

Influence of silica gel in production of diacylglycerol via enzymatic glycerolysis of palm olein

ABSTRACT

Enzymatic glycerolysis was explored in this paper for the production of diacylglycerol (DAG) oils from palm olein. Three commercial enzymes, Lipozyme TL IM, Lipozyme RM IM and Novozym 435 were used for their ability to synthesize DAG in a solvent-free system. Novozym 435 was found to be the more effective enzyme, resulting in a high DAG production even in the absence of an adsorbent such as silica gel. The yields of DAG were between 43 and 50 wt-%. Lipozyme TL IM and RM IM, being supported on hydrophilic materials, require an adsorbent to allow slow release of glycerol for reaction with the enzyme and oil. In the absence of silica, no reaction was observed. The success of the reaction is therefore very dependent on the amount of silica used. The yields of DAG using Lipozyme TL IM and RM IM were 52 and 45 wt-%, respectively. In addition, the degree of reduction in tocopherols and tocotrienols appeared correlated with the efficacy of the glycerolysis reaction. Changes in the slip melting points and solid fat contents of the products are indicative of the reaction occurring.

Keyword: Diacylglycerol; Enzymatic glycerolysis; Enzyme carrier; Immobilized enzyme; Palm olein