Enzymatic Acidolysis of Olive Oil with Palmitic-Stearic fatty acid mixture for Production of Cocoa Butter Equivalent

Ibrahim O. Mohamed, Department of Food Science, College of Food and Agriculture United Arab Emirates University, P.O.Box 15777 Al-Ain, UAE

Cocoa butter (CB) is one of the major ingredients of dark chocolate, white chocolate and milk chocolate amounting to about 30% according to European Standard. CB gives chocolates the characteristics of sharp melting at body temperature resulting in cooling sensation in the mouth. Limited supply of cocoa butter and high demands from confectionary industry directed the attention to enzymatic production of cocoa butter equivalent (CBE) from various suitable oils. The aim of this work is to enzymatically re-structure olive triacylglycerol (TAG) to produce CBE. Enzymatic acidolysis reaction of substrate consisting of refined olive oil and palmitic-stearic fatty acids mixture. The reactions were performed in a batch reactor at a temperature of 60 °C in an orbital shaker operated at 160 RPM. Different mass ratios of substrates were explored and the compositions of the five major triacylglycerols (TAG) of the structured lipids were identified and quantified using cocoa butter certified reference material IRMM-801. The reaction attained steady state conversion in about five hours with an overall conversion of 92.5% for the olive oil major triacylglycerol POO. The five major TAG of the structured lipids produced with substrate mass ratio of 1:3 (Olive oil: fatty acid mixture) were close to that of the cocoa butter and with melting temperature ranges between 32.6 °C to 37.7 °C. The profile of the endothermic peaks shown in the thermo-gram indicated that the CBE can be easily recovered from the other structured TAG by control crystallization and separation.