



INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

"KEY ELEMENTS FOR A SUSTAINABLE WORLD: ENERGY, WATER AND CLIMATE CHANGE"

Glycerol: An Innovative Energy Source from Biodiesel Production

B. R. L. Gonçalves ^a, L. Perez ^a, A. C. D. Ângelo ^a

a. Universidade Estadual Paulista, Bauru, brulopes@fc.unesp.br

a. Universidade Estadual Paulista, Bauru, lperez@fc.unesp.br

a. Universidade Estadual Paulista, Bauru, acangelo@fc.unesp.br

Abstract

The world concern on applying public policies focused mainly on environmental-friendly energy production is observed in a great deal nowadays. In this viewpoint biofuels assume an outstanding position since they present a large number of benefits and advantages when compared to the fossil ones. Among those benefits it is possible to point out the reducing emanation of gases responsible for the greenhouse effect, possibility of carry out regional, social and agricultural development and both in a sustainable way. Biodiesel is an example of biofuel that has been carried a great deal of effort to become applicable in the productive net. This fuel is obtained from biological and, consequently, renewable sources as vegetable oils and animal fat, and it presents a strong biodegradable characteristic. No less important, biodiesel produces a low amount of pollutant gases from its oxidation process and it can replace with advantages several fossil derivative compounds. Biodiesel is obtained from the transesterification reaction of distinct kind of oils that, under the action of a catalyst, chemically react with an alcohol (usually methanol or ethanol) producing esters (biodiesel) and glycerol as sub-product. Brazil has assumed a remarkable position in the world energy scenario with the biodiesel production and policy of use in its fleet on heavy duty vehicles. As a consequence of this policy (PROBIODIESEL) is it planned for the next decades a gradual addition of the biodiesel to regular diesel (up to 20% rich biodiesel fuel in 15 years). It can be easily predicted a real problem concerning the use of the waste glycerol from this growing demand of biodiesel. As a matter of fact, for each ton of produced biodiesel it is parallelly obtained 100kg of waste glycerol that can become an adverse result to the biodiesel economy. This paper proposes the use of waste glycerol from biodiesel production as a fuel in fuel cells. This highly promising proposal corresponds to the oxidation of this alcohol in a Direct Alcohol Fuel Cell. The reaction can potentially produce three times more energy than methanol under the same experimental conditions, with the additional advantages of non-flammability and non-volatility characteristics. In conclusion, the paper will discuss the state-of-the-art of this technology in the light of the future Brazilian bio-energy scenario.

Keywords: biofuel, biodiesel, glycerol, fuel cell
