

Fermentation of Xylose and Glucose Mixture in Intensified Reactors by *Scheffersomyces stipitis* to Produce Ethanol

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Abstract : In this work, two fermentations at different temperatures (25 and 30 °C), with cell recycling, were accomplished to produce ethanol, using a mix of commercial substrates, xylose (70%) and glucose (30%), as organic source for *Scheffersomyces stipitis*. Five consecutive fermentations of 80 g L⁻¹ (1^o, 2^o and 3^o recycles), 96 g L⁻¹ (4^o recycle) and 120 g L⁻¹ (5^o recycle) reduced sugars led to a final maximum ethanol concentration of 17.2 and 34.5 g L⁻¹, at 25 and 30 °C, respectively. Glucose was the preferred substrate; moreover xylose startup degradation was initiated after a remaining glucose presence in the medium. Results showed that yeast acid treatment, performed before each cycle, provided improvements on cell viability, accompanied by ethanol productivity of 2.16 g L⁻¹ h⁻¹ at 30 °C. A maximum 36% of xylose was retained in the fermentation medium and after five-cycle fermentation an ethanol yield of 0.43 g ethanol/g sugars was observed. *S. stipitis* fermentation capacity and tolerance showed better results at 30 °C with 83.4% of theoretical yield referenced on initial biomass.

Keywords : 5-carbon sugar, cell recycling fermenter, mixed sugars, xylose-fermenting yeast

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