Antimicrobial Compounds Extracted from Soil Isolates

Abigail Elizabeth Wink

Advisor: Jessica Elizabeth Geyer, Dr. Yvonne Y. Sun

Introduction

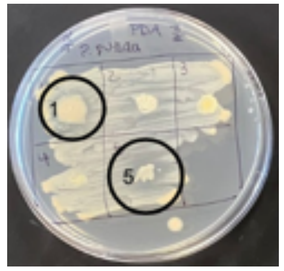
Antimicrobial compounds play an integral role in modern medicine because of drug resistant pathogens that pose as a serious public health issue. The demand for discovering new antibiotics and exploring various alternative methods of infection treatment has increased due to the prevalence of antibiotic resistance. As outlined by the CDC, various pathogens such as drug-resistant Neisseria gonorrhoeae and Carbapenem-resistant Acinetobacter are recognized as an urgent threat due to their antibiotic resistance (CDC, 2019). Thus, the goal of this research is to further identify antibiotics isolated from soil samples on the UD campus to determine if they produce antibiotic compounds in the presence of ESKAPE pathogens.

Methodology

- Chemical extractions were utilized to determine if the bacteria exhibited antimicrobial activity.
- Biochemical assays, such as catalase testing and gram staining were used to identify isolate species.
- Soil Sample extracted at (39.7345784, -84.1738669)

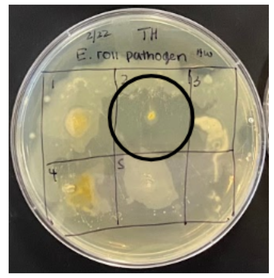
Findings

Zones of inhibition were found to be produced in the presence of *Pseudomonas putida, Bacillus subtilis,* and *Escherichia coli* which demonstrated antimicrobial activity



Pseudomonas putida
Media: PDA

Bacillus subtilis
Media: PDA

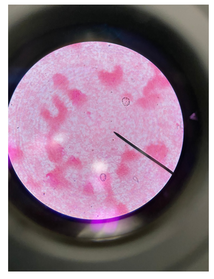


Escherichia coli
Media: TH

Biochemical Test	Result
MSA	negative
Blood Agar	alpha hemolysis partial
EMB	lactose fermenting
Macconkey Agar	not lactose fermenting
Simmon's Citrate Slant	blue
SIMS	negative
Gelatin	gelatinase producing

Table 1
Biochemical Test Results for Isolate 1

Gram Staining was conducted on Isolate 1 from the PDA media. The bacteria stained pink, indicating that the isolate is gram negative and contains a thin layer of peptidoglycan as well as an outer lipid membrane.



Discussion

- Growth on MacConkey Agar indicated that Isolate 1 is tolerant to bile salt and crystal violet and thus, is gram-negative
- Isolate 1 uses citrate as the sole carbon source, is Gelatinase producing, and cannot ferment glucose, sucrose, or lactose.
- Catalase testing on Isolate 1 from the PDA media bubbles, indicating that the bacteria contains enzymes that can oxidize hydrogen peroxide.

Select References

CDC. (2019). Antibiotic Resistance Threats in the United States. Atlanta, GA.: U.S. Department of Health and Human Services