

Parichart Khonzue 2006: Selection and Production of Animal Feed Enzymes by Thermophilic Fungi, *Thermomyces lanuginosus* (Tsiklinskaya). Master of Science (Microbiology), Major Field: Microbiology, Department of Microbiology. Thesis Advisor: Associate Professor Vichien Kitpreechavanich, Dr.Eng. 126 pages.
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The abilities of 89 strains of thermophilic fungi, *Thermomyces lanuginosus* to produce xylanase and α -amylase were investigated in condition of both solid state and submerged cultures. Xylanase activity was assayed towards soluble and insoluble xylan. Each strain was grown at 50°C for 5 days on 70% initial moisture content of solid substrate, which consisted of either 5 g of alkaline treated corncobs or corncobs, 5 g of wheat bran and 2 g of rice husk. It was found that most of strains *T. lanuginosus* grown on alkaline treated corncobs were able to produce xylanase with a higher amount of soluble xylan degrading activity than one grown on untreated corncobs. With the exception of this, 12 strains were found to produce enzyme with a fairly equivalent amount of soluble xylan degrading activity notwithstanding the difference between alkaline treated and untreated corncobs. Furthermore, It was found that all but 7 strains grown by submerge culture at 50°C in shaking flask for 5 days on medium consisted of 15 g/l corncobs, 15 g/l yeast extract, 5 g/l KH_2PO_4 and 0.3 ml/l Tween 80 were able to produce xylanase with high amount of soluble and insoluble xylan degrading activity. The strains with high proficiency level in the enzyme productions on solid state culture were different from submerge culture. Moreover, most of strains were produced low amount of α -amylase activity in both cultivation methods. However, to reduce production cost and for practical application of xylanase, the selection of *T. lanuginosus* that produced high xylanase was considered on a basis of insoluble xylan degrading activity that cultured on untreated corncobs undergo acid-stability and thermo-stability. It was found that insoluble xylan degrading activity from crude enzyme of *T. lanuginosus* THKU56 obtained from submerged culture was the most stable that remained 28.2 and 58.9 % after treated at pH 3.5 and 70°C for 1 h, respectively. Concentration of corncobs, yeast extract, KH_2PO_4 and Tween80 were optimized in shaking condition for production of insoluble xylan degrading enzyme by *T. lanuginosus* THKU56, using a central composite design. Unlike other components, only corncobs and yeast extract were discovered to affect on the xylanase production. The optimal concentration of the active nutrients for xylanase production were 41 g/l of corncobs and 24 g/l of yeast extract, which gave a predicted yield of 526.7 units/ml after 5 days culture at a temperature of 50°C. The xylanase activity obtained from the experiment was 541 units/ml that was close to the predicted value.

Student's signature

Thesis Advisor's signature