



Production of biomass of *Saccharomyces cerevisiae* and *Torulaspora delbrueckii* changing aeration and agitation condition in batch reactor

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Introduction. The yeast production industry of biomass represents the largest volume of unicellular microorganisms production in the world². However, during the process, yeasts are exposed to different environmental conditions (temperature, pH, agitation and aeration rate). These are factors that affect the cellular composition and metabolic activity¹. The adequate management of these factors allows increasing and optimizing industrial fermentation processes³.

The aim of this study was to determine the best conditions of aeration and agitation to increase biomass production of yeast *Saccharomyces cerevisiae* and *Torulaspora delbrueckii* isolated.

Methods. The cultures were made in a fermenter (Applikon) with a volume of 3 L, at 30 °C. YDP was used as culture media. A design 3³ was performed, evaluating different agitation speeds (200, 300 and 400 rpm) and aeration rates (0.5, 1 and 1.5 vvm). Samples were taken every hour. Biomass was quantified by dry weight (g/L), substrate consumption was determined by the DNS technique. Growth rate (h⁻¹) and yield (Y_{X/S}) were calculated from the experimental data. All experiments were done in duplicate. The results were statistically analyzed by Tukey test.

Results. We compared the variation factors (agitation and aeration) to see the effect on the response variables (biomass, growth rate and yield).

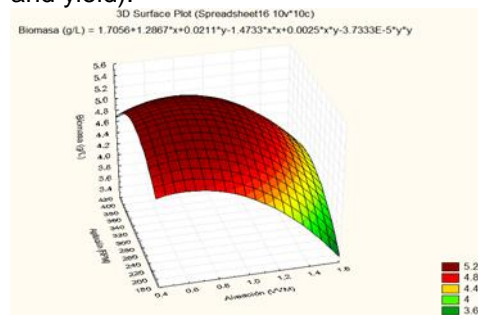


Fig.1 Biomass production of *Saccharomyces cerevisiae* to different conditions of aeration and agitation.

for biomass production were 1 vvm and 200 rpm (Fig. 1), obtaining 4.92 g Biomass/L, $\mu=0.53\text{h}^{-1}$ and yield of 8.13%.

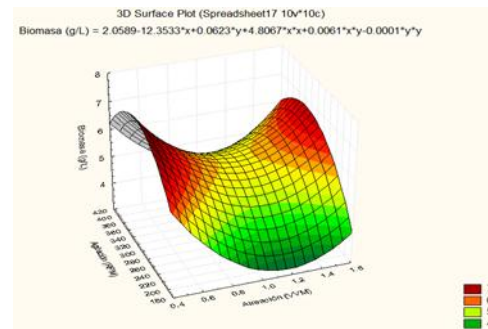


Fig.2 Biomass production of *Torulaspora delbrueckii* to different conditions of aeration and agitation.

T. delbrueckii showed no significant difference in the growth rate. The highest biomass production was 6.96 g/L and the best yield was 15.23%, using 1.5 vvm and 300 rpm.

Conclusions. The best condition for biomass production are, is 1 vvm and agitation at 200 rpm (*S. cerevisiae*), while the best condition for *T. delbrueckii* are 1.5 vvm and 300 rpm.

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S. cerevisiae showed a negative effect with high aeration (1.5 vvm). The best parameters