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Immobilised yeast grape must deacidification in a recycle fixed bed reactor.

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Abstract

Maloalcoholic fermentation (MAF) of grape must by *Schizosaccharomyces pombe* immobilised in calcium-alginate double-layer beads (ProMalic) was studied in Erlenmeyer flasks and in a total recycle fixed-bed reactor operating in batch mode. The reaction is pseudo-first order with respect to l-malic acid and under similar conditions deacidification is faster in the recycle reactor. This was attributed to mass transfer limitations which were confirmed in the recycle reactor by studying the influence of yeast load on the rate of MAF. Mass transfer limitations are also responsible for the lower activation energy of fermentation with the immobilised yeast (67 ± 9 kJ mol−1) in comparison with the free cells (126 ± 19 kJ mol−1). Alcoholic fermentation and MAF were performed simultaneously, both in the recycle reactor and in the industrial trials, confirming the efficacy of immobilised S. pombe to reduce grape must acidity without interfering with the main fermentation. Altogether, the present results are useful for the scale-up of a recycle reactor to process large volumes of grape must.