

AQUEOUS TWO - PHASE SYSTEM FOR CONTINUOUS PRODUCTION  
OF GLUCOSE AND IMMOBILIZED SYSTEMS FOR THE CONVERSION OF  
GLUCOSE TO FRUCTOSE AND ETHANOL

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An aqueous two - phase system was used for the bioconversion of starch suspension (10% w/w) to glucose by alpha amylase and glucoamylase to increase the productivity of the bioprocess. The aqueous two - phase system consisted of crude dextran (3% w/w) and 5% (w/w) polyethylene glycol (MW 20,000). A continuous stream of 11.6% (w/w) glucose was obtained by the first step of downstream processing by the use of a membrane filtration unit. The polymers forming the phase and the starch degrading enzymes in the enzyme mixer-settler reactor were reused by recycling. The activities of alpha amylase and glucoamylase in the mixing chamber and in the top and bottom phase of the settling chamber were monitored throughout the experiment and the reactor system was recharged with enzymes whenever essential. This addition of enzymes helped to avoid the clogging of the ultrafiltration membrane. This experiment was continued for 8 days. The glucose formed (11.64%) by starch hydrolysis was used for continuous production of high fructose syrup by immobilized glucose isomerase in a packed column for a week. The liquid glucose was also used for continuous production of ethanol by immobilized Saccharomyces cerevisiae packed in column. The ethanol was produced for a period of 2 weeks without problem.