



International Journal of Pharmaceutics and Drug Analysis

Available at www.ijpda.com

ISSN: 2348:8948

In-vitro screening of antihelmintic and antibacterial activity of *malvastrum coromandelianum* leaves

Tirupathi Rao Annavarapu^{*1}, B Pragna Malavika², Aravinda Swami P¹.

¹ SIMS College of Pharmacy, Mangaldas Nagar, Guntur, Andhra Pradesh.

² NOVA College of Pharmaceutical Education and Research, Jupudi, Andhra Pradesh.

Article History	Abstract
<p>Received on: 17-11-2020 Revised On : 28-01-2021 Accepted on : 04-02-2021</p>	<p>The main objective of the work is to investigate the antihelmintic and antibacterial activity of the <i>Malvastrum coromandelianum</i> leaves. The extract was tested for antihelmintic activity against adult Indian earthworm and also tested for antibacterial activity against the gram positive bacteria <i>S.aureus</i>, <i>B.subtilis</i> and gram negative bacteria against <i>E.Coli</i>, <i>P.aerugenosa</i>, <i>P.putida</i>. The anthelmintic activity was observed at 100mg/ml with reference to standard Albendazole (10mg/ml). The maximum antibacterial activity was observed in <i>S.aureus</i> at 500mg/ml with of zone of inhibition 17 mm and next is <i>S.aureus</i>, the best antibacterial activity was observed against <i>P.aerugenosa</i> and <i>P.putida</i> with 15 mm of zone of inhibition. The zone of inhibition of extract was compared with standard Gentamycin 25 µg/ml. The extract shows significant activity against the other bacterial pathogens. From the results, it was concluded that the ethanolic extract of <i>Malvastrum coromandelianum</i> leaves have anthelmintic and antibacterial activity.</p> <p>Keywords: Antibacterial, Anthelmintic, Malvastrum coromandelianum, Gentamycin, Albendazole.</p>
<p>*Corresponding Author Tirupathi Rao Annavarapu SIMS College of Pharmacy Mobile No: 9493825355 Email: tirupathionline@gmail.com</p>	
<p>DOI: https://doi.org/10.47957/ijpda.v9i1.450</p>	

© 2021 Published by South Asian Academic Publications. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>)

Introduction

Herbs are any plants "with leaves, seeds, or flowers used for flavoring, food, medicine, or perfume" or parts of "such a plant as used in cooking [1]. The plant products are rich in different therapeutic activities like antimicrobial [6-7], antimalarial, antifungal, hepatoprotective, anthelmintic, antioxidant, anticancer, anti-inflammatory etc. *Malvastrum coromandelianum* is commonly known as false mallow, broom weed, and clock plant. It belongs to the family of malvaceae. It consists of different chemical constituents like alkaloids, tannins, amino acid proteins, and carbohydrates, with appreciable amounts of phenolic and flavonoid contents. The can be used in treatment of different pathological conditions like ring worm infection [2], jaundice [3], diabetes [4], anti-inflammatory and analgesic [5]. Anthelmintics are the agents used to treat helminthiasis. This leads to health complications in humans and cattle's. The natural agents are more effective for helminthiasis [11] than chemical agent with fewer side effects. Antibacterial agents are the agents which are used

to treat different bacterial infections either gram positive or gram negative infections.

Materials And Methods

Collection plant material

The leaf material of *Malvastrum coromandelianum* was collected from surroundings of Aditya Pharmacy College, Surampalem, East Godavari, Andhra Pradesh.

Preparation of Extract

The leaf materials were dried under the shade for 5-7 days and ground to fine powder with the help of electrical grinder. The dried powder of leaves of *Malvastrum coromandelianum* subjected to maceration separately using ethanol for 5 days with intermittent shaking. The extract was prepared by maceration of 80 gm of powder with 500 ml ethanol solvent. The obtained liquid is subjected to distillation [12]. The extracts thus obtained is then evaporated to dryness and used in present study.

