The Development of a Novel Treatment for Lactose Intolerance Using Synbiotic Formulations

Martin, Eliza (School: PLC Sydney)

Lactose intolerance is a common digestive system disorder caused by an inability to break down lactose, the common sugar in milk and dairy products. There is currently no long-term treatment for this condition and patients are required to remove all dairy from their diet which has drastic effects on their overall health. This study investigates the potential use of synbiotics for lactose intolerance by measuring the effectiveness of synbiotics in breaking down lactose into glucose and galactose in milk samples. Single strain probiotic powders (Lactobacillus acidophilus, Lactobacillus bulgaricus, Bifidobacterium bifidum and Bifidobacterium longum) were combined with prebiotics (polyoxyethylene sorbitan monooleate, polyoxyethylene sorbitan monolaurate and inulin) to create different formulations of synbiotics. Using a water bath set to 98 degrees Fahrenheit (human body temperature), pH levels were recorded over a 7-hour period using a wireless hand-held pH meter. Results showed a significant decrease in pH in all samples (excluding controls), signifying the production of lactic acid as a by-product of lactose break-down, demonstrating that probiotics and synbiotics are effective at removing lactose from milk. The most successful strain of probiotic bacteria was Bifidobacterium bifidum closely followed by Lactobacillus bulgaricus. The results showed that the addition of prebiotic fibres had no effect on the probiotic bacteria's ability to break down lactose. Implications of these findings are that probiotic bacteria are effective at removing lactose from the gut environment and prebiotics are not able to enhance their effects. This demonstrates the potential use of probiotic bacteria for the long-term treatment of lactose intolerance.

Awards Won:
Fourth Award of $500