



NCUR 2021 Proceedings

Enhancing the Biosynthesis of Antibiotic Compounds from Soil-Derived *Bacillus* Using Co-Culturing Techniques

Microbiology - Time: Tue 5:00pm-6:00pm - Session Number: 5671

Andrew Hoium and Dr. Lathadevi Chintapenta, Department of Biology, University of Wisconsin River Falls, 410 S 3rd St, River Falls, WI 54022

Andrew Hoium

The need for the creation of new antibiotics has never been more urgent with the growing trend of antibiotic resistance in the bacterial world. Bacteria can become resistant because of random mutations that can give rise to degradation enzymes that will interfere with the transport mechanisms. To make the issues worse, bacteria confer resistance. Antibiotic resistance has cost the economy \$168 million in 2018 and caused more than 2 million infections. Pharmaceutical companies have decreased the amount of time and money spent searching for antibiotics due to the lack of revenue from antibiotics. The USFDA approval of new drugs decreased by 56% between 1998-2002. This research focuses on the production of new antibiotics and exploring the metabolic profiles of the antibiotic producers with a long-term goal to share the pilot-scale information with industries. Currently, 3 *Bacillus* sp. isolated from the soil have shown to inhibit the growth of *Acinetobacter baylyi* and *Enterococcus raffinosus*. To accomplish the discovery of new antibiotic compounds, co-culturing will be utilized with the hopes of revealing cryptic genes that would otherwise be silenced in pure culture. Preliminary results from co-culturing revealed that the isolates can eliminate the pathogens from a mixed culture. Additionally, it was discovered that our *Bacillus* isolates utilize a broad spectrum of carbon sources. During metabolic profiling, it was discovered that 2-hydroxybenzoic acid was not utilized efficiently. This result is significant as 2-hydroxybenzoic acid is an important precursor compound to many other compounds and it may promote antibiotic production from the *Bacillus* sp. Future research will be focused on genomic analysis to examine the antibiotic biosynthetic islands within the genome. The genes will be tested for expression using qRT-PCR when co-cultured with the pathogen. Various biochemical tests will also be performed with the hopes of obtaining a concrete metabolic profile.

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Students' Not-So-Safe Place: Addressing Guns' Roles in School Shootings

English & Literature - Time: Wed 12:00pm-1:00pm - Session Number: 924

Ryan Huling, Dr. Greta Gaard, Department of English, University of Wisconsin - River Falls, 410 S 3rd St, River Falls, WI 54022

Ryan Huling

The rise in mass shootings in schools across the United States has created arguments regarding various causes of the events. This research paper dives into an argument by Gary Kleck written after gun control laws were established in response to the school shooting at Columbine High School. Firstly, Kleck's opposition to gun control is dissected and his motives discussed. The approach uses his own words to show contradiction and counter with real-world examples for support. Then the paper transitions into discussions regarding the effect of mass shootings in schools and their impact on students, parents, teachers, and school climate. Main focuses of the sections include students' academic success, people's fear of the school environment, and precautions taken by school districts. These show that schools are doing what they can to protect students. However, the fight over guns produces little headway toward safer schools. The result of the polarizing climate brought on by gun rights and gun control activists is a lack of focus on topics such as toxic masculinity, bullying in schools, and homophobia with their relation to guns and school shootings.

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The Effects of Agglomerated Blood Plasma on Scour Incidence and Severity in Pre-Weaned Dairy Calves

Animal Sciences - Time: Mon 3:00pm-4:00pm - Session Number: 227

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Alyssa Seitz

Newborn dairy calves are predisposed to a number of health issues that can affect their long-term growth and development. The most common and detrimental of these is scours. Feeding agglomerated bovine blood plasma may decrease the incidence and severity of scours as observed in calves fed blood plasma over the course of 21 days shortly after birth. Four hundred forty dairy calves of assorted breeds from Hall's Calf Ranch in Kewaunee, WI were used in this trial. Half (220) received blood plasma in their milk twice a day for 21 days starting shortly after birth. Calves were evaluated initially for vigor and scour incidence, and then scour scored three times a week over the course of feeding the plasma. Calves were weighed prior to starting the trial. Confounding factors such as weather, treatments and palatability of blood plasma were also recorded, as was the mortality rate. It was found that calves fed blood plasma experienced a 15% decrease in severe scours cases compared to their control group counterparts, with little effects on palatability. There was also a decrease in mortality rate seen.

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The Role of Chronic Caffeine Administration on Major Depressive Symptoms in Long Evans Rats

Psychology - Time: Wed 3:00pm-4:00pm - Session Number: 7102

Lucy Landaeta, Keely Johnson, Dr. James Cortright, and Dr. Daniel Ehlinger, Department of Psychology, University of Wisconsin-River Falls, 410 S. 3rd Street, River Falls WI 54022

Lucy Landaeta, Dan Roever

To date, caffeine leads globally as the most consumed psychoactive drug. Its readily available nature and alertness-exerting effects have appealed to populations of all psychiatric histories. Given the prevalence of psychiatric conditions such as Major Depressive Disorder (MDD), in which symptoms such as lethargy are commonplace, a potential relationship between caffeine administration and attenuation of MDD symptoms has been suggested. In particular, within groups exposed repeatedly to stress, a frequent trigger of MDD, caffeine intake surges. This has led to an observed inverse correlation between caffeine intake and MDD symptoms (Kaster et al). Clinically, the current state regarding caffeine administration as part of MDD treatment remains limited but established. When conjunctively applied in the presence of Selective Serotonin Reuptake Inhibitors (SSRIs), caffeine has shown to augment the therapeutic effects in human and animal models (Minor et al; Szopa et al.). However, the mechanism of action by which caffeine specifically exerts these effects remains unknown. The purpose of our study was to expand upon previous literature and to elucidate these mechanisms by combining behavioral and morphological analysis.

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