ISOLASI, FRAKSINASI DAN AMOBILISASI ENZIM

L-ASPARAGINASE DARI BAWANG MERAH (*Allium ascalonicum L*)

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RINGKASAN

L-asparaginase merupakan enzim hidrolase yang memiliki peranan penting dalam bidang kesehatan khususnya pengobatan penyakit kanker. Enzim L-asparaginase ini berperan mengkatalisis reaksi hidrolisis L-asparagin menjadi asam aspartat dan amonia melalui pemutusan ikatan amida. Asparagin merupakan asam amino yang diperlukan oleh sel kanker untuk tumbuh dan berkembang sehingga apabila ia terhidrolisis perkembangan sel kanker akan terhambat. L-asparaginase banyak terdapat di dalam bawang merah (*Allium ascalonicum L*) dan belum banyak dimanfaatkan sebagai obat terutama obat kanker. Oleh karena itu perlu dilakukan isolasi, fraksinasi dan amobilisasi enzim L-asparaginase dari salah satu sumber utamanya, yakni bawang merah.

Isolasi enzim L-asparaginase dilakukan dengan cara ekstraksi dan sentrifugasi. Pemurnian ekstrak enzim ini dilakukan dengan $(NH_4)_2SO_4$ dan dialisis melalui membran selofan. Aktivitas enzim ditentukan dengan metode Nessler menggunakan kurva standar amonium sulfat dalam suasana alkali. Kadar protein ditentukan dengan metode Lowry menggunakan kurva standar BSA.

Dari penelitian yang telah dilakukan diperoleh enzim dengan kemurnian tertinggi pada fraksi 20-40 % (F2) yang mempunyai aktivitas spesifik 497,03 Unit/mg, kemurnian ini meningkat 96 kali dibanding ekstrak kasar. Aktivitas enzim (F2) ini optimum pada suhu 37^{o}C, pH 8,4 dan waktu inkubasi selama 50 menit. Enzim L-asparaginase hasil isolasi perlu diamobilisasi untuk penggunaan enzim dengan lebih efisien. Amobilisasi dilakukan dengan menjerat enzim dalam matriks agar-agar yang diuji aktivitasnya pada tiga kali pemakaian enzim amobil. Enzim amobil hasil isolasi efektif pada dua kali pemakaian.

SUMMARY

L-asparaginase is a hydrolase enzyme that has an important rule in medicine especially for cancer treatment. This enzyme catalyzes hydrolysis reaction of L-asparagin producing aspartic acid and ammonia through breaking the amide bond. Asparagin is an amino acid that causes the cancer cell growth and multiplication obstructed. There are many L-asparaginases in onions (*Allium ascalonicum L*) but its uses as cancer treatment has not been observed yet. This research aim is to Isolate, fractionate and immobilizate L-asparaginase enzyme from onions as one of potential source.

The isolation of L-asparaginase enzyme was obtained by extraction and centrifugation. This enzyme was purified by fractionation using ammonium sulfate and dialysis by celofane membrane. The enzyme activity was determined by Nessler method with ammonium sulfate standard curve under alkaline condition. The protein was determined by Lowry method with standard curve of BSA.

The result of the research showed that the most pure enzyme was fraction with saturation of 20-40 % (F2) that had specific activity 497,03 Unit/mg, the purity increased 96 times than the crude extract. This enzyme (F2) activity was optimum at 37^{o}C, pH of 8.4 and incubation of 50 minutes. The L-asparaginase isolated is necessary to be immobilizated for the efficiently use. The immobilization was obtained by entrapping the enzyme into agar matrix that determined its activity for three times uses. The immobilized enzyme was efficient for twice application.

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