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

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Abstract *Candida utilis* 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}/l, 0.046 ± 0.003 g_{rs}/l, and 1.036 ± 0.001 g_{COD}/l, respectively. Maximum biomass productivity ($Q_{x max}$) 2.8 ± 0.03 g_x/l 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/l h, and 84.2 ± 0.42%, respectively.

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