



**INTERNATIONAL JOURNAL OF  
PHARMACEUTICAL SCIENCES**  
[ISSN: 0975-4725; CODEN(USA): IJPS00]  
Journal Homepage: <https://www.ijpsjournal.com>



## Research Paper

# Elucidation of Anti-Bacterial Potential of *Argemone Mexicana*

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### ARTICLE INFO

Published: 04 May 2025

**Keywords:**

Argemone Mexicana, Anti-bacterial activity, Turmeric, Plant extracts, Escherichia coli

**DOI:**

10.5281/zenodo.15335742

### ABSTRACT

Medicinal plants have historically played a crucial role in treating infectious diseases. *Argemone Mexicana* L., commonly found in desolate regions of Maharashtra, has been traditionally used for its medicinal properties. This study elucidates the anti-bacterial potential of *Argemone Mexicana* extracts against *Escherichia coli* and compares it with turmeric (*Curcuma longa*) extract. The results confirm the promising antibacterial activity of *A. Mexicana*, supporting its potential use in the development of alternative antimicrobial therapies.

## INTRODUCTION

Nature offers countless plants with hidden medicinal properties, and *Argemone Mexicana*, often overlooked as a wild weed, stands out with significant therapeutic potential. This spiny annual herb, when cut, releases a yellow latex rich in biologically active compounds. Traditionally, various parts of *A. Mexicana* have been used to treat skin diseases, respiratory issues, ulcers, and more. Amidst rising antibiotic resistance, plant-based treatments gain renewed interest for their safety and efficacy.<sup>1-5</sup>

### Objectives:

1. To prepare aqueous extracts of *Argemone Mexicana*.
2. To evaluate and compare the anti-bacterial activity against *E. coli*.
3. to benchmark its efficacy with turmeric extracts.<sup>6-10</sup>

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**Relevant conflicts of interest/financial disclosures:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.





Figure no. 01: Plant Image, Stem, Flower, Leaves, Fruits and Seeds of *A. Mexicans*.

Literature Review: Several studies have demonstrated *A. Mexicans* antimicrobial activity against pathogenic bacteria including *Staphylococcus aureus*, *Escherichia coli*, and *Bacillus subtilis*.<sup>11-15</sup> Various extraction methods using solvents like methanol, hexane, and aqueous preparations have confirmed its broad-spectrum potential due to its alkaloids, flavonoids, and phenolic compounds.

Plant Profile:

Botanical Name: *Argemone Mexicana* L.

Family: Papaveraceae

Common Names: Mexican Poppy, Pila Dhatura, Phirangi Dhotra

Active Constituents: Berberine, Protopine, Pancorin, Oxyberberin, Alkaloids, Flavonoids.

Medicinal Uses: Antimicrobial, hepatoprotective, anti-inflammatory, expectorant.<sup>16-23</sup>

#### **MATERIALS AND METHODS:**



**Plant Collection and Preparation:** Fresh leaves were collected, washed with distilled water, shade-dried, and ground into powder.

**Extraction:** Using Soxhlet extraction with ethanol as solvent, concentrated extract was obtained and stored for analysis.



**Figure no. 02: Collection and preparation of *A. Mexicana*.**



**Figure no. 03: Soxhlet extraction and evaporation of aqueous extract of *A. Mexicana*.**

**Anti-Bacterial Assay:** Agar Well Diffusion Method was employed using nutrient agar inoculated with *E. coli*. Wells were filled with varying concentrations of *A. Mexicana* extract,

turmeric extract (positive control), and distilled water (negative control). Zones of inhibition were measured after 24 and 48 hours.



**Figure no. 04: Preparation of nutrient agar medium for *A. Mexicana*.**

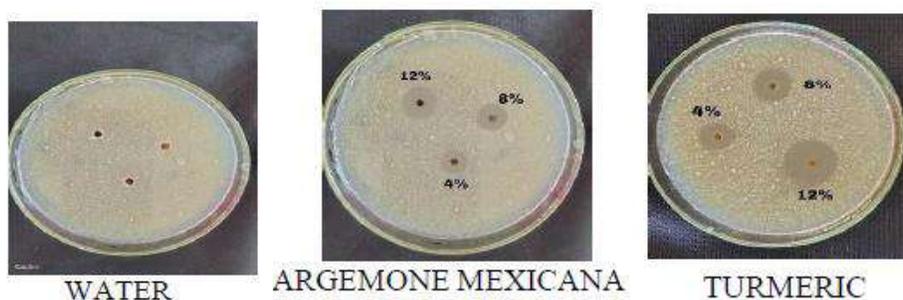


Figure no. 05: Zone of Inhibition after 24 hrs.

