



**PHYSICOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF  
*MALVASTRUM COROMANDELIANUM* (L.) GARCKE**

Vaibhavi A. Soundatti<sup>1</sup>, Firoj A. Tamboli\*<sup>2</sup>, Harinath N. More<sup>3</sup> and Kuber N. Tarkasband<sup>4</sup>

<sup>1</sup>PG Student, Department of Pharmaceutics, Bharati Vidyapeeth College of Pharmacy, Kolhapur -416013 Maharashtra, India.

<sup>2</sup>Head, Department of Pharmacognosy, Bharati Vidyapeeth College of Pharmacy, Kolhapur -416013 Maharashtra, India.

<sup>3</sup>Principal, Bharati Vidyapeeth College of Pharmacy, Kolhapur -416013 Maharashtra, India.

<sup>4</sup>Manager, CQA Pharma Industry.

\*Corresponding Author: Dr. Firoj A. Tamboli

Head, Department of Pharmacognosy, Bharati Vidyapeeth College of Pharmacy, Kolhapur -416013 Maharashtra, India.

Article Received on 05/05/2021

Article Revised on 26/05/2021

Article Accepted on 16/06/2021

**ABSTRACT**

*Malvastrum coromandelianum* (L.) Garcke (family *Malvaceae*), also known false mallow, broom weed, and clock plant. Various parts of this plant are used by numerous tribal populations throughout the world. In traditional Indian system of medicine the plant is reported as an antiinflammatory, analgesic, and antidysenteric. Phytochemical analysis showed presence of various secondary metabolites like alkaloids, fixed oils, saponins, phenolic, tannins, carbohydrates, and proteins. Antibacterial activity of *M. coromandelenium* against *Staphylococcus aureus* showed positive results.

**KEYWORDS:** *Malvastrum coromandelianum*, Phytochemical screening, Antibacterial activity.

**INTRODUCTION**

*Malvastrum coromandelianum* (L.) Garcke, commonly called false mellow (*Malvaceae*), is an invasive alien weed distributed throughout India. Native distribution of this plant is in Tropical America. Ethnomedicinally, the plant possesses analgesic, anti-inflammatory, antimicrobial, antifungal, antidysenteric, antihemorrhagic, hepatoprotective and antipyretic properties.<sup>[1-7]</sup> Moreover, this plant has been used in folk medicine for the treatment of various diseases, such as hepatitis, liver infection, ringworm infection and jaundice.<sup>[8-10]</sup> Its leaves shown presence of malvastrone.<sup>[11]</sup> with antidiarrhoeal property.<sup>[7]</sup> Presence of  $\beta$ -sitosterol (phytosterol), has been detected via HPTLC analysis.<sup>[12]</sup>

The aim of present study was to carry out the phytochemical screening and antibacterial activities of *Malvastrum coromandelianum* L. plant extracts.

**EXPERIMENTAL**

**MATERIALS AND METHODS**

**Plant collection**

The collected fresh plants of *M. coromandelenium* from Kolhapur region. The plants were washed with tap water, air-dried at room temperature for 2-3 weeks at 35-40°C and then reduced to coarse powder for further use.

**Extract preparation**

3gm of powdered material mixed with 30ml ethanol and this mixture was irradiated at microwave for 10 min at 250 Watt.

**Phytochemical screening**

All the extracts were screened qualitatively for detection of phytoconstituents using general and specific chemical reagents.<sup>[13-14]</sup>

**Thin layer chromatography**

Thin layer chromatography was performed using silica gel G as adsorbent. Slurry of silica gel was prepared in distilled water. The slurry was applied to get a thin layer of 0.3 mm thickness over a clean and dry glass plate of 10 x 20 cms size by an applicator. The plate was activated at  $110 \pm 1^\circ\text{C}$  for one hour.<sup>[15]</sup>

**The details of TLC as**

**Table: Specifications for TLC.**

Adsorbing agent	Silica gel G.
Mobile phase	Hexane: Acetone (7:3)
Detection	UV 365 nm

