

Utilisation of Biopolymers



The exploitation of starch and cellulose for the production of single cell protein (SCP) was the ultimate goal of a research line active during the seventies and the eighties. Following the screening of strains from 59 yeast species capable of using starch as a carbon and energy source, the strain *Lipomyces kononenkoae* CBS 5608 (IGC 4052) was selected as promising candidate for the direct conversion of starch into SCP. The temperature profile of growth, death and yield of this starch converting yeast was characterized. Studies envisaging the characterization of the extracellular amylolytic system of this strain, consisting of an alfa-amylase, a glucoamylase and a debranching transferase, were performed and the hyperproduction of these enzymes, whose synthesis was found to be subjected to carbon catabolite repression, was attempted through UV mutagenesis. The selective screening of the derepressed mutants of *L. kononenkoae* was based on the use of the glucose analogue deoxyglucose. The same strategy was explored to isolate derepressed mutants of *L. starkey* for the production of extracellular endodextranase and to isolate a mutant of *Trichoderma reesi* with enhanced production of beta-glucosidase activity which limited the capacity of its extracellular cellulolytic complex for cellulose saccharification. A detailed comparative analysis of the biomass production and the amylolytic activity of the parental strain *L. kononenkoae* and of a selected derepressed mutant in starch-limited continuous culture revealed a significant increase of the critical dilution rate up to values close to its theoretical value for the repression-resistant mutant grown in the chemostat.

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