In- Vitro anthelmintic Activity

Test Organisms

Anthelmintic activity; The Healthy adult Indian earthworms *Pheritimaposthumadue*. These organisms are collected from surrounding of SIMS College of Pharmacy, Guntur. Standard Concentration (5mg/ml): 1.25ml of Albendazole suspension was taken and diluted to 10ml with sodium CMC solution. Test extract concentrations: 1gm of ethanolic extract was dissolved in 10ml of sodium CMC which is regarded as (T1) (100mg/ml), 5ml of T1 diluted to 10ml of sodium CMC which is regarded as (T2) (50mg/ml), 5ml of T2 diluted to 10ml of sodium CMC which is regarded as (T3) (25mg/ml).

Method

The different concentrations of ethanolic extracts of *Malvastrum coromandelianum* were evaluated for anthelmintic activity using adult Indian earthworm model. The anthelmintic assay was carried as per the method [8] with minor modifications. The extracts exhibited a dose-dependent inhibition of spontaneous motility (paralysis). The earth worm was placed in petridish containing three different concentrations (100, 50 & 25 mg/ml) of ethanolic extract of leaves of *Malvastrum coromandelianum*. Each petridish was placed with one worms and observed for paralysis or death. Mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; the time death of worm (min) was recorded after ascertaining that worms neither moved when shaken nor when given external stimuli. The test results were compared with reference compound Albendazole (5 mg/ml) treated samples.

In-Vitro Antibacterial Activity

Antibacterial activity; For this study two gram positive bacteria such as *S.aureus*, *B.subtilis* and three gram negative bacteria such as *E.Coli*, *P.aerugenosa*, *P.putidaare* used [9]. These cultures are procured from MicrobesSpeciality Lab Danavaipeta, Rajahmundry, East Godavari District 533103, Andhra Pradesh, India. The nutrient agar media was used for antibacterial test. The concentrations of test compounds were prepared by dissolving the dried extract in Sodium CMC at a concentration of 100mg/ml, 300mg/ml and 500mg/ml. The reference standard Gentamycin was prepared at a concentration of 25µg/ml with same solvent.

Method

The antibacterial activity of ethanolic extract was performed using Agar cup-plate method [10]. 20ml of sterile nutrient agar medium was poured into sterile Petri dishes and allowed to solidify. The Petri dishes were incubated at 37°C for 24 hours to check for sterility. The medium was seeded with the organisms by pour plate method using sterile top agar (4 ml) contained 1 ml

culture. Bores were made on the medium using sterile borer. The different concentrations of extract (100 mg/ml, 300 mg/ml and 500mg/ml), were added (0.05 ml) to the respective bores. The standard drug Gentamycin at a concentration of (25 µg/ml) was taken as standard reference. All the plates were kept in a refrigerator at 2 to 8 °C for a period of 2 hours for effective diffusion of test compounds and standards. Later, they were incubated at 37°C for 24 hours. The presence of definite zone of inhibition of any size around the cup indicated antibacterial activity. The diameter of the zone of inhibition was measured and recorded. It was done in triplicate and mean of zone of inhibition was calculated.

In- vitro anthelmintic activity

Table: 01 anthelmintic activity of ethanolic extracts of *malvastrum coromandelianum* leaves on earthworms

Treatment	Concentration	Time taken for Paralysis (min)	Time taken for Death (min)
0.5% Sodium CMC control			
Albendazole	10 mg/ml	22.90 ± 2.90	52.42 ± 2.32
Ethanolic extract	100 mg/ml (T1)	9.44 ± 1.23	33.02 ± 1.97
	50 mg/ml (T2)	21.95 ± 1.19	42.66 ± 0.71
	25 mg/ml (T3)	25.26 ± 1.28	54.51 ± 2.56

