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ScienceDirect

Procedia Chemistry 14 (2015) 256 – 262

Procedia Chemistry

2nd Humboldt Kolleg in conjunction with International Conference on Natural Sciences, HK-ICONS 2014

Whole Cell Hydrolysis of Sardine (*Sardinella lemuru*) Oil Waste using *Mucor circinelloides* NRRL 1405 Immobilized in Poly-urethane Foam

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Abstract

Sardine (*Sardinella lemuru*) fish canning industries produce oil waste that can be potentially reused because of its omega-3 content. However, the majority of the omega-3 content are still bound to triacylglyceride form. The objective of this study is to determine optimum pH and temperature of hydrolysis process using lipase of whole-cell biocatalyst *Mucor circinelloides* immobilized in Poly-Urethane Foam (PUF). The optimum hydrolysis products were obtained at pH 7 and temperature 35 °C. The hydrolysis product at the optimum condition was fractionated using *Thin Layer Chromatograpy* (TLC). For further analysis, every fraction was extracted and esterified using Fatty Acid Methyl Ester (FAME) method. Fatty acid methyl ester were analyzed using Gas Chromatography (GC) to determine the omega-3 content. After hydolysis, GC result showed an increase in omega-3 (EPA and DHA) content as much as 12.56 % compared to the crude oil. However, total lipid was reduced, presumably by lipid consumption activity of fungus during the hydrolysis process, resulting in the lost of more than 80 % of total lipid in oil waste.

Peer-review under responsibility of the Scientific Committee of HK-ICONS 2014

Keywords : Fish oil; *Mucor circinelloides*; omega–3

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Peer-review under responsibility of the Scientific Committee of HK-ICONS 2014
doi:10.1016/j.proche.2015.03.036