Reducing Carcinogenic Toxins in Milk: Examining the Effects of Using Probiotic Bacteria to Bind Aflatoxin M1

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The purpose of this experiment was to determine the capabilities of certain lactic acid bacteria species to bind aflatoxin M1 (AFM1) in milk. AFM1 is a carcinogenic mycotoxin that is often found in dairy products. This research focused on the concept of adding probiotics to milk as a potential treatment method for reducing this carcinogen. If this process were successfully utilized, dairy farmers and producers would benefit from the effective control of aflatoxin levels and protection from major economic loss. Consumers would benefit from increased assurance of food safety, decreased long-term exposure to carcinogenic toxins, and desired health benefits of probiotics when added to dairy milk. The four species compared were Lactobacillus casei, L. plantarum, L. rhamnosus, and L. acidophilus in live and heat-killed forms. Milk samples spiked with each microorganism were tested for AFM1 levels before and after short- and long-term exposure periods. The effects of probiotic spiking, such as microorganism levels and shelf-life, were also analyzed to explore the feasibility of real-world applications of this concept. All strains reduced AFM1 levels after the 48 hour exposure time. Live Lactobacillus plantarum was most effective, binding 10% after 48 hours and 17% after 2 weeks. Many practical aspects make this technology applicable, including pH stability, control of pathogenic microorganisms, relatively rapid AFM1 binding rates, and desirable probiotic benefits when added to milk. The conclusion of this experiment is that the addition of probiotic bacteria has significant potential to be an effective treatment method for controlling aflatoxin M1 in milk.

Awards Won:
Third Award of $1,000