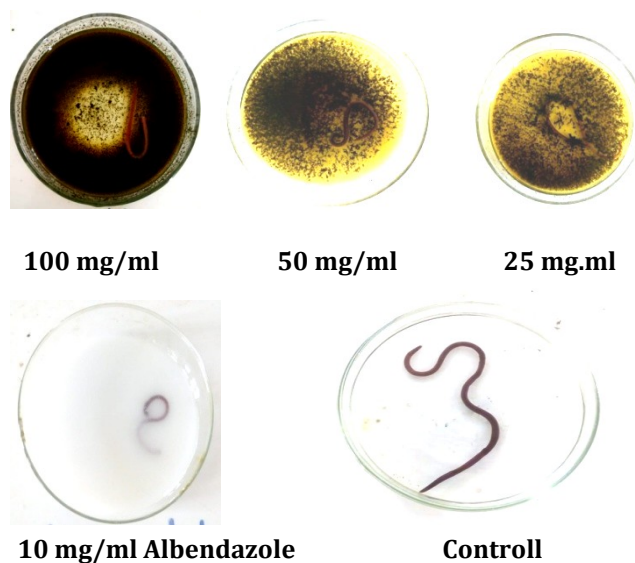


Fig: 01 Anthelmintic Activity of Ethanolic Extracts of *Malvastrum Coromandelianum* Leaves on Earthworms

In-Vitro antibacterial activity

Table: 02 Antibacterial Activity Of Ethanolic Extracts Of *Malvastrum Cormandelianum* Leaves On Some Gram Positive & Negative Bacteria

Microorganism	Zone of inhibition (mm)			
	100 mg/ml	200 mg/ml	300 mg/ml	Gentamycin 25µg/ml
<i>S.aureus</i>	15 ± 0.21	16 ± 0.26	17 ± 0.15	12 ± 0.12
<i>B.subtilis</i>	11 ± 0.62	12 ± 0.64	13 ± 0.21	12 ± 0.12
<i>E.Coli</i>	11 ± 0.48	12 ± 0.48	13 ± 0.52	12 ± 0.12
<i>P.aerugenosa</i>	12 ± 0.36	13 ± 0.39	15 ± 0.53	12 ± 0.12
<i>P.putida</i>	13 ± 0.26	13 ± 0.52	15 ± 0.25	12 ± 0.12

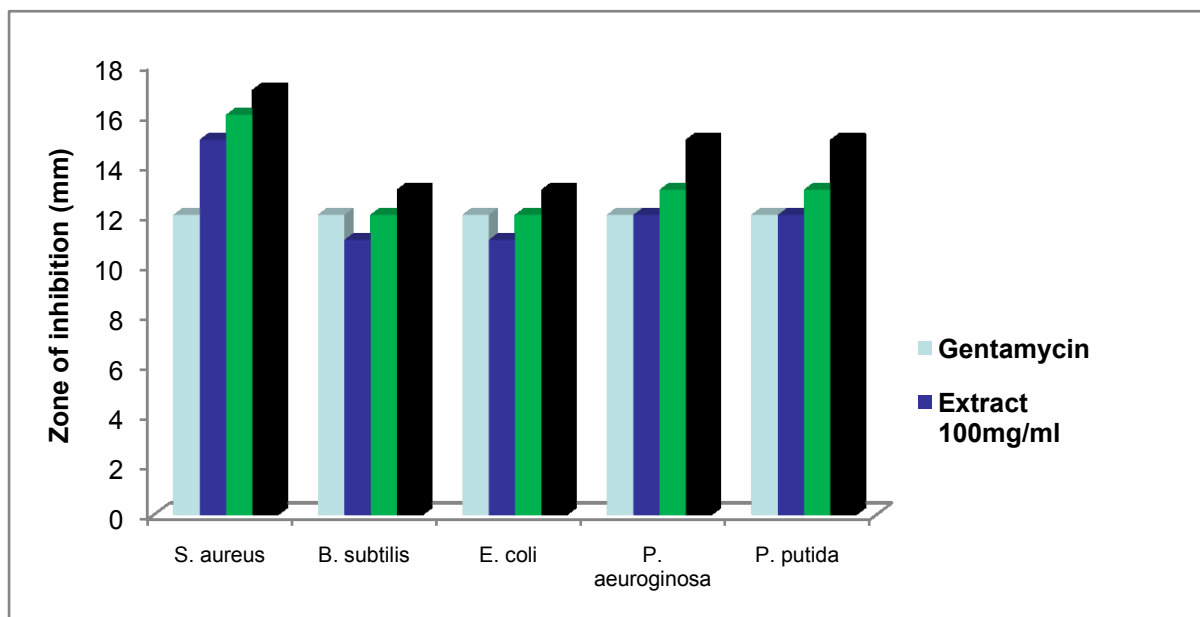


Fig: 02 comparison of antibacterial activity of ethanolic extracts against the some pathogenic organisms

