



Valorizing fish canning industry by-products to produce ω -3 compounds and biodiesel



T. Lopes da Silva^{a,*}, A.R. Santos^a, R. Gomes^b, A. Reis^a

^a Unidade de Bioenergia, Laboratório Nacional de Energia e Geologia, Lisbon, Portugal

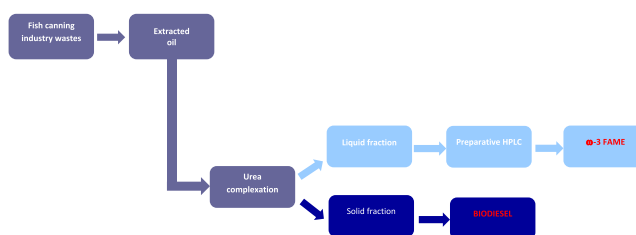
^b AllMicroalgae–Secil, Lisbon, Portugal

HIGHLIGHTS

- An inexpensive strategy was used to valorize fish canning industry by products.
- Urea complexation was more efficient than winterization.
- The solid fraction contained 79.94% (*w/w*) of saturated and monounsaturated FAME.
- The liquid fraction was further analysed by preparative HPLC analysis.
- After HPLC analysis, an oil fraction containing 89.25% EPA (*w/w*) was obtained.

GRAPHICAL ABSTRACT

FISH WASTES OIL VALORISATION FOR ω -3 COMPOUNDS AND BIODIESEL PRODUCTION



ARTICLE INFO

Article history:

Received 21 April 2017

Received in revised form 9 October 2017

Accepted 7 November 2017

Available online 15 November 2017

Keywords:

Fish canning wastes

Urea complexation

ω -3 compounds

Biodiesel

ABSTRACT

A novel, inexpensive strategy was used to valorize fish canning industry by-products, aiming at ω -3 compounds and biodiesel production. Winterization and urea complexation methods were used to fractionate the oil extracted from fish canning industry wastes. Urea complexation was the most efficient method, producing a liquid fraction with 99.99% (*w/w*) of polyunsaturated fatty acid methyl esters (FAME) when methanol was used as solvent, and a solid fraction with 79.94% (*w/w*) of saturated and monosaturated FAME when ethanol was used as solvent, which was considered a potential feedstock for biodiesel production. The liquid fraction was further analysed by preparative HPLC analysis, producing an oil fraction with 99.44% (*w/w*) ω -3 compounds, containing 89.25% eicosapentaenoic acid (EPA) (*w/w*). The method here described has an enormous potential for fish canning industry waste valorization as it is easily scale-up, foreseeing an environmentally sustainable society.

© 2017 Elsevier B.V. All rights reserved.

* Corresponding author.

E-mail address: teresa.lopesilva@lneg.pt (T. Lopes da Silva).