Hydrolysis of the Bovine Milk Lactose from Beta-Galactosidase Enzyme Obtained by Extraction and Permeabilization of Saccharomyces fragilis IZ 275 Cells

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Cheese whey is a by-product of cheese manufacture. A daily production of 10.000 liters of whey causes a load of organic pollutants similar to a city of 5.000 inhabitants. The diversified use of whey is a promising technological alternative due to its nutritional, environmental and economic advantages. The objectives of my project were to evaluate the best conditions for the cultivation and use of the yeast Saccharomyces fragilis IZ 275, a producer of the enzyme Beta-galactosidase, for the hydrolysis of lactose, since approximately 70% of the adult population in Brazil are lactose intolerant. For this reason, I used the wholemeal cheese whey and demineralized with and without lactose supplementation. I determined the best culture medium for the growth of yeast biomass and evaluated the enzymatic activity. I tested the extraction by glucose oxidase method and permeabilization of the yeasts. Subsequently I characterized the best conditions for lactose hydrolysis of the whole bovine milk, so I determined the ideal methods and parameters of temperature, hydrolysis time and enzyme concentration by methylamine method. The results show that the culture medium with wholemeal cheese whey presented good levels of yeast growth and good rates of enzyme activity, and this culture medium was selected for the next stages. In the whole bovine milk samples hydrolyzed by permeabilized enzymes, the rate of hydrolysis reached 100% in the first hour. Therefore, I conclude that the permeabilized yeasts grown in wholemeal cheese whey are efficient in the total hydrolysis of lactose present in bovine milk.

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