Lipase Activity Enhancement by SC-CO$_2$ Treatment

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Dedicated to Professor Gérard Demazeau on the occasion of his 65th birthday

The activity of lipases from porcine pancreas, *Candida antarctica* recombinant from *Aspergillus oryzae*, *Candida cylindracea* (immobilized), *Penicillium roqueforti*, *Aspergillus niger*, *Rhizopus arrhizus*, *Mucor miehei* (two types of immobilization), and *Pseudomonas cepacia* (two types of immobilization) was studied after using them as biocatalysts of blackcurrant oil hydrolysis under SC-CO$_2$ conditions. The reaction was performed at 40 $^\circ$C and 15 MPa in a continuous-flow reactor. Increased relative activity of all used lipases after the hydrolytic reaction was observed. The most remarkable increase in the activity was noted for the lipase from *Rhizopus arrhizus* which was increased by more than 50 times. The highest activity was shown by Lipozyme® lipase from *Mucor miehei* immobilized on macroporous resin. Both treated and untreated Lipozyme® were used as biocatalysts in hydrolytic resolution of the racemic cis- or trans-isomers of 2-(4-methoxybenzyl)cyclohexyl acetates. Satisfactory reaction yields (40%) and excellent enantiomeric purity of the products ($E = 472$) were obtained when hydrolysis of the trans-isomer of 2-(4-methoxybenzyl)cyclohexyl acetate was catalyzed by Lipozyme® treated with SC-CO$_2$.

Key words: Lipase Activity, Supercritical Carbon Dioxide, Enantioselectivity