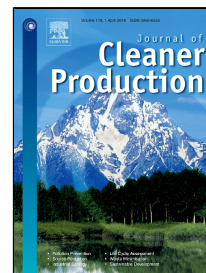


Accepted Manuscript

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PII: S0959-6526(18)30585-7
DOI: 10.1016/j.jclepro.2018.02.253
Reference: JCLP 12200
To appear in: *Journal of Cleaner Production*

Received Date: 30 October 2017
Revised Date: 13 February 2018
Accepted Date: 23 February 2018

Please cite this article as: Teresa M. Mata, Fábio Pinto, Nídia Caetano, António A. Martins, Economic and Environmental Analysis of Animal Fats Acidity Reduction by Enzymatic Esterification, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.02.253

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Amount of words? 7857

Economic and Environmental Analysis of Animal Fats Acidity Reduction by Enzymatic Esterification

Teresa M. Mata^{1*}, Fábio Pinto¹, Nídia Caetano^{1,2}, António A. Martins¹

¹*LEPABE, Faculty of Engineering-University of Porto (FEUP), R. Dr. Roberto Frias S/N, 4200-465 Porto, Portugal*

²*CIETI, School of Engineering (ISEP), Polytechnic Institute of Porto (IPP), R. Dr. António Bernardino de Almeida S/N, 4200-072 Porto, Portugal*

* *Corresponding author. Tel.: + 351 22 508 1467; Fax.: + 351 22 508 1449.*

E-mail address: tmata@fe.up.pt (T. Mata)

ABSTRACT

This study examines the economic potential of reducing the acidity of animal fats (fish oil, poultry and mammalian fats) by enzymatic esterification, when applied at industrial scale in a Portuguese company, and determines its carbon and water footprints as a measure of its potential environmental impact. Cost and revenue data were obtained from real industrial and commercial sources, complemented with literature and life cycle inventory data for the environmental impact calculations. Based on esterification experiments, for optimizing operating conditions and enzymes selection, two scenarios are analysed in this work, using ethanol 96 % (v/v) as reagent, and the following enzymes commercialized by Novozymes as catalyst: (1) *Lipozyme® CALB L* for fish oil and mammalian fat and *Novozym® 435* for poultry fat; (2) *Lipozyme® TL 100L* for fish oil and *Lecitase® Ultra* for mammalian fat. Results show that under current conditions the

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