

Diacylglycerols formation by Enzymatic reaction of rapeseed oil, pork lard, glycerol mixtures using biocatalysts Lipozyme[®] TL IM

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The aim of the work was the investigations of obtaining diacylglycerols (DAG) using of pork lard (L), rapeseed oil (R) and glycerol (GI) mixtures. Two raw materials were used in the work which have different characteristics of fatty acids. These were rapeseed oil which contains about 90% unsaturated fatty acids, C 18 group, and pork lard containing about 45% saturated fatty acids (palmitic C 16:0 and stearic C 18:0) and unsaturated fatty acids 55% (mainly oleic C 18:1). The interesterification of these fat mixtures, in different proportions, with glycerol absorbed on silica gel, using biocatalyst Lipozyme[®] TL IM from *Thermomyces lanuginose* was carried out. The catalyst was specific in relation to ester bonds in *sn*-1,3 positions of the triacylglycerol molecules. The investigations in model system in batch reactor with stirrer and without solvent on the laboratory scale was carried out. The yield of DAG depended on the reaction temperature, molar ratio of glycerol to triacylglycerol, water content in mixture and time of reaction. The temperature was 60°C. At the molar ratio of TAG/GI 1:2 the reaction was highly efficient. and Lipozyme TL IM gave conversions of TAG to DAG. The main product of diacylglycerols was *sn*-1,3 DAG. The DAG yield was most effective when the amount of lipase was 6% and the water content was above 3,5%. The reaction time was from 4 to 24 hours but after 5 hours about 60% of DAG was achieved. The following analytical tests were selected: determination of the composition of fatty acids by GLC, determination of the composition of fatty acids in the 1,3-position of the diacylglycerols molecules (DAG) by GLC, determination of the acid value. The product obtained consists of mainly diacylglycerols 62,0% (DAG), triacylglycerols 28,0% (TAG), monoacylglycerols 10,0% (MAG). These studies on the enzymatic process indicate that a reaction with this lipase is an efficient way to produce oils high in DAG. A new structure of DAG fats is especially favorable from the nutritional point of view.