Discussion

The results indicate that the ethanolic extract of *Malvastrum coromandelianum* showed the best anthelmintic activity at concentration of 100 mg/ml within 33min. The anthelmintic effect of extracts is comparable with that of the effect produced by the standard drug albendazole (10 mg/ml). All three concentrations have significant activity against earthworm with vary in duration of time. The antibacterial activity of leaves extract with different concentrations 100 mg/ml, 300 mg/ml and 500mg/ml was very well compared with standard reference drug Gentamycin 25 µg/ml. The maximum zone of inhibition was observed in *S.aureus* at 500mg/ml with of zone of inhibition 17 mm and next is *S.aureus*, the best antibacterial activity was observed against *P.aerugenosa* and *P.putida* with 15 mm of zone of inhibition. The extract has significant antibacterial activity against all microorganisms.

Conclusion

In present days, many microorganisms developing resistance to different chemical agent. So, it is necessary to develop new antibiotics. From the discussion, it is concluded that the ethanolic extract of *Malvastrum coromandelianum* leaves have Anthelmintic

activity and Antibacterial activity against the adult Indian earthworm and some pathogenic microorganisms respectively.

Acknowledgement

The author is thankful to the management, principal and staff of SIMS College of Pharmacy for their support towards my project work.

Funding

No funding

Author Contribution

All authors are contributed equal work

Conflict of interest

Authors are declare no conflict of interest

References

1. McKean, Erin, ed. (2005), the New Oxford American Dictionary (2nd ed.), Oxford University Press, ISBN 978-0-19-517077-1.

2. Dolores LL, Felipe A. Plants used by the Mexican Kickapoo Indians. *Econ Bot.* 1977; 31:340-57.
3. Sebastian MK, Bhandari MM. Medicoethnobotany of Mount Abu, Rajasthan, India. *J Ethnopharmacol.* 1984; 12:223-30.
4. Andrade-Cetto A, Heinrich M. Mexican plants with hypoglycaemic effect used in the treatment of diabetes. *J Ethnopharmacol.* 2005; 99:325-48.
5. Khonsung P, Nantsupawat S, Jesadanont SN, Chantharateptawan V, Panthong A. Anti-inflammatory and analgesic activities of water extract of *Malvastrum coromandelianum* (L.) Garcke. *Thai J Pharmacol.* 2006; 28:8-15.
6. Sittiwet C, Jesadanont S, Pongpech P, Naenna P, Pongsamart S. Antibacterial activity of *Malvastrum coromandelianum* Gracke against methicillin-sensitive and methicillin-resistant strains of *Staphylococcus aureus*. *Curr Res Bacteriol.* 2008; 1:42-5.
7. Jain P, Bansal D, Bhasin P, Anjali Antimicrobial activity and phytochemical screening of five wild plants against *Escherichia coli*, *Bacillus subtilis* and *Staphylococcus aureus*. *J Pharm Res.* 2010; 3:1260-2.
8. Ghosh T, Maity TK, Bose A, Dash GK. Anthelmintic activity of *Bacopamonierri*. *Indian J Nat Prodct.* (2005); 21:16-9.
9. Siti NazrinaCamalxaman et al., In vitroAntimicrobial Activity of *Vigna radiata*(L) Wilzeck Extracts Against Gram Negative Enteric Bacteria, *World Appl. Sci. J.*, 21 (10):1490-1494, 2013.
10. Hood, J. R., Wilkinson, J. M and Cavanagh, H. M.A.Evaluation of common antibacterial screening methods utilised in essential oil research. *J Essential oil Res.*,Nov/Dec (2003).
11. Aswar M, Aswar U, Watkar B, Vyas M, Wagh A, Gujar KN.Anthelmintic activity of *Ficus benghalensis*. *International Journal of Green Pharmacy* 2, 2008, 170-172.
12. Kinabakht S and Jahaniani F: Evaluation of the antibacterial activity of *Tribulus terrestris* L. growing in Iran. *Journal of Pharmacology Ther* 2003; 2: 22-24.