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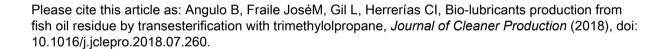
PII: S0959-6526(18)32249-2

DOI: 10.1016/j.jclepro.2018.07.260

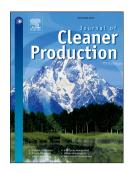
Reference: JCLP 13714

To appear in: Journal of Cleaner Production

Received Date: 12 April 2018 Revised Date: 25 July 2018 Accepted Date: 26 July 2018



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ACCEPTED MANUSCRIPT

Bio-lubricants production from fish oil residue by transesterification with trimethylolpropane

Beatriz Angulo, ^{a,b} José M. Fraile, *a Laura Gil^b and Clara I. Herrerías ^a

^a Instituto de Síntesis Química y Catálisis Homogénea (ISQCH), Facultad de Ciencias, CSIC-Universidad de Zaragoza, C/Pedro Cerbuna 12, E-50009 Zaragoza, Spain. E-

mail: jmfraile@unizar.es

^b Solutex GC, SL,, P. I. El Zafranar, E-50550 Mallén (Zaragoza), Spain

Abstract

The fatty acid ethyl esters mixture, a fish oil residue obtained after the extraction of omega-3 polyunsaturated fatty esters, has been converted into mixtures of mono-, di-, and triesters of trimethylolpropane by transesterification at 100-140°C under vacuum with sodium ethoxide as catalyst. This method has shown to be more efficient than the enzymatic transesterification using commercially available lipases. The crude reaction mixture (84% conversion of ethyl esters), enriched in trimethylolpropane triesters (96% selectivity) was characterized and its properties compared with those of the starting ethyl esters mixture and the trimethylolpropane esters obtained from vegetal sources.

Keywords: bio-lubricants; waste fish oil; transesterification; trimethylolpropane

Abbreviations

ASTM American Society for Testing and Materials

DE Diesters

DHA Docosahexaenoic acid
EPA Eicosapentaenoic acid

EtONa Sodium ethoxide

FAs Fatty Acids

FAEEs Fatty Acid Ethyl Esters
FAMEs Fatty Acid Methyl Esters

ISO International Standards Organization

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