Antimicrobial Efficacy of Bacterially Secreted Peptide Microcins Compared to Antibiotic Nitrofurantoin

Ngo, Billy (School: North Carolina School of Science and Mathematics)

Microcins are antimicrobial proteins secreted by bacteria to provide a competitive edge in nutritionally stressful situations. These peptides are uniquely active against strains of susceptible bacteria that are closely related to the microcin secreting strain. As antibiotic resistance to current drugs increases due to bacterial evolution, microcins have been considered as an alternative, narrow spectrum treatment against pathogenic bacteria. In this study, I investigated the antimicrobial efficacy of microcins compared to a common antibiotic in inhibiting the growth of E. coli. The combination of an antibiotic and microcin treatment significantly lowered the carrying capacity of the E. coli. Additionally, I found that between a minimal dosage of nitrofurantoin and a minimal dosage of microcins, there was no detected difference in their reduction of growth in the carrying capacity parameter of E. coli. Furthermore, trends in the growth parameters suggest the methodology for inducing microcins was successful. The data also indicated a minimal dosage of antibiotics and the combination treatment of microcins and antibiotics was sufficient in significantly reducing the carrying capacity growth parameter of E. coli. This research demonstrates the potential for microcin treatments as a new effective weapon against bacterial illness and antibiotic resistance.

Awards Won: