

Extended Abstract

Comparative Study on Unsaturated Fatty Acid Extraction Using Green Extraction Methods [†]

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1. Introduction

Polyunsaturated fatty acids (PUFA) have a preventive effect on high blood pressure, inflammation, and cancer [1]. The main polyunsaturated fatty acids are eicosapentaenoic acid (EPA, C20:5) and docosahexaenoic acid (DHA, C22:6).

In recent years, green extraction methods based on the use of alternative solvents and low energy consumption have been used to obtain high-quality products. These methods improve oil extraction yield, optimize extraction procedures and are recognized as a promising alternative to organic solvents and oil extraction grease [2]. These methods have many advantages, use nontoxic solvents, and the time for the extraction and separation process is faster and the lower temperature of the process is much safer.

In this context, this paper presents a comparative study regarding the extraction process (reflux extraction, classic extraction, and ultrasound-assisted extraction) of polyunsaturated fatty acids from different sources using different extraction methods.

2. Materials and Methods

Fish wastes were purchased from fish farms, and rapeseed as well as soybean seeds were purchased from a national seed producer, whereas ethanol and hexane grade were supplied by Scharlau (Barcelona, Spain). The analysis of active compounds was performed using GC–MS/MS TRIPLE QUAD (Agilent 7890 A).

The ultrasound-assisted extraction and reflux condenser was used for the unsaturated fatty acid extraction.

3. Results

To improve oil extraction yield and optimize extraction procedures, the influence of various parameters (solvent concentration, the ratio of solvent to solid, time, temperature) was studied. Fatty acid ethyl esters were synthesized to be enriched in and vitamins by molecular distillation.

The analysis of unsaturated fatty acid esters was performed using GC–MS/MS TRIPLE QUAD (Agilent 7890 A).

4. Conclusions

Regarding the composition of unsaturated fatty acids, fish oil contains the highest amount of eicosapentaenoic acid (EPA, C20:5) and docosahexaenoic acid (DHA, C22:6), while rapeseed oil contains a large amount of linolenic acid (ALA, 18:3). These compositions were obtained using hexane as the extraction solvent in the ultrasonic field.

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