Antimicrobial Activity and Germination Conditions of the Medicinal Plant *Argemone mexicana*

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Commonly called the Mexican prickly poppy, *Argemone mexicana* is a stress-resistant member of the Papaveraceae family of plants that has been used in traditional medicine for centuries by indigenous communities in Mexico and Western parts of the United States. This plant has been used to treat a wide variety of ailments, including skin diseases and intestinal infections, with reported antimicrobial properties. However, these properties are poorly understood and no bioactive compounds have yet been identified in the plant to account for this antimicrobial action. Herein, we describe the growth conditions and preliminarily characterize the antibiotic effects of different parts of the *A. mexicana* plant. We report that 2 mg of *A. mexicana* methanol root extract possesses antibacterial activity against the bacteria *Bacillus cereus* and *Staphylococcus aureus*, while the same concentration has no inhibitory effect on the fungus *Candida albicans*. Moreover, the methanol root fraction displays a stronger antibacterial effect, when compared to either the methanol seed or leaf fractions at the same concentrations and normalized to background solvent alone. Additionally, we show that when supplemented with 1000 mg/L of the phytotoxohone gibberellic acid (GA), germination rates of *A. mexicana* are significantly increased when compared to germination with either no GA or 100 mg/L GA. These preliminary results warrant further research into defining the antimicrobial properties and chemicals produced in the roots of these plants and are especially significant given the growing global concern of antibiotic-resistant ‘superbugs’ and lack of new antimicrobial drug discovery.

**RESULTS & METHODS**

<table>
<thead>
<tr>
<th><strong>A. mexicana</strong></th>
<th><strong>B. cereus</strong></th>
<th><strong>C. albicans</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mg/L GA</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>1000 mg/L GA</td>
<td>Negative</td>
<td>Positive</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

- *A. mexicana* germination rates are significantly increased with the addition of 1000 mg/L gibberellic acid (Fig. 2).
- The methanol root extract displays antimicrobial activity against two bacterial species but has no effect on the fungal species tested (Fig. 4).
- The methanol root fraction displays a stronger antibacterial effect than either the methanol seed or leaf fractions (Fig. 4).
- Further experiments are being conducted to:
  - Test these extracts against different microorganisms
  - Identify the compounds in the methanol root fraction
  - Extract compounds in solvents with different polarities
  - Examine these extracts for anti-cancer properties
- These results are significant given the growing global concern of antibiotic-resistant ‘superbugs’ and lack of new antimicrobial drug discovery.

**REFERENCES**


Emmart (1940) The Badianus Manuscript: an Aztec Herbal of the Medicinal Plant *Argemone mexicana*. The Badianus Manuscript: an Aztec Herbal of the Medicinal Plant *Argemone mexicana*. Journal of Ethnopharmacology, 100 (1–2): 84-89.

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