

## Abstract

A horizontal multistage bioreactor with replaceable immobilized plates (bioplates) was constructed for continuous wine fermentation. The bioplates were prepared by immobilizing viable cells in the form of membranes onto sintered glass plates, using calcium alginate as the carrier. Five bioplates were inserted vertically along a rectangular frame constructed from acrylic sheets, thus separating it into six compartments. The residence time distribution curve of the bioreactor approximated that of six tanks in a series model ( $j = 5.61$ ). The bioreactor was used for the continuous fermentation of koshi grape must. During the steady state sugar and ethanol concentration gradients existed from the first to the last compartment. The steady state was maintained for more than 42 days. Also application of this bioreactor for continuous wine fermentation with simultaneous deacidification of a Muscal Balley grape must was carried out. Two bioplates of *Schizosaccharomyces pombe* 0.77 and five bioplates of *Saccharomyces cerevisiae* 2HY-1 were used to separate the reactor into eight compartments. In this system, the total acidity of the wine during the steady state was reduced by 17% to 38% and the L-malic acid concentration by 58% to 76%. The L-lactic acid concentration remained more or less constant throughout the process. KEY WORDS: biocatalyst, bioreactor, continuous fermentation

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