Antibacterial Potential of Lactic Acid Bacteria Isolated From Vegetables: Bacteriocin Gene Screening and Inhibitory Activity Analysis

D'Elia, Gianna (School: Vero Beach High School)

Antibiotic are medicines used to kill or inhibit bacterial growth. Due to overuse, antibiotics are becoming less effective. Lactic acid bacteria (LAB) are a group of bacteria which produce antimicrobial proteins called bacteriocins which could be used to inhibit bacterial growth and minimize concerns of resistance to antibiotics. This experiment tested to see which vegetables may harbor bacteriocin producing LAB. The hypothesis was that different vegetables have different LABs associated with them that may produce bacteriocins with differing capabilities of inhibiting bacterial growth. This experiment started by isolating ten LABs from each of five different vegetables and screening their ability to inhibit bacterial growth of Gram-positive and Gram-negative bacteria. PCR and gel electrophoresis were performed on isolates to detect the gene for the bacteriocin Nisin. Isolates were identified by PCR and DNA sequencing of the 16S rRNA gene. While all the vegetables had similar colony forming units per gram (CFU/gram) of total bacteria, carrots and turnips had the highest amounts of CFU/gram of bacteria which showed growth inhibition. Further, isolates from turnip also demonstrated the broadest spectrum of inhibition. Molecular characterization identified the Nisin gene in most of the isolates and classified all of the isolates as belonging to one of the known two LAB families. These results may provide insight to developing new antimicrobial products with potential applications in human health, cosmetics, food preservatives and agriculture.

Awards Won:
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