

# Abstract

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## Intestinal digestion of fish oils and $\omega$ -3 concentrates under *in vitro* conditions

Martin D, Nieto-Fuentes J, Señoráns F, Reglero G, Soler-Rivas C.

Facultad de Ciencias, Sección Departamental de Ciencias de la Alimentación, Universidad Autónoma de Madrid, Cantoblanco, Madrid, Spain.

**OBJECTIVE:** A comparative study of the *in vitro* bioaccessibility of  $\omega$ -3-oils (salmon oil, SO; tuna oil, TO; enriched- $\omega$ -3 oil as triacylglycerols (TAGs),  $\omega$ -3-TAG; and enriched- $\omega$ -3 oil as ethyl esters (EEs),  $\omega$ -3-EE) was performed after treatment with pancreatin (pancreatic lipase as major lipolytic enzyme) at pH 7.5.

**METHODS:** Aliquots were taken at different times of digestion for analyzing the evolution of lipid products. The micellar phase (MP) formed at 120 min of digestion was isolated, its total lipid content was extracted and its composition in lipid products was analyzed.

**RESULTS:** The rate of hydrolysis of  $\omega$ -3-TAG concentrates was continuous throughout the time of reaction (51% hydrolysis of TAGs at 120 min), whereas the digestion of SO and TO was initially faster but stopped after 10 min of reaction (35 and 38% hydrolysis of TAGs at 120 min of SO and TO, respectively). A poor hydrolysis of EEs took place for the  $\omega$ -3-EE oil (around 7% hydrolysis of EEs at 120 min). The MP of  $\omega$ -3-TAG oil, SO, and TO mainly consisted of free fatty acids (FFAs) and MAGs. The MP from digested  $\omega$ -3-EE oil consisted of FFAs and undigested EEs. Therefore, the highest degree of hydrolysis and inclusion of lipid products in the micellar structure was found for the  $\omega$ -3-TAG oil, but compared to fish oils long times of digestion were required.

**CONCLUSIONS:** This experience also shows for the first time the MP composition from  $\omega$ -3-concentrates in the form of EEs.