Monoacylglycerol synthesis via enzymatic glycerolysis using a simple and efficient reaction system

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The production of monoacylglycerols (MAGs) via enzymatic glycerolysis in a simple and efficient operation was evaluated. The sunflower oil was used as the starting material to produce MAGs containing polyunsaturated fatty acids. Three commercial immobilized lipases, namely Lipzyme RM IM, Lipzyme TL IM and Novozym 435 were employed in a batch reaction system. Novozym 435 showed better properties in glycerolysis. The increased temperature and high glycerol/oil ratio had little effect on the yield of MAGs in such a system. The reaction in a packed bed reactor (PBR) gave lower yield of MAGs because of the insufficient contact between the oil and the glycerol in the continuous reactor. The low homogeneity in the enzymatic glycerolysis system was the obstacle to improve the MAG yield, thus, tert-butanol was used in the reaction system. The equilibrium yield of up to 70% MAGs in the selected reaction system was easily obtained within 2 h in a simple batch reactor. The reaction in a PBR was also conducted in tert-butanol medium with a conjugated linoleic acid oil. The MAG yield of 70% was also obtained with a residence time of only 30 min. The pressure drop of the system was less than 1 bar per m/h linear flow rate, indicating that the operation could be used in practical applications.

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