



RENEWABLE CETANE IMPROVER FROM GLYCERIN OF BIODIESEL

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The use of biofuels have being increasing globally in the last few years due to the search of alternative energy resources, obtaining less pollutant fuels. As a good example, it can be seen a significant number of countries compelling the mixture of biodiesel in the fossil diesel.

Glycerol, historically produced from propane via petrochemical route, is currently a biodiesel by-product. For every ton of biodiesel produced, 100kg of glycerol is also produced. Projections show that Brazil will produce 75,000 and 214,000 tons per year of glycerol in 2008 and 2013, respectively. Globally, the glycerol production will be 4.5 million tons in 2010.

Therefore, new uses for glycerol are being studied. Today, PETROBRAS uses 2-ethylhexyl nitrate (2-EHN) as cetane improver, witch is totally imported. The current PETROBRAS consumption is 14,000 tons per year and it is projected to be around 36,000 tons in 2009.

In this work, a new product will be presented based on glycerol as raw material. In the first step the glycerol the production of ethers, which could be used as cetane improvers, from glycerol and isobutylene presented if the FCC C4 cut, both feedstocks available in the PETROBRAS system, was studied using commercial acid resins as catalyts.

The glycerol molecule has three hydroxyl groups that can react totally or partially with isobutylene forming glycerol ethers. Thus, the formation of mono-, di- and tri-substituted ethers depends on the catalytic system and reaction conditions. The di-substituted ethers were nitrated and added to diesel for cetane number determination via Ignition Quality Test (IQT) by IR quantification.

The analysis of a sample with 500ppm of nitrated di-substituted ethers in the diesel fuel shows a significant increase in the cetane number from 43.9 (diesel without additives) to 47.3. A sample with 500ppm of commercial 2-EHN was also tested, resulting in a cetane number of 49.6.