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Title: Enrichment of sn-2 position of hazelnut oil with palmitic acid: Optimization by response surface methodology

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Abstract: Hazelnut oil was enriched with palmitic acid (PA) at the sn-2 position using PA (acidolysis) or ethyl palmitate (ester exchange) as the acyl donor using Novozym 435 and hexane. Optimizing reaction conditions using response surface methodology, independent variables were selected as substrate mole ratio (Sr: 4-6 mol/mol) and reaction time (t: 6-18 h). Responses were total PA content in the SL and at the sn-2 position. Reaction temperature was fixed at 65 degrees C and enzyme at 10 g/100 g. Optimal conditions were 17 h with substrate mole ratio of 6 mol/mol. Model verification under these conditions yielded 48.6 mol PA/100 mol total fatty acid (TFA) of which 35.5% was at the sn-2 position for milligram-scale production. However, gram-scale solvent-free reaction yielded 63.5 mol PA/100 mol TFA of which 71.1% was incorporated at the sn-2 position. After purification, the SL was analyzed for triacylglycerol molecular species and characterized. Tocopherol contents of the SL were 46, 19, 61, and 12 mu g/g for alpha-, beta-, gamma-, and delta-tocopherol, respectively. Melting range was wider and OSI values were lower for the SL The aim of this present work was to produce a SL to be used as human milk fat substitute after lost tocopherols are added back for stability. (C) 2012 Elsevier Ltd. All rights reserved.

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