World Journal of Microbiology and Biotechnology

10.1023/A:1015201215368

Optimization of dilution rate for the production of value added product and simultaneous reduction of organic load from pineapple cannery waste

J.N. Nigam[1] **and M.C. Kakati**[2]

(1) Biochemistry Division, Regional Research Laboratory, Jorhat, 785 006 Assam, India

(2) Computer Section, Regional Research Laboratory, Jorhat, 785 006 Assam, India

J.N. Nigam
Email: jnnbio@yahoo.com
Fax: +91-376-370 011

Abstract *Candida utiilis* NRRL Y-900 was grown on pineapple cannery waste as the sole carbon and energy source in a chemostat at dilution rates ranging between 0.05 and 0.65 h^{-1} to determine the growth kinetics. The cell yield coefficient varied with dilution rate and a maximum value of 0.662 ± 0.002 g_x/g_{carb} was obtained at a dilution rate of 0.4 h^{-1}. At steady state, the concentrations of carbohydrate, reducing sugar, and chemical oxygen demand (COD) appeared to follow Monod kinetics. At maximum specific growth rate (μ_{max}) 0.65 h^{-1}, the saturation constants for carbohydrate, reducing sugar and COD were 0.51 ± 0.02 $g_{carb}/1$, 0.046 ± 0.003 $g_{rs}/1$, and 1.036 ± 0.001 $g_{COD}/1$, respectively. Maximum biomass productivity ($Q_{x\,max}$) 2.8 ± 0.03 $g_x/1$ h was obtained at a dilution rate of 0.5 h^{-1}. At this dilution rate, only 71.0 ± 0.41% COD was removed whereas at a dilution rate of 0.1 h^{-1}, 98.2 ± 0.35% reduction in COD was achieved. At a dilution rate of 0.4 h^{-1}, the optimal yeast productivity and reduction in COD were 2.7 ± 0.13 $g_p/1$ h, and 84.2 ± 0.42%, respectively.

Biomass - *Candida utilis* - chemostat - continuous culture - growth kinetics - pineapple cannery waste - steady state