In vitro Assessment of Lactase Production Activity, Efficiency, and Survivability of L. acidophilus in Non-Dairy Carriers

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Lactobacillus acidophilus produces lactase, an enzyme that hydrolyzes lactose into glucose and galactose, helping alleviate symptoms of lactose intolerance. However, the protective effects of non-dairy carriers on L. acidophilus remain unclear. The study assessed three non-dairy carriers, almond, rice, or oat milk, on their ability to deliver L. acidophilus. Carriers were inoculated with L. acidophilus, exposed to stomach-like conditions, then supplied with lactose. Glucose production measured every 30 minutes for two hours served as an indicator of lactose metabolism. Compared with the respective controls without probiotics, rice and almond milk showed consistent significant differences in lactose breakdown ($p<0.05$). In contrast, oat milk differed from its control only at 30 minutes ($p<0.001$), showing minimal probiotic activity at most points. When comparing all carriers together, the study found that they differ in the temporal patterns of lactose breakdown. These temporal pattern differences show potential for immediate (oat milk), delayed (rice milk), or steady release (almond milk) delivery systems. Survivability could not be assessed due to plate contamination. Regardless, these results show that the use of L. acidophilus in non-dairy carriers can aid the development of a non-dairy treatment for severe lactose intolerance.

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