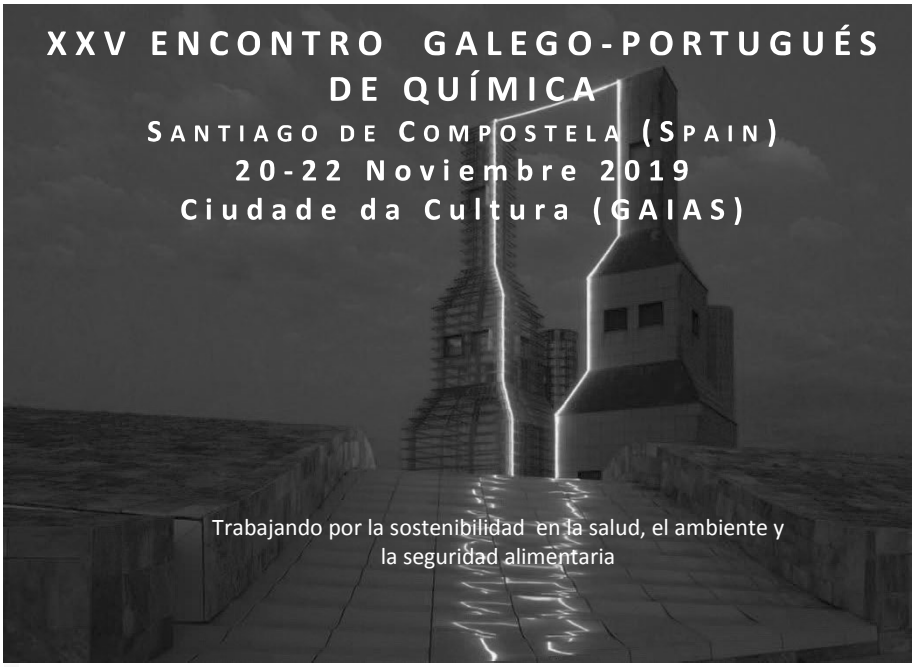

20 al 22 de noviembre de 2019

Edificio CINC. Ciudad de la Cultura

Santiago de Compostela-Galicia (España)

Colegio Oficial de Químicos de Galicia

SOCIEDADE PORTUGUESA DE QUÍMICA

ASOCIACIÓN DE QUÍMICOS DE GALICIA

XXV ENCONTRO GALEGO PORTUGUÉS DE QUÍMICA

XXV ENCONTRO GALEGO-PORTUGUÉS DE QUÍMICA

20 al 22 de noviembre de 2019

Edificio Cinc. Ciudad de la Cultura

Santiago de Compostela-Galicia (España)

Colegio Oficial de Químicos de Galicia

Sociedade Portuguesa de Química

Asociación de Químicos de Galicia

XXV ENCONTRO GALEGO-PORTUGUÉS DE QUÍMICA.
Noviembre 2019

Coordinador Editorial
Cristina Díaz Barral
Manuel Rodríguez Ménez

Edita
Colegio Oficial de Químicos de Galicia
Rúa Lisboa, nº 10, Local 31E – Edificio Área Central Fontiñas.
15707 Santiago de Compostela (A Coruña)
www.colquiga.org

Tirada
50 Ejemplares y 250 en formato digital

Imprime
OCERO
Sada (A Coruña)

Depósito Legal
VG699-2017

ISBN
978-84-09-16320-5

Este libro de comunicaciones y conferencias, presentadas en el XXV Encontro Galego-Portugués de Química, Colegio Oficial de Químicos de Galicia

Catalogación recomendada Libro de resúmenes del XXV Encontro Galego-Portugués de Química. Edificio Cinc. Ciudade da Cultura. Santiago de Compostela (España) 2019

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Production and Characterization of Biodiesel obtained by Transesterification Catalyzed by the Ionic Liquid Choline Hydroxide

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Biodiesel is a mixture of alkyl esters derived from vegetable oils or animal fat. It is a biodegradable and renewable fuel and does not contribute to the emission of polluting gases into the atmosphere, but its major disadvantage is its relative high cost usually regarding to production and raw materials costs [1].

Crude oils and fats extracted from plant and animal sources are alternatives to the use of highly polluting fossil fuels. They are composed of triglycerides which can be converted into biofuels through three different paths, cracking, esterification and transesterification, being the last one, the most common method. In transesterification processes, the alcohol most used is methanol due to its low cost and physicochemical properties. The transesterification reaction has glycerol as a byproduct which adds some value to the technology since it shows several potential applications in the industry [2]. The literature describes the alcoholysis of vegetable oils or animal fats in various ways using different types of catalysts: acids, bases and enzymes. Acid catalysis is used when the oil has a high concentration of free fatty acids, but it requires large amounts of alcohol and has a slow reaction velocity. Basic catalysis is about 4,000 times faster than acid catalysis and does not require large amounts of alcohol. The most commonly used basic catalysts are sodium or potassium hydroxide [2, 3]. The use of ionic liquids (IL) in catalytic processes has been studied mainly in the ecological field, as it allows a high recycling efficiency. IL based on the choline's cation (2-hydroxyethyl trimethylammonium) have received much attention in recent years. This fact is due, mainly to its biocompatibility characteristics and potential for various industrial applications, mainly choline hydroxide (ChOH) because of its good catalytic performance due to its good basicity in methanol solution, in addition to its successful reuse [4].

The parameters selected for the study of biodiesel production catalyzed by choline hydroxide IL were: reaction time, reaction temperature, molar ratio oil/methanol, catalyst charge, and catalyst recyclability. In this work, ChOH was synthesized, characterized and used as a catalyst in the production of biodiesel. The preliminary results showed that for a reaction time of 4 h, using a temperature of 60°C, a molar ratio oil/methanol of 1:10 and 10wt% of catalyst, using a waste cooking oil sample, it occurred the transesterification reaction with the synthesis of fatty acid methyl esters (FAME), which was confirmed by gas chromatography (GC-FID).

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