

435I Production of Galacto-Oligosaccharides from Whey Lactose by Using Two-Step Immobilized Enzyme Reactor

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Galacto-oligosaccharides (GOS), also known as Bifidus growth factor, are prebiotic functional food ingredients that have been shown to beneficially affect the host well being by selectively stimulating the growth and/or activity of health-promoting bacterial species in the colon. GOS can be produced from whey permeate or lactose by an enzymatic transgalactosylation reaction using β -galactosidase. The goal of this project was to develop a two-step immobilized enzyme reactor for GOS production. First, lactase was immobilized in cotton cloth treated with polyethyleneimine (PEI), a strong positive charges polymer. After the immobilization, glutaraldehyde was used for crosslinking, working with a high enzyme loading. Using an initial lactose concentration of 400g/l, products containing 40% GOS (at 60% lactose conversion) and 25% GOS (at 45% lactose conversion) were obtained by using lactase from *Bacillus circulans* and *Aspergillus oryzae* respectively. In the overall design the unreacted lactose was recycled back to the first enzyme reactor to further improve GOS yield.