

ABSTRAK

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PRODUKSI N-ASETILGLUKOSAMIN DARI CANGKANG UDANG WINDU (*Penaeus monodon*) DENGAN FERMENTASI MEDIA CAIR MENGGUNAKAN SPORA *Mucor circinelloides* TERIMOBILISASI PADA κ -KARAGENAN

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(xv + 73; 13 gambar; 8 tabel; 9 lampiran)

N-asetilglukosamin (NAG) merupakan salah satu produk hasil hidrolisis kitin yang melalui fermentasi cangkang udang menggunakan kapang *Mucor circinelloides*. Namun, penelitian mengenai stabilitas spora sel kapang *M. circinelloides* terimobilisasi dalam mendegradasi kitin belum pernah dilakukan sehingga tujuan dari penelitian ini adalah mengetahui pengaruh imobilisasi sel dengan metode penjeratan terhadap kestabilan *M. circinelloides* dalam mendegradasi kitin menjadi NAG. Variasi konsentrasi κ -karagenan (3%, 3,5%, 4%) (b/v) dan kepadatan spora sel kapang (10^5 , 10^6 , 10^7 spora/ml) digunakan untuk imobilisasi sel dalam memfermentasi kitin. Pemakaian berulang spora sel terimobilisasi (pemakaian berulang ke 1, 2, 3, 4) juga dilakukan untuk menentukan kadar NAG tertinggi dan stabilitas spora sel kapang terimobilisasi yang dilakukan melalui fermentasi. Kadar NAG tertinggi dihasilkan oleh κ -karagenan dengan konsentrasi 4% dan kepadatan spora sel kapang 10^6 spora/ml dengan kadar $6348,10 \pm 283,33$ ppm. Konsentrasi κ -karagenan dan kepadatan spora sel kapang terbaik digunakan untuk menentukan stabilitas *M. circinelloides* berdasarkan pemakaian berulang spora sel terimobilisasi sebanyak 4 kali. Kadar NAG tertinggi dihasilkan pada pemakaian berulang sel terimobilisasi ke 1 yaitu sebesar $6414,17 \pm 207,63$ ppm, diikuti dengan pemakaian berulang ke 2 dan 3 yaitu sebesar $2627,26 \pm 76,91$ ppm dan $968,93 \pm 18,04$ ppm. Pemakaian berulang ke 4 tidak dilakukan karena seluruh *beads* pecah saat penyaringan hasil fermentasi pemakaian berulang ke 3. Berdasarkan pemakaian berulang, spora sel *M. circinelloides* terimobilisasi dengan metode penjeratan menggunakan κ -karagenan dapat digunakan hingga 3 kali fermentasi untuk menghasilkan NAG.

Kata Kunci: Cangkang udang, imobilisasi sel, κ -karagenan, *Mucor circinelloides*, N-asetilglukosamin

Referensi: 93 (1999-2018)

ABSTRACT

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PRODUCTION OF N-ACETYLGLUCOSAMINE FROM BLACK TIGER SHRIMP SHELL (*Penaeus monodon*) BY LIQUID FERMENTATION USING IMMOBILIZED *Mucor circinelloides* SPORE IN κ -CARRAGEENAN

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(xv + 73 pages, 13 figures, 8 tables, 9 appendices)

N-acetylglucosamine (NAG) is a hydrolyzed product of chitin from shrimp shells fermentation with Mucor circinelloides. However, the stability of immobilized M. circinelloides during chitin fermentation has not been further developed, thus the aim of this study was to determine the effect of cell immobilization by entrapment method towards the stability of M. circinelloides in degrading chitin to produce NAG. Various concentration of κ -carrageenan (3%, 3.5%, 4%) (w/v) and the cell density of mold spores (10^5 , 10^6 , 10^7 spores/ml) for cell immobilization in chitin fermentation. The repeated usage of immobilized spore cells (repeated usage/cycle 1, 2, 3, 4) also been observed in order to determine the highest NAG content and its stability. The highest NAG content was produced from the combination of 4% κ -carrageenan and 10^6 spores/ml with a content of $6348,10 \pm 283,33$ ppm. The best combination of κ -carrageenan and cell density of mold spores was used to determine the stability of immobilized M. circinelloides upon 4 cycles of repeated usage of immobilized spore cells. In addition, the highest NAG content was produced in the 1st cycle of repeated usage of immobilized spore cells i.e. 6414.17 ± 207.63 ppm, followed by the 2nd and 3rd cycle of repeated usage of immobilized spore cells respectively 2627.26 ± 76.91 ppm and 968.93 ± 18.04 ppm. The 4th cycle of repeated usage of immobilized spore cells was not carried out because all beads broke during the filtration of the 3rd cycle of repeated usage of immobilized spore cells fermentation product. Based on the cycle of repeated usage, immobilization of M. circinelloides spore cells by entrapment method using κ -carrageenan could be used up to 3 cycle of repeated usage to produce NAG.

Keywords: Cell immobilization, κ -carrageenan, Mucor circinelloides, N-acetylglucosamine, shrimp shell

Reference: 93 (1999-2018)