

Title: FERMENTATION KINETIC HIGH ALCOHOLIC USING SELECTED YEAST

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Abstract:

This project proposed a new design to the ethanol industry, ethanol production using a yeast capable of fermenting in medium with high alcohol content, from sterile wort. To do this we used two strains of selected yeasts (Y904 and PE-2) for fermentation in wort with high sugar content. Obtaining wine with high alcohol content can reduce the amount of vinasse produced and enables lower power consumption in the distillation step. The aims of this study were: i) adapt two strains of yeasts for wine with high alcohol content; ii) evaluate the product inhibition kinetics of formation of biomass and consumption of the substrate by high sugar content and verify the inhibitory effects of ethanol on the productivity and income of these two strains of yeast (Y904 and PE- 2). Both yeast strains have been adapted to subsequent fermentation media with increasing concentrations of total reducing sugars , up to a maximum concentration of 260 g / L . In sequence, a fermentation kinetics with 3 cycles was conducted , using the sugar concentration equal to 260 g/L. The parameters evaluated were: viability of yeast cells, total reducing sugars, residual sugar, ethanol content, yield and productivity of the product. According to the statistics generated by the analysis program R (2006), the fermentation parameters Yield (%), Productivity (g / L / h), Biomass Production (g / L) and Ethanol production (g / L) showed no significance at the 5% probability, or both yeast strains showed similar behavior. The fermentation yield of PE-2 line during the three cycles averaged 67.2 % , biomass has remained stable at around 17 g / L and ethanol production peaked at 89% , with productivity 2.66 g EtOH/h. By contrast , the fermentation yield of Y904 strain during the three cycles averaged 61.4 % , biomass has remained stable at around 14 g / L and ethanol production peaked at 79% , with productivity 2.46 g EtOH/h. The Residual sugars parameter (g / L) showed significance at 5% probability, so the lines have different average amounts of residual sugar, the Y904 strain being the one with the highest values. This experiment allowed us to conclude that both yeast strains (PE-2 and Y904) are capable of being adapted to fermentations with high alcohol content. The inhibitory effect of ethanol in yeast was present even after such adjustment, although most cells remained alive in the substract with sugar content equal to 260 g/L.

Key words: Alcoholic fermentation, ethanol production, wine with high alcohol content and yeast.

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