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Simultaneous determination of quality parameters in biodiesel/diesel blends using synchronous fluorescence and multivariate analysis

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Abstract

An analytical method was developed to determine four quality parameters (Biodiesel percentage, Cetane Number, Heat of Combustion Gross and Color) in biodiesel/diesel blends through a simple synchronous fluorescence spectrum of the samples.
For this purpose, chemometrics models based on fluorescence spectra and PetroSpect data obtained from mixtures of biodiesel/diesel were built.
A variable selection by the successive projections algorithm (SPA) was used in order to obtain simple multiple linear regression (MLR) models based on a small subset of wavelengths.
The SPA-MLR results were compared with a partial least squares (PLS) full spectrum regression.
The best values found for the root mean square error of prediction using external validation were 0.37% (w/w) for the biodiesel in diesel, 0.5 for cetane number, 0.013 MJ/kg for heat of combustion and 0.1 for color.

Biography

Matías Insausti, is a doctoral student in chemistry at INQUISUR-UNS-CONICET, who has developed automatized methods of analysis and using Chemometric techniques on different parameters about the Biofuel quality. His doctoral thesis deal with quality of Biodiesel and he has published four papers, he was working on his thesis from September of 2010. Dr. Beatriz S. Fernández Band is the leader of the thesis; she is full professor in this University.