

# Identification of Antibiotic-producing Microbes from Soil

Eszter Klein and Dr. Daniel Herman | Biology Department

University of Wisconsin  
Eau Claire



## INTRODUCTION

The ongoing rise of antibiotic-resistant microbes is a major concern in the medical field. Many pathogenic bacteria that were once vulnerable to common antibiotics have developed resistance, posing significant challenges to medicine and public health. Infections caused by these resistant bacteria are both expensive and challenging to treat. To address this growing crisis, we aim to identify new antibiotic-producing microbes isolated from soil samples. Following the collection of the soil, testing was done to determine the presence of any substances produced that either inhibit or kill any of the tester strains used (*Salmonella enteritidis*, *Escherichia coli*, *Staphylococcus aureus*, and *Bacillus subtilis*). We have identified four strains of microbes that show evidence of producing an antimicrobial substance. We are working to identify these strains and determine if the antimicrobial substance they are producing is novel [1].

## MATERIALS AND METHODS

Unknown bacterial strains were isolated from soil samples collected in Eau Claire, WI, using a serial 1/10 dilution. Samples were plated onto two types of media: limited-nutrient R2A and 1/10 concentration CBA. After overnight incubation at room temperature, 16 visually distinct colonies were sub-cultured onto a master plate using a labeled grid. These colonies were then transferred in the same grid pattern onto CBA and R2A plates pre-inoculated with *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis* or *Salmonella enteritidis* to detect antimicrobial activity through zones of inhibition [1].

## RESULTS

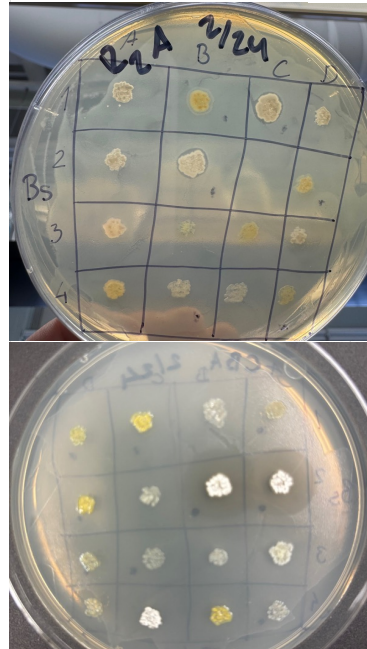


Figure 1. Plates showing soil isolates that inhibit tester strains.



Figure 2. Plate showing soil isolate inhibiting a mold.

## DISCUSSION

We have identified three strains of microbes from the soil that show evidence of producing an antimicrobial substance that inhibits one or more of the tester strains. In addition, we identified a soil isolate that appears to produce an antifungal substance.

## FUTURE RESEARCH

We are working to identify these strains and determine if the antimicrobial substance they are producing is novel. To do this we will do 16s ribosomal RNA gene sequencing. The sequence will be analyzed using the NCBI data base to determine species identity. After determination of the identity of the species, we will do a literature search to determine if they have been previously characterized or if the species are potentially novel.

## ACKNOWLEDGEMENTS

Funding for this research project was provided by the Office of Research and Sponsored Programs at UW-Eau Claire

## REFERENCES

[1] Hernandez, S., Tsang, T., Bascom-Slack, C., & Handelsman, J. (2016). Small World Initiative (Fourth ed.). Small World Initiative Press.

### INHIBITION OF TESTER STRAINS BY SOIL ISOLATES

	<i>S. aureus</i>	<i>B. subtilis</i>	<i>E. coli</i>	<i>S. enteritidis</i>
CBA A2	Inhibited	Inhibited	Not inhibited	Not inhibited
CBA B2	Inhibited	Inhibited	Not inhibited	Not inhibited
R2A B2	Not inhibited	Inhibited	Not inhibited	Not inhibited
R2A B1	Not inhibited	Not inhibited	Inhibited	Not inhibited