

Identifying Antimicrobial Phytochemicals to Combat ISS Superbugs

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Abstract: The isolation, or creation, of novel antimicrobial agents is currently at the forefront of modern healthcare due to the stark decrease in antimicrobial drug development in recent years and due to the increasing rise of superbugs, or microorganisms that are resistant to more than one type of antimicrobial treatment, which are predicted by 2050 to cause 10 million deaths/year. In addition to being a terrestrial cause for concern, antimicrobial resistant microbes are also a threat to the health of the individuals on the International Space Station (ISS). According to recent studies, a diverse population of bacteria and fungi, including several opportunistic pathogens, have colonized the ISS, and many of these strains have been found to possess antimicrobial resistance genes. Therefore, our research is focused on testing bacterial and fungal pathogens that have been isolated from the ISS against methanolic extracts from different medicinal plants, such as *Argemone mexicana* and *Curcuma longa*. Additionally, from previous work in our lab (<https://doi.org/10.1371/journal.pone.0249704>), we have identified several antibacterial compounds in *A. mexicana* and are attempting to determine the distribution of these phytochemicals (berberine, chelerythrine, sanguinarine) in the plant using quantitative chemistry techniques. This work highlights the importance of plants as an invaluable pharmaceutical resource at a time when antimicrobial drug discovery has plateaued.

Keywords: Superbugs, *Argemone Mexicana*, *Curcuma longa*, antimicrobial phytochemicals