## Evaluation of Antibacterial Activity

### Micro biological assay

A Petri dish (Petri plate) is a shallow cylindrical glass lidded dish that is typically used to culture microorganisms (agar plates). Before being used for culture purposes, it is important to ensure that the Petri dish is not only clean, but also sterile. This helps prevent the contamination of the new culture. Agar is a polymer made up of various sub-units of galactose and various species of red algae. Although it has other uses including culinary and dentistry, agar plays an important role in microbiology as culture media for a variety of microorganisms. Agar well diffusion method was used to determine the antimicrobial activity of plant extract *in vitro*. Agar was used to culture different microorganisms examined in this study. Against the wall of the tube above the liquid to remove excess inoculum. The entire surface of agar plate wash then swab bed 3 times with the cotton swab, transferring the inoculum, while the plates were rotated by approximately 60° between streak stone sure even distribution. The overall procedure of inoculums preparation and inoculation of culture media remained the same for all three bacteria. Each bacterium was inoculated on two agar plates.<sup>[16]</sup>

### Preparation of Agar Plates

Before starting, ensure that the Petri dish (dishes) is closed its lid on until to pour the agar in to them.

### Sterilization of equipment's and the chemicals

Nutrient agar medium and normal saline solution were sterilized in autoclave at 15 lbs pressure (121°C) for 150

mins. Petri plates Whatman filter paper, cotton swab were sterilized in oven at 160°C for 2 hrs.

### Preparation of nutrient agar medium slant

Nutrient agar powder 4gm was dissolved in 200ml distilled water, boiled and then poured in the test tubes then plugged with cotton and sterilized in autoclave at 15lbs for 15 min. After sterilization the tubes containing the nutrient medium were kept in inclined position for 30 min. Then on the surface of slant pure culture of staphylococcus aureus were streaked in aseptic condition and incubated at 37°C for 24 hrs.

### Preparation of suspension of test Bacteria

Using the 24 hrs old growth of test bacteria from the slant, suspension of the bacteria was made separately in sterile normal saline solution (0.85%Nacl in distilled water) in aseptic condition to get moderate turbidity. Zone of Inhibition=9mm

### Zone of inhibition

Below 4mm it show negative activity (-)  
Between 4mm – 6mm (+) sign. (slight activity)  
In between 6mm – 8mm (++) sign. (moderate activity)  
In between 8mm – 10mm (+++) sign. (higher activity)

## RESULT AND DISCUSSION

All the extracts were screened qualitatively for detection of phytoconstituents using general and specific chemical reagents as per following

**Table 1: Phytochemical screening of extracts of *M. coromandelanum*.**

Chemical constituents	Test	EtOH ext.
Alkaloids	Dragendroff's test	++
	Wagner's test	++
	Hager's test	++
	Mayer's test	++
Carbohydrates	Molisch's test	+
	Barfoed's test	+
	Benedict's test	+
Saponins	Foam test	++
Triterpenes	Liebermann Burchard test	--
Cardiac Glycosides	Balget's test	--
	Keller killiani test	--
	Legal's test	--
Steroids	Salkowaski test	++
	Liebermann Burchard test	++
	Sulphur test	++
Tannins	5% Ferric chloride test	++
	10% lead acetate	++
	Acetic acid	++
	Pot. Permagnate	++
	Dil. Iodine	++
Proteins	Millon's test	++
	Xanthoproteic test	++
	Biuret test	++
	Ninhydrin test	+

### Thin layer chromatography

Thin layer chromatography (TLC) of extract of *M. coromandelenium* was performed by using hexane: Acetone (7:3) as mobile phase and Retention factor (Rf) was found to be 0.69.



Figure 1: TLC profile of *M. coromandelenium* extract.

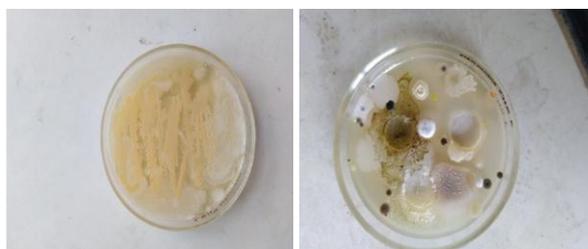


Figure 2: Antibacterial Activity of *M. coromandelenium* extract.

