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A novel strategy for discriminating marine oils by using the positional distribution (*sn*-1, *sn*-2, *sn*-3) of omega-3 polyunsaturated fatty acids in triacylglycerols

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Abstract

A novel strategy for discriminating genuine and adulterated marine oils is proposed. The strategy consists of *i*) determining the stereospecific distribution (*sn*-1, *sn*-2 and *sn*-3) of omega 3 polyunsaturated fatty acids (ω-3 PUFA) on the backbone of triacylglycerols by using liquid chromatography tandem mass spectrometry; *ii*) transforming the qualitative stereospecific information into quantitative data by means of a novel strategy; *iii*) analyzing the transformed data by principal component analysis. The proposed strategy was tested on pure oils (seal, salmon, cod liver, sandeel, blue whiting, herring), a mixture of blue whiting, herring, sandeel and Norway pout and some intentionally adulterated oils. In addition, some published krill oil data were analysed to confirm the reliability of the new approach.

Keywords: Triacylglycerol; Positional distribution; Fish oil; Marine oil; Liquid chromatography mass spectrometry; adulteration

Introduction

The quality of marine oils may vary significantly according to the origins and the manufacture of the raw materials, and it is therefore essential to establish reliable analytical methods in order to carry out the quality assessment and authentication work on these kinds of products. Adulteration of marine oils is an old practice. The deliberated addition of low grade shark oil to cod liver oil was reported in 1904 [1]. Cod liver and halibut liver oils adulterated with fish

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