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Production of cellulosic ethanol and biodiesel in Brazil

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During years 2014/2015, an area of 9000 acres was planted with cane sugar in Brazil, which corresponds to 659 million tons of cane and that will produce 38 million tons of sugar and 28 billion liters of ethanol. Bioethanol is a renewable fuel and its consumption in Brazil is by blends of ethanol and gasoline (22%) or as single fuel for flex fuel vehicles. The increase in demand for this biofuel and to avoid the expansion area planted with sugarcane, which has been growing 3% per year, the cellulosic ethanol (2G ethanol) production is a promising alternative. The sugar and ethanol industry in 2014 generated about 155 million tons of straw and bagasse potentially capable of generating up sugar to produce 442 billion liters/year of ethanol. In October 2014, the first commercial-scale ethanol-2G plant (GranBio) has initiate with production capacity of 82 million liters of ethanol per year (21.6 million US gallons) in Alagoas, northeastern Brazil. The biodiesel or alkyl-esters produced by transesterification reactions between triglycerides and alcohol, is the second alternative biofuel in Brazil but the current production capacity meets only 170 million liters/year, which correspond to 17% of the demand, considering the mix B2. The raw materials used for biodiesel production has been the oils of palm, babassu, soybean and sunflower. Brazil currently has 89 biodiesel production plants spread across the country. Many of them use transesterification by methyl route. However, due to high production of ethanol in the country, the ethylic route has been proposed, associated with new catalysis methods such as enzyme and solid.

Green sustainable alternatives for the valorisation of glycerol: Upgrading to glycerol carbonate and solketal

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The boom of the biodiesel industry has led to a scenario in which a significant surplus of the by-product glycerol (Gly) has become available resulting in a pronounced drop of its price. For this reason, attention towards its use as a building block to yield new products has grown significantly. Two examples of these valuable new alternatives are glycerol carbonate (GC) and solketal (Sk). Owing to the features of GC, it has been put used as a green solvent in the degradation of lignocellulosic feedstock to fermentable sugars. Sk has been applied as an additive in gasoline and biodiesel. This communication deals with the reactions of Gly with organic carbonates (dimethyl and ethylene carbonate) to yield GC with a homogeneous reaction approach and Gly with acetone to yield Sk using sulphonic ion exchange resins heterogeneous catalysts. The influence of the operating variables (stirring rate, temperature, initial molar ratio of reactants and catalyst load) on the performance of the process will be assessed. The kinetics of these reactions will be presented together with the influence of the presence of a liquid-liquid biphasic system at the start of the reaction.