Produksi Enzim D-Amino Acid Oxidase dari Trigonopsis variabilis Menggunakan Sirup Gula Singkong = Production of D-Amino Acid Oxidase from Trigonopsis variabilis using Cassava Glucose Syrup

Zaldy Rusli, author

Abstrak

Antibiotik golongan sefalosporin menjadi salah satu solusi terhadap resistensi antibiotik, terutama golongan penisilin. Konversi sefalosprorin C (CPC) menjadi 7-aminocephalosporanic acid (7-ACA), yang merupakan inti aktif sefalosporin, dapat dilakukan menggunakan bantuan enzim D-amino acid oxidase (DAAO) yang dihasilkan oleh Trigonopsis variabilis. Penelitian ini bertujuan untuk menganalisa pemanfaatan sirup gula singkong sebagai sumber karbon alternatif, memperoleh kondisi optimum untuk produksi enzim DAAO menggunakan sirup gula singkong, serta karakterisasi enzim DAAO yang dihasilkan. Produksi DAAO dilakukan dengan fermentasi menggunakan kultur kocok yang diawali dengan skrining konsentrasi sirup gula singkong dan dilanjutkan dengan optimisasi, purifikasi dan karakterisasi enzim hasil purifikasi. Optimisasi dilakukan melalui skrining Plackett-Burman dan Response Surface Method. Karakterisasi pengaruh pH dan suhu, serta kinetika enzim dilakukan terhadap enzim DAAO yang telah dipurifikasi. Berdasarkan penelitian ini, diketahui bahwa sirup gula singkong dapat dimanfaatkan sebagai sumber karbon alternatif. Hasil optimisasi proses fermentasi menggunakan kultur kocok diperoleh bahwa konsentrasi sirup gula singkong dan DL-alanin serta waktu fermentasi merupakan faktor-faktor yang mempengaruhi produksi DAAO dengan konsentrasi berturut-turut 12.3% dan 0.3% selama 56.1 jam akan menghasilkan enzim dengan aktivitas spesifik sebesar 195.3826 U/g. Enzim DAAO yang dihasilkan memiliki suhu dan pH optimum berturut-turut 4 - 10°C dan 8, serta nilai Vmax sebesar 0.007 µmol/menit dan KM sebesar 78 mM.
<hr>
The antibiotic of cephalosprorin groups become one of the solution to the antibiotic resistance, especially penicillin groups. Conversion of Cephalosporin C into 7-aminocephalosporanic acid (7-ACA), which is an active core of the cephalosporin groups, can be performed using D-amino acid oxidase from Trigonopsis variabilis. The study was to aimed to analyze the usage of Cassava glucose syrups as an altenative carbon source; to obtain the optimum conditions in the production of DAAO using Cassava glucose syrup; and to obtain the characterization of the products. DAAO production was done by shaking culture fermentation which started with screening of cassava sugar syrup concentration and continued with optimization, purification and characterization of purified enzyme. Optimization is done by using Plackett-Burman screening and Response Surface Method. Characterization of the effect of pH and temperature, and also enzyme kinetics is done on purified DAAO. Optimization is done using Plackett-Burman screening and Response Surface Method. The characterization of the temperature, pH and kinetic parameters was carried out on the purified products. Based on this study, it is known that Cassava glucose syrup can be use as an alternative carbon source. The result of optimization using culture shake was found that the concentration of cassava glucose syrup and DL-alanine and also incubation periods were influencing factors with consecutive concentration was 12.3% and 0.3% for 56.1 hours, will produce enzyme with specific activity 195.3826 U / g.The products has an optimum temperature and pH was 4 - 10 ° C and 8, Vmax value was 0.007 µmol / min and a KM was 78 mM.