

Murane Boriboonsook 2014: Optimization for Carboxymethylcellulase Production by Thermophilic Bacteria from Soil. Master of Science (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Mangkorn Rodprapakorn, Ph.D. 97 pages.

The effect of carbon sources from agricultural wastes including rice straw, coconut husk, corn peel, corncob and sawdust at 1% (w/v). for Carboxymethylcellulase (CMCase) production of *Thermobifida fusca* PA 1-1 was investigated. In this study, pretreated rice straw induced the highest CMCase activity, next below were corncob, corn peel, sawdust and coconut husk, respectively. The highest CMCase activity of 0.975 U/ml. was released on 5th day at pH 6.99-7.12 by induction of pretreated rice straw. The effect of nitrogen sources including peptone, ammonium sulphate, yeast extract, malt extract and baker's yeast for CMCase production of *T. fusca* PA 1-1 was investigated. Yeast extract showed the highest CMCase activity, next below are baker's yeast, peptone, malt extract and ammonium sulphate, respectively. The highest CMCase activity of 1.294 U/ml was released on 5th day at pH 6.99-7.12 by using yeast extract as nitrogen source. However, price of yeast extract is expensive. Therefore, the cheaper baker's yeast was selected to be used as nitrogen source. The optimization of CMCase production was studied using the response surface methodology with carbon source and nitrogen source. It was found that the most significant factors influencing enzyme production were both carbon source and nitrogen source ($p < 0.05$). The second order polynomial regression model was obtained with an R^2 of 0.903 ($p < 0.05$). From the result of the optimization, maximum CMCase activity at 1 U/ml was achieved at carbon source 1.75 % (w/v). and nitrogen source 2 % (w/v). To confirm the applicability of the model, *T. fusca* PA 1-1 was cultured at this condition in a shaking flask. And the highest CMCase activities was measured at 1.41 U/ml.

Student's signature

Thesis Advisor's signature