

# Antibiotic Discovery Research Using Soil Samples: Microbiology Undergraduate Research

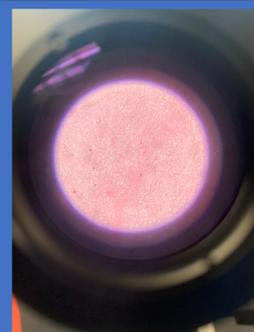
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## Intro

Given that antibiotics are being used worldwide to treat various bacterial infections and diseases, antibiotic resistance has become an increasingly mainstream and widespread issue; therefore, causing many antibiotics to lose effectiveness over time in treatment. As a result, research in the field of bacterial resistance to antibiotics has become increasingly popular and widely demanded as we search to produce new effective antibiotics. Bacteria produce these antimicrobials when put in an environment with present pathogens or with limited resources, causing either a competition for survival or a need to fight infection. These antibiotics can either be created synthetically, or can be removed and isolated from bacterial colonies with antimicrobial properties. This independent research aims to observe isolates of bacteria from specific soil samples, while deciding if the isolates display any antimicrobial properties in an environment with antibiotic resistant pathogens. Zone of inhibitions will be generated, indicating antimicrobial properties in the existence of *B. subtilis*, *E. carotovora*, *E. coli*, and *S. epidermis*. Bacteria which generate antimicrobial properties will be inspected additionally by a sequence of biochemical tests, gram staining and catalase testing. In establishing and recognizing which bacteria produce antimicrobial agents and demonstrate these properties, these procedures will be crucial to fight the rise of antibiotic resistance, and to create effective new antibiotics.

## Discussion

- Isolate did not show antimicrobial activity because no zone of inhibitions were formed, either because antimicrobial properties did not exist in my isolate or they were not extracted properly in lab
- Isolate tested negative for all types of hemolysis
- My bacteria does not retain crystal violet staining due to thin peptidoglycan layer and outer lipid membrane
- PDA-CH isolate bacteria sample moved towards the positive electrode by opposite attraction when present in the gel electrophoresis; therefore, DNA was present because DNA is negatively charged
- The isolate was not toxic to eukaryotic cells



## Results

Test For PDA-CH Isolate	Results
Gram Staining	Negative
Catalase Activity Testing	Negative
Blood Agar	Negative
MacConkey Agar	Negative
EMB Agar	Negative
Triple Sugar Iron Agar Slant	Positive For Sucrose/Lactose
Simmons Citrate Agar	Negative
Gelatin Agar	Positive
MSA Agar	Negative
Sulfide Indole Motility	Negative
Starch Agar	Negative
Gel Electrophoresis	DNA Present
Antimicrobial Activity	Negative
Toxicity Test	Negative

My PDA-CH Isolate was identified as Domain Fungi according to the sequencing.

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