Synthesis of Monoacylglycerol Rich in Polyunsaturated Fatty Acids from Tuna Oil with Immobilized Lipase AK

The aim of this study was to produce monoacylglycerols (MAG) rich in polyunsaturated fatty acids (PUFA), especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), by glycerolysis of tuna oil with lipase AK from Pseudomonas fluorescence immobilized on Accurel EP-100 (IM-AK). tert-Butyl methyl ether (MTBE) was the most suitable organic solvent after screening a list of different solvents and their mixtures. The optimum conditions for MAG production were: 10% w/v of tuna oil in MTBE; mole ratio of glycerol to tuna oil 3:1, water added 4 wt% in glycerol; the amount of IM-AK 30 wt%, based on tuna oil. The temperature was controlled at 45 degrees C. Under these conditions, with a 24 h reaction, the yield of MAG was 24.6%, but containing 56.0 wt% PUFA (EPA and DHA). Stability of the IM-AK was also studied. The hydrolytic activity of the enzyme remained at 88% and 80% of initial activity after incubating in MTBE for 24 h at 4 and 45 degrees C, respectively. The K-m and V-max values of the lipase-catalyzed glycerolysis of tuna oil in MTBE were found to be 19.5 mM and 2.71 mg MAG/min, respectively, for IM-AK. (c) 2006 Elsevier Ltd. All rights reserved.