

## **Enzymatic Interesterification of Canola Oil with *Momordica charantia* (Bitter Gourd) Seed Fatty Acids to Produce Structure Lipids**

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Canola oil (CO) is beneficial for health due to its low saturated fatty acids, and high mono (oleic acid) and polyunsaturated (linoleic acid, omega-3 fatty acid) fatty acids contents. Conjugated linolenic acid (CLNA) is a generic term used to describe a mixture of positional and geometric isomers of octadecatrienoic acids containing three double bonds in conjugation. CLNA is an effective antioxidant that can protect plasma, low density lipoprotein and erythrocyte membrane from oxidation which may be effective in reducing the risk of coronary heart disease and diabetes mellitus. Furthermore, it slows down the tumor growth and enhances the immunity system. The total CLNA content of bitter gourd (*Momordica charantia*) seed oil is 55-60%. Four different CLNA isomers have been identified and bitter gourd fatty acids (BGFA) contain the highest amount of  $\alpha$ -eleostearic acid (9*c*,11*t*,13*t*-18:3).

The main goal of this study is to produce structured lipids (SL) containing CLNA by the enzymatic interesterification (acidolysis) of canola oil with bitter gourd fatty acids catalyzed by sn-1,3 specific lipase from *Thermomyces lanuginosa* (Lipozyme TL IM). To obtain the highest incorporation of CLNA reaction parameters were also evaluated.

In acidolysis reaction, 1.0 g substrates mixture (CO and BGFA), Lipozyme TL IM and 5 mL hexane were mixed in an orbital shaker at 220 rpm. Acidolysis product consisted of modified triacylglycerols (SLs) and free fatty acids (FFAs). SLs were separated from acidolysis product by neutralization of FFAs with 0.02 M NaOH. Fatty acid composition of SLs were determined by gas chromatography.

Effect of reaction conditions for the highest incorporation of CLNA into CO was studied at various substrate molar ratios (CO:BGFA; 1:3-1:7), enzyme loads (7-19% based on oil weight), reaction times (1-5h) and temperatures (40-60 °C). Canola oil containing 40% of CLNA was obtained at 10% enzyme load, 1:7 substrate molar ratio, 55 °C and 3h reaction time.

New functional oil products could be produced by the enzymatic interesterification of canola oil with bitter gourd fatty acids for food applications.