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WANNARUT KUTTIARCHEEWA : IMMOBILIZATION OF CYCLODEXTRIN GLYCOSYLTRANSFERASE ON INORGANIC CARRIERS . THESIS ADVISOR : ASSO. PROF. PIAMSOOK PONGSAWASDI, Ph.D., 97 PP. ISBN 974-584-435-7

Cyclodextrin glycosyltransferase (CGTase) from *Bacillus* All was purified about 15 fold and was immobilized on various carriers. The immobilization by physical adsorption on chitosan, alumina, carbon, porous glass and silica at pH 6.0 had been studied. Silica was found to be the best support since it bound 54% of the loaded CGTase activity. However, this immobilized CGTase was not suitable for cyclodextrins production since the enzyme was detached from the support during operation.

CGTase was also immobilized on the above mentioned carriers by covalent means. Aminopropyltriethoxysilane and glutaraldehyde were used to activate the carriers. Seventy-one of the loaded CGTase was covalently bound onto alumina which was the best support. The ability to bind CGTase of alumina activated with 1.0% aminopropyltriethoxysilane and 0.25% glutaraldehyde was 258 units per gram alumina. The optimum pH and optimum temperature of immobilized CGTase were slightly shift from 6 and 60 ^{o}C to 7 and 55 ^{o}C after immobilization. The stability to pH were in the range of 4.5 - 9.0 for both the immobilized and the free enzyme, wherease the stability to temperature of immobilized CGTase was up to 55 ^{o}C which was higher than the free enzyme. When this immobilized CGTase was used for continuous cyclodextrins production, the optimum conditions for substrate given were 1.5% soluble starch and 5 ml/hr feed rate. Approximately 72% of soluble starch was converted to cyclodextrins, the production level which was constant for 5 days. By supplying sodium azide, the production can be prolonged without bacterial contamination. In batch operation, the immobilized CGTase converted soluble starch to cyclodextrins with 78% conversion. This enzyme could be repeatedly used for 10 times, after which the amount of cyclodextrins produced decreased 40%.