

Application of Statistical Method for Screening of Factors Influencing the Production of α -cyclodextrin from Sago Starch Using Combination of Pullulanase and CGTase Enzymes

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Abstract: The production of α -cyclodextrin (α -CD) from sago starch was carried out using combination of debranching enzyme and Cyclodextrin Glucanotransferase (CGTase). The contribution of each reaction parameters was evaluated and optimised using statistical modelling. A 2^{3-1} Fractional Factorial Design (FFD) was employed to screen the effect of substrate concentration, CGTase concentration, pullulanase concentration, pH and temperature for CGTase reaction on the production of α -cyclodextrin (α -CD) using combination of pullulanase and CGTase. The result of first-order factorial design showed that pH and pullulanase had significant positive effect ($p < 0.05$) to the reaction. Substrate concentration, CGTase concentration and temperature exhibited insignificant effect in this reaction. In addition, interaction between CGTase and pH, substrate and pH, pullulanase and temperature, CGTase and temperature, substrate and CGTase gave significant effects ($p < 0.05$) to the α -CD production.

Key words: Cyclodextrin, sago starch, combined debranching and CGTase, statistical model

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