

438d Bioreactor Production of Probiotic Bacteria, Lactic Acid and Lactate Dehydrogenase by Fermentation with Lactobacillus Acidophilus

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The effects of fed-batch operation, aeration conditions and microfiltration on the bioreactor fermentation of probiotic bacteria Lactobacillus Acidophilus were investigated to maximize the production of L-Lactobacillus Acidophilus LA-14 and the intracellular enzyme L-Lactate Dehydrogenase as the two primary products. Bioreactor operation under microfiltration and micro-aerophilic conditions improved the fraction of L-lactate dehydrogenase from 71% to 84% through micro-aerophilic operation (most importantly decreasing the fraction of D-lactate dehydrogenase from 29% to 16% thereby improving the product quality by 45%) and improved biomass cell density by over 50% achieving 4.8 g/l by continuous microfiltration. The Lactobacillus Acidophilus cells from micro-aerophilic, fed-batch and continuous microfiltration operation was disrupted by sonication yielding a crude extract with a lactate dehydrogenase activity of 179 units per milligram.