

Enzymatic Modification of Canola Oil with Conjugated Linolenic Acid (CLNA) from Pomegranate Seed Oil

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With the ability to combine the beneficial characteristics of component fatty acids into triacylglycerol (TAG) molecule, lipid modification enhances the role fats and oils play in food, nutrition, and health applications. Structured lipids (SLs) are tailor-made fats and oils with improved nutritional or physical properties because of modifications to incorporate new fatty acids or to change the position of existing fatty acids on the glycerol backbone. Lipid modification strategies for the production of functional fats and oils include chemically or lipase catalyzed interesterification and/or acidolysis reactions and genetic engineering of oilseed crops. The pomegranate (*Punica granatum*) seed oil contains 64-88% of conjugated linolenic acids (CLNA) mainly puniolic acid. Due to its high CLNA content, the pomegranate oil has beneficial effects on human health by reducing visceral lipids and enhancing immune response and preventing metabolic disorders of type 2 diabetes.

In this study the health benefits of canola oil was enhanced with the incorporation of CLNA into their triacylglycerols. Acidolysis reactions were conducted between canola oil (CO) and pomegranate oil fatty acids (PFA) having 84.5% of CLNA with Lipozyme TL IM (*Thermomyces lanuginosa*) lipase.

Acidolysis reactions were conducted using 1g of substrates, 5 mL hexane and 10 % (w/w of substrates) of enzyme in a 50 mL glass flask at 50 °C. CLNA incorporation was affected by mole ratio of substrates and reaction time. The highest CLNA incorporation was obtained in the reaction carried out at 50 °C in hexane at CO: PFA molar ratio of 1:4 for 5h. Under this condition, the structured lipids containing 31.8% of CLNA were obtained. These structured lipids having PFA could be used in the formulation of healthy food products.