

Transesterification of salmon oil to produce biofuel: Experimental design and process simulation

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Abstract

Waste oils are considered as a promising and sustainable source of raw materials in the biofuel industry. In recent years, research has been focused on the conversion of free fatty acids (FFAs) in fish oil to fatty acid methyl esters (FAMES) mainly through the transesterification reaction. The biodiesel produced from salmon wastes provides an alternative source of raw material for sustainable energy production, meeting the growing energy demand without damaging the environment. The aim of this work is to investigate biodiesel production from salmon oil through a complete experimental design of the transesterification process. The biodiesel production was carried out by a homogeneous alkaline transesterification process using methanol and potassium methylate as a catalyst. The salmon oil was transesterified and then the FAMES content was estimated using the peak areas of several FAMES peaks observed in the chromatogram using GC-MS/FID analysis. The experimental results were modelled through Aspen Plus software, where the salmon oil was reacted with methanol in the presence of a catalyst and the results were validated against the experimental data. This study demonstrated that the oil produced from salmon wastes showed suitable characteristics and is a promising source for sustainable biofuel production.