

Produksi Enzim Selulase oleh *Aspergillus niger* pada Ampas Sagu

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ABSTRACT

Production of cellulase by *Aspergillus niger* was carried out by growing the culture on sago waste. Sago waste contains cellulose that has not been used optimally. Cellulose is a polysaccharide consisting of glucose monomers linked by α -1,4-glycosides bonds. Glycoside bonds in cellulose can be enzymatically hydrolyzed into glucose with cellulase enzymes. Solid fermentation used to produce cellulase on sago waste as substrate was influenced by pH (3 to 6), moisture content (40% to 85%), and fermentation time (4 to 10 days). Products of the cellulase enzyme activity was measured by phenol-sulfuric acid method. The results showed that the highest cellulase enzyme activity was 0.172 U/mL obtained at 85% moisture content, pH 5, and 8 days of fermentation time.

Keywords: *Aspergillus niger*, cellulase, sago waste

ABSTRAK

Produksi enzim selulase oleh *Aspergillus niger* pada ampas sagu telah dilakukan. Ampas sagu adalah salah satu bahan yang mengandung selulosa di mana ampas sagu belum dimanfaatkan secara optimal. Selulosa merupakan polisakarida yang terdiri atas monomer glukosa yang dihubungkan oleh ikatan α -1,4-glikosida. Ikatan glikosida pada selulosa dapat dihidrolisis menjadi glukosa secara enzimatis dengan enzim selulase. Fermentasi padat digunakan untuk menghasilkan enzim selulase pada substrat ampas sagu yang dipengaruhi oleh faktor pH (3 sampai 6), kadar air (40% sampai 85%) dan waktu fermentasi (4 sampai 10 hari). Produk aktivitas enzim selulase diukur dengan metode fenol-asam sulfat. Hasil penelitian menunjukkan bahwa aktivitas enzim selulase tertinggi adalah 0,172 U/mL yang diperoleh pada kadar air 85%, pH 5, dan waktu fermentasi 8 hari.

Kata Kunci: Ampas sagu, *Aspergillus niger*, Selulase

PENDAHULUAN

Enzim selulase merupakan enzim yang dapat menghidrolisis ikatan α -1,4 pada selulosa. Adanya selulosa dalam suatu substrat dapat menginduksi terbentuknya enzim selulase oleh mikroorganisme selulolitik. Mikroorganisme selulolitik yang dapat digunakan untuk menghasilkan enzim selulase misalnya kapang *Aspergillus niger* (Ul-haq *et al.* 2005).

Substrat yang digunakan untuk memproduksi enzim selulase adalah substrat berbahan lignoselulosa. Substrat lignoselulosa yang telah diteliti dengan kapang *A. niger* yaitu jerami padi (Sa'adah *et al.* 2008), serbuk gergaji kayu (Guruchandran & Sasikumar 2010; Acharya *et al.* 2008), ampas tebu (Guruchandran & Sasikumar 2010), tandan pisang (Retnoningtyas *et al.* 2006), jerami gandum (Jeca 2000), kulit gandum (Jeca 2000), dan ampas singkong (Pothiraj *et al.* 2006).

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