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Simultaneous Extraction and Fractionation of Fish Oil from Tuna By-Product Using Supercritical Carbon Dioxide (SC-CO₂)

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ABSTRACT

Fish oil was extracted and simultaneously collected into six fractions based on molecular weight and the chain length of triglycerides in terms of fatty acid constituents without splitting of the triglycerides, using supercritical carbon dioxide (SC-CO₂) at optimized conditions of 40 MPa, 65°C, and a flow rate 3 mL min⁻¹. In each type of fractionation, the first fraction (F1) was rich in saturated fatty acids (SFA; 52.57 to 61.26%), followed by monounsaturated fatty acids (MUFA; 22.17 to 23.22%) and polyunsaturated fatty acids (PUFA; 0.54 to 20.37%); the sixth fraction (F6) was rich in PUFA (48.93%), followed by MUFA (33.59%) and SFA (13.61%). It was obvious that short-chain fatty acids were extracted at an earlier fraction; therefore, the latter fractions were dominant in long-chain fatty acids, especially MUFA and PUFA. Thus, omega-3 fish oil (last three fractions) was successfully separated to be used as a value-added health product.

KEYWORDS: Tuna by-product, fish oil, omega-3 fatty acids, fractionation, supercritical carbon dioxide (SC-CO₂)

Additional information

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