

Title: Microbial Warfare in Soil: An investigation of microbial competition using secondary metabolites

Research Lead: Karina Cuellar, St. Edward's University student

Faculty advisor(s): Teresa Bilinski

*Project Goal:* The objective of this project was to investigate if a strain of *E. coli* and soil bacterial isolates are equally susceptible to antibiotics produced in the soil. We hypothesized that soil bacteria produces antibiotics that target other soil bacteria, rather than *E. coli* due to the evolutionary pressure of competition.

*Methods:* Soil samples were collected from Wild Basin Creative Research Center and brought back to the lab until further use. One gram of the soil samples were shaken in 50mL of deionized water for one minute. Afterward, 1mL of the mixture was pipetted into a flask containing 300mL of tryptic soy broth (bacterial growth media). The test tubes containing these samples were incubated in the incubator shaker for a total of twenty four hours to culture bacteria, then transferred to a new set of test tubes to measure microbial growth using a spectrophotometer. These cultures needed to be obtained before reaching stationary phase. To measure the susceptibility of the bacteria to the supernatant we extracted the antibiotics from the bacteria by placing 1mL of the sample in an Eppendorf tube and centrifuge for 30 minutes at a velocity of 16,000 rotational centrifugal force. This allowed the supernatant, which contains antibiotics, to separate from the bacterial cells. The supernatant was placed in sterile discs, then transferred to Mueller-Hinton agar. The supernatant was tested against *E. coli* and 5 soil bacterial isolates.

*Results:* The antibiotics produced by the soil bacteria had less of an effect on *E. coli* than on soil isolates.

*Future work:* Investigate whether bacteria in beetle guts produce antibiotic or antimicrobial compounds.

*Dissemination of Results:* These results have been presented at SEU in July 2014 at the NSCI student research symposium, and in October 2014 at an SEU NSCI poster session. These results will also be presented at Annual Biomedical Research Conference for Minority Students (ABRCMS) in San Antonio, TX in November 2014.