Isolation of a Microbe to Produce N-acetylchitooligosaccharides and Characteriztion of Its Chitinase

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ABSTRACT

In this study, a microbe, named DYU-Too13, was isolated from soil of Huatan Township in Changhua County to degrade chitin into N-acetylchitooligo- saccharides. The microbe was first cultivated in various chitin sources of the chitin broth (CB) media. When β-chitin was the sole carbon source, the highest yield of N-acetylchitotriose was 1.02 g/L at 120 h. To study the effect of nitrogen source on the production of N-acetylchitooligosaccharides, various nitrogen sources were considered. The highest yield of N-acetylchitotriose was 1.62 g/L at 96 h when DYU-Too13 was cultivated in a peptone medium. The microbe was also cultivated in media containing various β-chitin contents (1% - 6%) to study the effect of the content on the production of N-acetylchitooligosaccharides. The yield of N-acetylchitotriose reached a maximum (2.72 g/L) at 96 h in a medium containing 6% β-chitin. When DYU-Too13 was cultivated in a medium with various peptone contents, the highest yield of N-acetylchitotriose was 1.902 g/L at 96 h in a medium containing 0.09 g peptone. When the microbe was cultivated in media with various NH4Cl contents, the highest yield of N-acetylchitopentose was 0.246 g/L at 96 h in a medium containing 0.06 g NH4Cl. Effect of cultivating temperature (30, 35 and 40°C) was also examined on the varieties and contents of N-acetylchitooligosaccharides. When DYU-Too13 was cultivated at 30 and 35°C, the highest yields of N-acetylchitotriose at 96 h were 1.158 and 1.359 g/L, respectively. At 40°C, major products at 96 h included N-acetylglucosamine (2.07 g/L), N-acetylchitotriose (0.327 g/L), and N-acetylchitotetraose (0.744 g/L). The optimum reacting temperature for the crude chitinases was 50°C, and the optimum reacting pH was 6.0. The crude chitinases was quite stable at pH 8 and in the temperature range of 10~30°C.

Keywords : DYU-Too13 ; chitinases ; N-acetylchitotriose

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