

Easy to use IR methodology for screening additives into biofuels

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Biodiesel is the main partial substitute for petrodiesel. Some biodiesels have low oxidative stability. To solve or minimize this problem, some compounds have been added to biodiesel as antioxidants. Phenolic compounds are common antioxidants used by the vegetable oil industries. There are studies examining commercial antioxidants that are already being used in biodiesel: Baynox® plus (2,2'-methylene-bis-(4-methyl-6-tert-butylphenol); N,N'-di-sec-butyl-p-phenylenediamine, PDA) and seven phenolic antioxidants, including butylated hydroxyanisole (BHA); butylated hydroxytoluene (BHT); 2,5-di-tert-butylhydroquinone (DTBHQ); 2,2'-methylene-bis-(4-methyl-6-tert-butylphenol) (MBMTBP); PG; pyrogallol (PY); and Tert butylhydroquinone (TBHQ). However, few studies have reported on the efficiency of aromatic amines used as antioxidants. One of the most efficient classes of compounds used for this is aromatic diamines because of their high antioxidant capacity at low concentration. The advantage of using amines is that this functional group does not often appear as a natural antioxidant in vegetable oils; therefore, these compounds can be used as artificial markers in biodiesel industries. Aromatic diamines can be used as artificial markers. It is sometimes necessary to determine the concentration of antioxidants in biodiesel after long storage times or to control quality. An easy to use spectrophotometric methodology was employed in this work to determine the concentration of aromatic diamines (0 to 500 ppm). We tested a use of this method as screening method based on IR spectroscopy, to identify antioxidant (phenolic and aromatic) into biofuel. Five calibration curves were constructed using 3 absorption frequencies from the infrared spectra of the samples. The standard deviation, correlation coefficient, linearity range, limit of detection and limit of quantification were determined. The better results from the easy to use method (814 cm^{-1}) show a linear range of 0–100 ppm with a strong correlation ($R^2 = 0.9966$) and a limit of quantification of 21.6 ppm

Biography

Luciano N. Batista has completed his Msc degree at the age of 27 years from Federal University of Rio de Janeiro. Was Coordinator of Environmental Science Course of Cabo Frio Polytechnic Institute. Working at Central Laboratory of Public Health Noel Nutels with Water Analysis promoting several courses. Authors of Two book Chapters about Biodiesel and glycerol use.

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