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Title: Enzymatic Synthesis of Extra Virgin Olive Oil Based Infant Formula Fat Analogues Containing ARA and DHA: One-Stage and Two-Stage Syntheses

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Abstract: Structured lipids (SLs) with high palmitic acid content at the sn-2 position enriched with arachidonic acid (ARA) and docosahexaenoic acid (DHA) were produced using extra virgin olive oil, tripalmitin, ABA and DHA single cell oil free fatty acids. Four types of SLs were synthesized using immobilized lipases, Novozym 435 and Lipozyme TL IM, based on one-stage (one-pot) and two-stage (sequential) syntheses. The SLs were characterized for fatty acid profile, triacylglycerol (TAG) molecular species, melting and crystallization profiles, tocopherols, and phenolic compounds. All the SLs had >50 mol % palmitic acid at the sn-2 position. The predominant TAGs in all SLs were PPO and OPO. The total tocopherol content of SL1-1, SL1-2, SL2-1, and SL2-2 were 70.46, 68.79, 79.64, and 79.31 mu g/g, respectively. SL1-2 had the highest melting completion (42.0 degrees C) and crystallization onset (27.6 degrees C) temperatures. All the SLs produced in this study may be suitable as infant formula fat analogues.

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