Enzymatic Modification of Canola Oil with Conjugated Linoleic Acid to Produce Structured Lipid

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Conjugated linoleic acid (CLA) which is a mixture of geometric and positional isomers of linoleic acid (C 18:2) has nutritional and health benefits. CLA decreases the risk of atherosclerosis and has anticarcinogenic effects. CLA also lowers the insulin resistance and consequently insulin levels. The richest sources of CLA are animal fats, especially milkfat. For these reasons, many studies were undertaken to increasing the CLA content of foods by means of enzymatic processes to incorporate of CLA into triacylglycerols.

In the present work, the objective was to investigate the CLA incorporation into canola oil by enzymatic acidolysis using 1,3-specific lipase, Lipozyme TL IM (*Thermomyces lanuginosa*) to enhance the health benefits of canola oil. Effects of the substrate mol ratio and the reaction time on the incorporation of CLA were studied.

In general, acidolysis reactions were conducted using 1.0 g of substrates, 12% (w/w of substrates) Lipozyme TL IM (*Thermomyces lanuginosa*) and 5 mL hexane in an orbital shaker at 200 rpm and at 50 ºC. Acidolysis products consisted of triacylglycerols (TAGs) and free fatty acids (FFAs) were filtrated to remove the enzyme and then titrated against a 0.02 M NaOH to separate FFAs. Fatty acid compositions of TAGs were determined by gas chromatography.

CLA incorporation was affected by mole ratio of substrates and reaction time. The highest CLA incorporation was resulted in the reaction carried out at 50 °C in hexane at canola oil/ CLA mole ratio of 1:5 and 6 h. Under these conditions, a structured lipid (SL) containing 45.9% CLA was obtained. This SL could be used as a source of dietary CLA in the formulation of food products.