Isolation and characterization of potential antimicrobial producing microorganisms from wetlands of Minnesota in a general microbiology laboratory

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The need for new antibiotics is becoming critical worldwide as more antibiotic resistance is revealed. To this end, we used the Tiny Earth model to identify, isolate, and identify potentially new sources of antibiotics from soil samples from the wetlands of Minnesota. The Tiny Earth project is a student-sourcing antibiotic discovery community dedicated to discovering potential new antimicrobials. This project was made possible through funding provided by the Legislative-Citizen Commission on Minnesota Resources (LCCMR). The current research project compares the results from three successive semesters of general microbiology (Fall 2021, 2022, and 2023). The media used were the following: nutrient, 10% tryptic soy, actinomyces, and glycerol yeast extract (gyea). The following were used as ESKAPE safe relative pathogens: *Enterococcus raffinosus*, *Staphylococcus aureus*, *Escherichia coli*, *Acinetobacter baylyi*, *Pseudomonas putida*, and *Klebsiella aerogenes*. Chemical extraction involved growing the isolate on agar plates and using ethyl acetate to extract substances to be tested against the ESKAPE safe relative pathogens. This process produced 58 isolates recovered from Fall 2021, 43 isolates were found to be pure and 13 of them showed continued inhibition against the ESKAPE pathogens. From the Fall 2022 samples there were 34 isolates demonstrating continued inhibition with ongoing effort to isolate pure cultures. And finally, there were 75 isolates initially recovered that demonstrated inhibition against the safe relative pathogens in this current fall semester. Ongoing research to isolate pure cultures and characterize the chemicals associated with the observed inhibition will be presented. Lessons learned over the course of this project will also be presented as well as future drug discovery opportunities related to the wetland environment.