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Low Cost Biodiesel Production Technology for Rural Regions

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Abstract

In plain 21st century constant energy supply is still a problem in some global regions, like rural communities along the Amazon river plains. These plains, inhabited mainly by small-scale landholders get their energy needs from old power generators run by Diesel during few hours per day. This not renewable fuel could easily be substituted by “green” Biodiesel produced from local oil crops. Biodiesel is chemically an ester, a chemical reaction product of an oil with, usually, a short chain alcohol like methanol or ethanol. These esters are chemically similar to petroleum Diesel and may substitute the latter in near future. Nowadays some governments like the Brazilian aim to reduce gradually the Diesel consumption by mixing Biodiesel in growing amounts to conventional Diesel, i.e. 2vol. % by end of 2007 (B2), and fully (B100) in the next 20 years. The Biodiesel production process demanding alcohol for the reaction is difficult to accomplish when adequate alcohol supply is a lack in the region of Biodiesel demand. In this case other technologies must be found to be able to produce Biodiesel with alcohol use like thermal separation of the oil compounds or “cracking”. The development of such a portable Biodiesel reactor using a catalytic vegetable oil cracking technology is done in the science laboratories of the CEULS/ULBRA in Santarém, adapting known technologies to local conditions in the eastern Para state region of Brazil. Oils of regional oil crops are used for the trials targeting using different temperature ranges for the thermal separation of oil compounds in a continuous process. The so produced Biodiesel could help small rural villages to produce their own fuel to feed the energy generators reducing fuel transportation costs for conventional, petroleum based Diesel.

Keywords: Biodiesel, Brazil, catalysis, oil-cracking reactor, Santarém, western Amazon