacterial and fungal pathogens have evolved numerous defense mechanisms against antimicrobial agents, and resistance to old and a newly produced drug is on the rise. The increasing failure of chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents has led to the screening of several medicinal plants for their potential antimicrobial activity^{3, 9}. There are several reports regarding the antimicrobial activity of crude extracts prepared from plants^{4, 8}. Therefore in the present study *Citrullus colocynthis* (Cucurbitaceae) were screened for their antibacterial potential against selected members.

Materials and Methods

The leaves of *Citrullus colocynthis* were collected from Coimbatore district of Tamil Nadu. The leaves were shade dried, pulverized, sieved through 40mesh and retained in 60- mesh size were collected. Thus obtained powder (10g) was extracted with chloroform and acetone (100 ml) extract in shaker for one day at room temperature. Then the extracts were kept in an oven at 40°C for removal of residual moisture.

Bacterial strains used for testing including *staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia* and *Serratia marcescens*. These were collected from Kovai Medical Centre, Coimbatore. The stock cultures were stored in Nutrient agar medium at 37°C.

Antibacterial activity of the chloroform and acetone extract of *Citrullus colocynthis* was studied using Agar disc diffusion method^{2, 6}. Petridishes containing 10ml of Nutrient Agar medium were selected with 24hrs culture of a selected bacterial strain. Sterile filter paper

discs (5mm) containing 100µg/disc of leaf extract were placed on the surface of the medium. Petridishes were incubated for 24hrs at 37°C for bacterial strains. The assessment of antibacterial activity was based on the measurement of zone of inhibition observed around the discs. Triplicates were maintained for each extract.

Results and Discussion

The antibacterial sensitivity of leaf extract was observed using the disc diffusion method by measuring the diameter of the growth inhibition of zone. The chloroform and acetone extract of *Citrullus colocynthis* showed significant antibacterial activity against all the bacteria tested and tabulated in table -1. Among the bacterial strains *Pseudomonas aeruginosa* (14mm) showed maximum zone of inhibition in acetone leaf extract. This is because different solvents have been reported to have the capacity to extract different phytoconstituents depending on their solubility or polarity in the solvent¹⁰. Phytoconstituents present in plants namely flavonoids, alkaloids, tannins and triterpenoids are producing exciting opportunity for the expansion of modern chemotherapies against wide range of microorganisms^{11, 12}. The plants showing significant therapeutic activity may reveal the presence of good antibacterial efficacy of an active principle in the extract.

^{1, 2 & 4}Ph.D. Research Scholar, Department of Botany, Kongunadu Arts and Science (Autonomous) College, G. N. Mills, Coimbatore 29, Tamil Nadu.

³Lecturer, Department of Botany, Government Arts and Science (Autonomous) College, Coimbatore 18, Tamil Nadu, India.

Table-1 Antibacterial activity of *Citrullus colocynthis* leaf extract

Organism	Chloroform(100µg)	Acetone (100µg)
<i>Staphylococcus aureus</i>	----	11.2
<i>Escherichia coli</i>	4.0	11.8
<i>Pseudomonas aeruginosa</i>	7.0	14.0
<i>Klebsiella pneumonia</i>	5.0	10.0
<i>Serratia marcescens</i>	6.0	9.0

References

1.Bandow, JE, Brotz, H, Leichert, L.I.O, Labischinski, H and Hecker, M (Proteomic approach to understanding antibiotic action), *Antimicro.Agents. Chemotherap.* 47, 948- 955, (2003).

2.Bauer, A.W, Kirby, W.M.M, Sherris, J.C and Turck, M (Antibiotic susceptibility testing by a standardized single disk method), *Am. J. Clin. Pathol.* 45, 493-496, (1996).

3.Colombo, M.L and Bosisio, E (Pharmacological activities of *Chelidonium majus* L), *Pharmacol. Res.* 33, 127-134, (1997).

4.Duraipandiyan, V, Ayyanar, M and Ignacimuthu, S (Antimicrobial activity of some ethnomedicinal plants used by Paliyar tribe from Tamil Nadu, India. *BMC Comp, Alt. Med.* 6, 35-41, (2006).

5.El-Seedi, H.R, Ohara, T., Sata, N and Nishiyama, S. [Antimicrobial terpenoids from *Eupatorium glutinosum* (Asteraceae)], *J.Ethnopharmacol.* 81, 293-296, (2002).

6.Parekh, J and Chanda, S. [In vitro antimicrobial activities of extracts of *Launaea procumbens* Roxb. (Labiatae), *Vitis vinifera* L. (Vitaceae) and

Cyperus rotundus L. (Cyperaceae)], *Afr. J. Biomed. Res.* 9, 89-93, (2006).

7.Parekh, J and Chanda, S. (In vitro antimicrobial activity and phytochemical analysis of some Indian medicinal plants), *Turk. J. Biol.* 31, 53-58, (2007).

8.Rojas, R., Bustamante, B., Bauer, J., Fernandez, I., Alban, J and Lock, O. (Antimicrobial activity of selected Peruvian medicinal plants), *J.Ethnopharmacol.* 88, 199-204, (2003).

9.Scazzocchio, F., Comets, M.F., Tomassini, L., Palmery, M. (Antibacterial activity of *Hydrastis canadensis* extract and its major isolated alkaloids), *Planta Med.* 67, 561-563, (2001).

10.Marjorie, MC. (Plant products as antimicrobial agents), *ClinMicrobiol Rev*1, 12(4), 564- 582, (1999).

11.Lutterodt, G.D, Ismai, I A, Basheer, R.H and Baharudin, HM. (Antimicrobial effects of *Psidium guajava* extracts as one mechanism of its antidiarrhoeal action), *Malaysian J Med Sci*, 6 (2), 17-20, (1999).

12.Marjorie MC. (Plant products as antimicrobial agents). *Clin.Microbiol Rev*, 12(4), 564- 582, (1999).