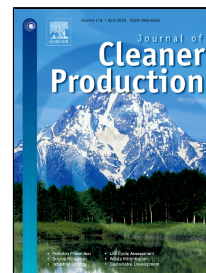


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Economic and Environmental Analysis of Animal Fats Acidity Reduction by Enzymatic Esterification

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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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