Use of Glutamate, Arginine, Glucose to Enhance the Survival of Probiotic Bacteria in an Artificial Gastric Environment

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Probiotics are live microorganisms found that are beneficial to human health. Lactobacillus acidophilus is one such probiotic bacterium. Previous studies have demonstrated the susceptibility of Lactobacillus to a low gastric pH. The objective of this experiment was to study if addition of substances such as glutamate, arginine, and glucose will enhance innate acid-protecting mechanisms used by Lactobacillus acidophilus to survive in an acidic gastric environment. The three additives were individually added to 3 samples, each containing Lactobacillus and commercially-available artificial gastric juice. 2 control samples comprised of Lactobacillus with gastric juice (Control 1) and Lactobacillus with water (Control 2) were prepared. A sixth sample containing an enteric coated Lactobacillus capsule with gastric juice was prepared. After 2 hours of incubation (to mimic the gastric emptying time), 5 mL of each of the samples were introduced to a milk culture medium and incubated for 4 hours. Hemocytometer and light microscope were used to measure bacterial concentration per 1 µL of sample taken from the milk medium. The bacterial concentration was found to be highest in milk inoculated with sample of water and Lactobacillus and lowest in the sample without additives. The bacterial concentrations of the three additive samples and enteric coated Lactobacillus samples were in the intermediate range, with glutamate having the greatest concentration amongst them. The study shows that in order to fully realize the health benefits of ingesting probiotic bacteria, additives such as glutamate, arginine and glucose can be used to improve their survival during the gastrointestinal transit.

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