

Past and Present Research Systems of Green Chemistry

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Techno-economic evaluation of biodiesel production from vegetable soybean oil by methylic and waste cooking oil by ethylic routes

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Currently due to gradual depletion of world fossil fuels reserves, the continuous increase in energy demand and the impact of environmental pollution of increasing of greenhouse gas emissions that contributes to global warming, there is an urgent need to develop alternative energy resources, such as biodiesel. This biofuel is non-toxic and biodegradable, and it can be used along with conventional petroleum based fuels to create diesel/biodiesel blends seeking important reductions of the emission level of the pollutants. Biodiesel can be produced from oils and/or fats; however the raw materials costs can represent a large percent of the direct biodiesel production costs. Also, one alternative of reducing the biodiesel production costs is to use inexpensive feed stock such as animal fats (tallow) and waste cooking oil. Thus, in this work the techno-economic analyses were performed about biodiesel production using two different feed stocks such as soybean oil and waste cooking oil. The economic evaluations involved the assessment of capital investment, estimation of operating costs, and analysis of profitability for the biodiesel production. Although the process using soybean oil had the lowest fixed capital cost, the process using waste cooking oil was more economically feasible overall, providing a lower total manufacturing cost and a lower biodiesel price. On the basis of these economic calculations, sensitivity analyses for these processes were carried out. Plant capacity and prices of feedstock oils and biodiesel were found to be the most significant factors affecting the economic profitability of biodiesel manufacture.

Biography

Oselys Rodriguez Justo attained his PhD degree in 2003 in Chemical Engineering (in the Development of Biotechnological Processes area) at the State University of Campinas Brazil. At present he is working as Associate Professor at the Estácio de Sá University (UNESA). He has experience in the bioproducts and biofuels production for chemical, pharmaceutical and food industry. Among 2013-2014 he accomplished as Visiting Scholar in the Biological System Engineering at the Washington State University in thermochemical biomass transformation problems.

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