Table 2: Antibacterial Activity of extracts of *M. coromandelenium*.

Sr. No.	Concentration (µg/ml)	<i>Staphylococcus aureus</i>
1	50	+
2	100	++
3	150	++
4	200	+++

### CONCLUSION

The present work has been taken with a view to lay down standards that could be useful to establish the authenticity of this medicinally useful plant. In the present study, we have found that most of the biologically active phytochemicals were present in the standardized extract of *M. coromandelenium*. The antibacterial activities of *M. coromandelenium* may be due to presence of these phytochemicals.

### REFERENCES

1. Ghani A, Batool M. Folk recipes of some medicinal plants used by the inhabitants of Soon valley

- Khushab (Pakistan). *Int. J. Curr. Pharm. Res.*, 2012; 4(1): 60-63.
- Dolores L, Latorre FA. Plants used by the Mexican. *Econ. Bot.*, 1977; 31(3): 340-357.
  - Rao PK, Hasan SS, Bhellum BL, Manhas RK. Ethnomedicinal plants of Kathua district, J&K, India. *J Ethnopharmacol*, 2015; 171: 12-27.
  - Pandey R. Optimization of morphological studies on *Malvastrum coromandelianum* (Linn) Garcke in different selected sites of Rewa, Madhya Pradesh. *World J. Pharm. Res.*, 2015; 5(1): 1198-1207.
  - Sharma, C. B., "Effect of light and seed germination of some desert grasses", *Ibid.*, 1971; 10: 33-36..
  - Andrade-Cetto, A. and Heinrich, M. "Mexican plants with hypoglycemic effect used in the treatment of diabetes". *J Ethnopharmacol*, 2005; 99: 325-48.
  - Khonsung, P., Nantsupawat, S., Jesadanont, S.N., Chantharateptawan, V., Panthong, A. "Anti-inflammatory and analgesic activities of water extract of *Malvastrum coromandelianum* (L.) Garcke," *Thai J Pharmacol*, 2006; 28: 8-15.
  - Dolores, L. and Felipe, A.L. Plants used by the Mexican Kickapoo Indians. *Econ. Bot.*, 1977; 31: 340-357.
  - Sanghai, D.B., Kumar, S.V., Srinivasan, K.K., Aswatharam, H.N. and Shreedhara, C.S. Pharmacognostic and phytochemical investigation of the leaves of *Malvastrum coromandelianum* (L.) Garcke. *Anc. Sci. Life*, 2013; 33(1): 39-44.
  - Sebastian, M.K. and Bhandari, M.M. Medico-ethnobotany of Mount Abu, Rajasthan India. *J. Ethnopharmacol*, 1984; 12: 223-230.
  - Alam MS, Chopra N, Ali M, Niwa M. A new lactone from *Malvastrum coromandelianum*. *Indian J Chem., Sect. B: Org. Chem. Incl. Med. Chem*, 1996; 35(12): 1354-1355.
  - Sanghai DB, Kumar SV, Srinivasan KK, Awatharam HN, Shreedhara CS. Pharmacognostic and phytochemical investigation of the leaves of *Malvastrum coromandelianum* (L.) Garcke. *Anc Sci Life*, 2013; 33(1): 39-44.
  - Firoj A. Tamboli, Harinath N. More, Evaluation of Anti ulcer and Antioxidant activity of *Barleria gibsoni* Dalz. leaves *Pharmacognosy Research*, 2016; 8(4): 226-230.
  - Firoj Tamboli, Harinath More, Pharmacognostic and Physicochemical analysis of *Barleria gibsoni* Dalz., *Pharmacophore*, 2016; 7(2): 118-123.
  - Stahl Egon. Thin layer chromatography- A Laboratory Handbook. 2<sup>nd</sup> ed. London: Springer international publication, 2005; 311-357
  - Rohrabach, M.S., Kreofsky, T. and Bock, J. Cotton bract condensed tannins. *Environments*, 1990; 52: 199-209.