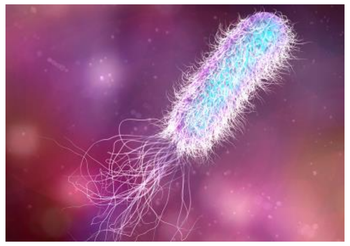

Antimicrobial Activity of Soil Isolates

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Introduction and Goals

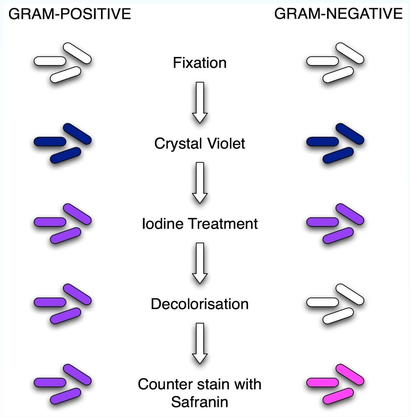
Antibiotics are used to treat a variety of bacterial infections and diseases. Many bacteria have built up resistance due to the wide usage of antibiotics, rendering them ineffective as a form of treatment. Because of this, there is a rising demand for research in order to create new and more effective antibiotics. These can be produced synthetically or through the isolation of bacterial colonies that display antimicrobial activity.

In correlation with the Small World Initiative, the goal of this research was to observe bacterial isolates from soil samples collected on UD's campus. This was done in order to determine whether they display antimicrobial activities and if the antimicrobials can be extracted from the bacteria. Antimicrobial activity was indicated through zones of inhibition produced in clinically relevant pathogens *Escherichia coli* and *Staphylococcus epidermis*.

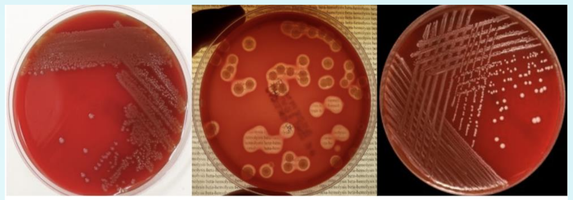
Methodology

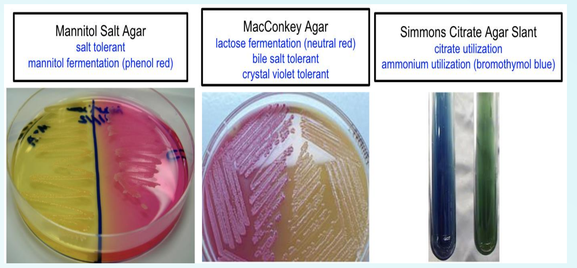
- Obtain soil isolates and reduce them to pure cultures through serial dilutions and various plating techniques on Potato Dextrose Agar (PDA) and Reasoner's 2A Agar (R2A)
- Create master plates as a baseline for bacterial growth.
- Use pathogen testing in order to determine if bacteria exhibit antimicrobial activity.
- Create Streak plates in order to obtain single colonies of bacteria displaying antimicrobial activities.
- Complete a series of biochemical tests in order to identify bacterial isolates which contain antimicrobials.

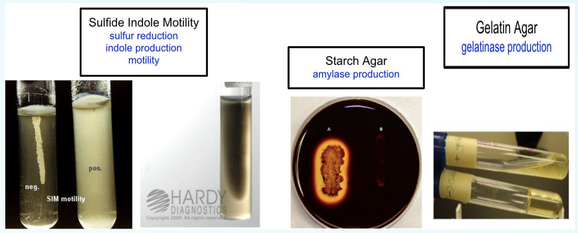
Gram Staining



Blood Agar Test

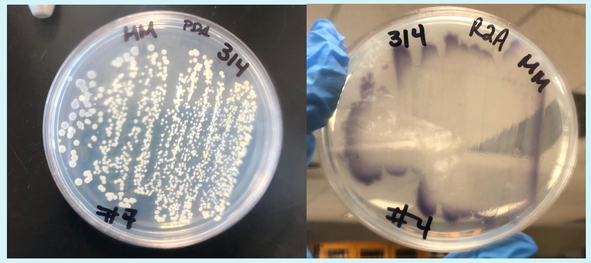






Triple Sugar Iron Agar Slant

Results



Two isolates were obtained from the soil sample that exhibited antimicrobial activities in *Escherichia coli* and *Staphylococcus epidermis*. Biochemical testing was used to identify characteristics of the isolates and confirm that they had the ability to produce antimicrobials.

Conclusion

Through this experiment, two isolates that produce antibiotics which have the potential to treat *Escherichia coli* and *Staphylococcus epidermis* infections were identified. Unfortunately, research was cut short due to campus shutdown from COVID-19. More research must be done in order to complete identification and develop new antibiotics in order to combat the resistance crisis that has become a worldwide medical issue.

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