

ABSTRAK

STUDI PENGARUH PENAMBAHAN XILITOL TERHADAP STABILITAS ENZIM α -AMILASE DARI *Aspergillus sp.*

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Enzim dalam industri banyak digunakan sebagai biokatalisator. Namun, kondisi penggunaan enzim yang terbatas, seperti suhu dan pH memerlukan pengembangan lebih lanjut agar memperoleh enzim dengan stabilitas yang diharapkan.

Penelitian ini bertujuan untuk memperoleh enzim α -amilase dari *Aspergillus sp.* dengan aktivitas dan tingkat kemurnian yang tinggi dibandingkan ekstrak kasar enzim, serta mempelajari pengaruh penambahan xilitol terhadap stabilitas enzim α -amilase dari *Aspergillus sp.* Tahap penelitian meliputi produksi, pemurnian dengan metode fraksinasi amonium sulfat dan dialisis, serta karakterisasi enzim.

Hasil penelitian menunjukkan bahwa enzim hasil dialisis mengalami peningkatan kemurnian sebanyak 10,25 kali dibandingkan dengan ekstrak kasar enzim yang ditunjukkan dengan peningkatan nilai aktivitas spesifik dari 244,6844 U/mg untuk ekstrak kasar enzim, menjadi 2.500,82 U/mg untuk enzim hasil dialisis. Hasil karakterisasi menunjukkan bahwa enzim hasil dialisis dan penambahan xilitol (0,5; 1; dan 1,5 M) memiliki pH optimum yang sama, yaitu 4,0. Sedangkan suhu optimum, enzim hasil penambahan xilitol mengalami peningkatan menjadi 60 °C untuk enzim-xilitol 0,5 M, 65 °C untuk enzim-xilitol 1 dan 1,5 M, dibandingkan enzim hasil dialisis dengan suhu optimum 50 °C. Uji stabilitas termal dilakukan pada suhu 60 °C selama 100 menit, enzim hasil dialisis memiliki aktivitas sisa sebesar 69,5418 % dengan waktu paruh 210,0446 menit, sedangkan enzim hasil penambahan xilitol 0,5; 1; dan 1,5 M berturut-turut menunjukkan aktivitas sisa sebesar 78,9942; 81,3803; dan 80,4696 % serta waktu paruh 277,2589; 330,0701; dan 407,7336 menit. Peningkatan stabilitas enzim hasil penambahan xilitol 0,5; 1; dan 1,5 M berturut-turut sebesar 1,32; 1,57; dan 1,94 kali dibandingkan dengan enzim hasil dialisis.

Kata kunci: xilitol, α -amilase, *Aspergillus sp.*, stabilitas enzim, industri

ABSTRACT

STUDY OF THE EFFECT OF XYLITOL ADDITION ON THE STABILITY OF α -AMYLASE ENZYMES FROM *Aspergillus sp.*

By

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Enzymes in industry are widely used as biocatalysts. However, the limited conditions of enzyme use, such as temperature and pH require further development in order to obtain enzymes with the expected stability.

This research aims to obtain α -amylase enzyme from *Aspergillus sp.* with high activity and purity level compared to enzyme crude extract, and to study the effect of xylitol addition on the stability of α -amylase enzyme from *Aspergillus sp.* The research stage includes production, purification by ammonium sulfate fractionation and dialysis methods, and enzyme characterization.

The results showed that the dialyzed enzyme increased in purity by 10.25 times compared to the enzyme crude extract as indicated by an increase in specific activity value from 244.6844 U/mg for the enzyme crude extract, to 2,500.82 U/mg for the dialyzed enzyme. Characterization results showed that the dialyzed enzyme and the addition of xylitol (0.5; 1; and 1.5 M) had the same optimum pH, which was 4.0. While the optimum temperature, the enzyme from xylitol addition increased to 60 °C for enzyme-xylitol 0.5 M, 65 °C for enzyme-xylitol 1 and 1.5 M, compared to the enzyme from dialysis with an optimum temperature of 50 °C. The thermal stability test was conducted at 60 °C for 100 minutes, the dialyzed enzyme had a residual activity of 69.5418 % with a half-life of 210.0446 minutes, while the enzyme from the addition of xylitol 0.5; 1; and 1.5 M respectively showed a residual activity of 78.9942; 81.3803; and 80.4696 % and a half-life of 277.2589; 330.0701; and 407.7336 minutes. The increase in enzyme stability from the addition of xylitol 0.5; 1; and 1.5 M was 1.32; 1.57; and 1.94 times compared to the dialyzed enzyme, respectively.

Keywords: xylitol, α -amylase, *Aspergillus sp.*, enzyme stability, industry