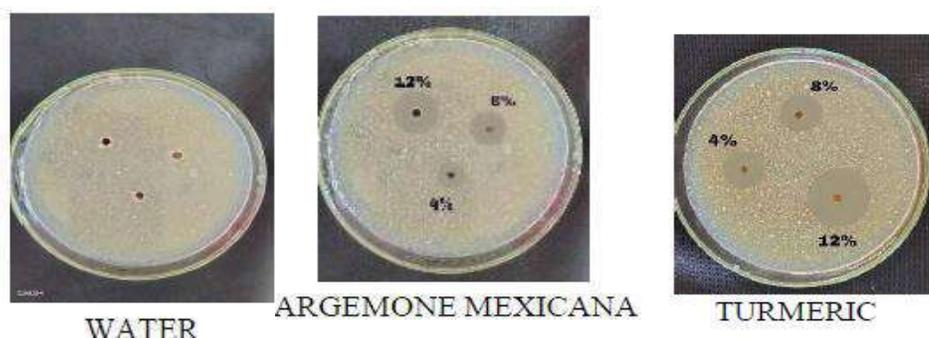


Figure no. 06: Zone of Inhibition after 48 hrs.

## RESULT

The antibacterial activity of *Argemone Mexicana* extract and turmeric extract was evaluated against *Escherichia coli* by measuring the Zone of Inhibition (ZOI) after 24 and 48 hours.

For the *Argemone Mexicana* extract:

- At 4% concentration, the ZOI was 10 mm after 24 hours and 11 mm after 48 hours.
- At 8% concentration, the ZOI was 13 mm after 24 hours and 14 mm after 48 hours.
- At 12% concentration, the ZOI was 16 mm after 24 hours and 17 mm after 48 hours.

For the turmeric extract:

- At 4% concentration, the ZOI was 18 mm after 24 hours and 20 mm after 48 hours.
- At 8% concentration, the ZOI was 21 mm after 24 hours and 23 mm after 48 hours.
- At 12% concentration, the ZOI was 24 mm after 24 hours and 26 mm after 48 hours.

The water (negative control) showed no antibacterial activity, with a Zone of Inhibition of 0 mm at both 24 and 48 hours.

Table no. 01: Result of Zone of inhibition after 24 and 48 hrs of different extract:

Treatment	Volume (µL)	ZOI after 24 hr (mm)	ZOI after 48 hr (mm)
<i>Argemone Mexicana</i> extract	4 %	10	11
	8 %	13	14
	12 %	16	17
Turmeric extract	4 %	18	20
	8 %	21	23
	12 %	24	26
Water (Control)	-	0	0

## DISCUSSION

The study demonstrated a dose-dependent antibacterial effect of *Argemone Mexicana* extracts. Although turmeric exhibited a larger inhibition zone, the extract of *A. Mexicana* also significantly inhibited bacterial growth. The activity is attributed to its rich content of secondary metabolites like alkaloids and flavonoids.

## CONCLUSION

Both *Argemone Mexicana* and turmeric extracts showed significant antibacterial activity against *E. coli*. This supports the potential use of *Argemone Mexicana* as a natural antimicrobial agent. Further research including MIC (Minimum Inhibitory Concentration) determination and phytochemical studies is recommended.

Marketed Preparations:

- Pure Organic Mexican Poppy Tablets – Skin diseases, microbial infections
- Yogimate Poppy Seed Powder – Digestive aid, respiratory support
- SBL *Argemone Mexicana* Dilution – Skin and liver support
- Argemone Mother Tincture – Respiratory and digestive aid
- Natural Herbs Poppy Seeds – Digestive and liver health booster.

### Acknowledgement

I sincerely extend my profound gratitude to Prof. Atish Salunkhe, Prof. Namita Jadhav, Prof. Jitendra More and Dr. A. V. Patil, Principal of Prof. Ravindra Nikam College of Pharmacy, Nagaon, Dhule, Maharashtra, for their invaluable guidance, insightful contributions, and unwavering support. Their expert mentorship, constructive feedback, and continuous encouragement have been instrumental in the successful completion of this research.

### Ethical Approval:

This review article does not content of any use of animal model.

### Conflict of Interest:

Authors declared that no conflict of interest for review of article.

### Funding:

NA.

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**HOW TO CITE:** Kothawade Sakshi, Kuril Nandini, Mahadik Rohit, Atish Salunkhe, Namita Jadhav, Jitendra More, Elucidation of Anti-Bacterial Potential of *Argemone Mexicana*, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 5, 557-562. <https://doi.org/10.5281/zenodo.15335742>

