Abstract

Quali-quantitative determination of synthetic antioxidants in biodiesel

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The EU has published specifications on biodiesel properties, particularly concerning the 6 hour limit of the induction period determined according to the EN.14112:2003 method. Many biodiesel samples naturally fulfill this requirement but we considered the possibility that some synthetic antioxidants could be added in order to increase the fuel oxidation stability.

With the EU Research Project BIOSTAB in our Institute we have developed a proposal for an analytical method for the quali-quantitative simultaneous determination of six different synthetic antioxidants by means of HPLC.

The analytical protocol is based upon the use of a C8 – Reverse Phase column, 150 mm length. After a simple dilution of biodiesel in methanol the sample is injected into a HPLC system equipped with a UV detection set at 254 and 280 nm. The duration of the test is approx. 40 minutes. Some data regarding repeatability on real additivated samples are here reported. These data are located in a more than acceptable range for all test antioxidants, with the only exception of data obtained with ascorbyl palmitate. For this antioxidant a problem was revealed concerning its stability in both sample preparations and in the HPLC analysis of the reference solution and sample solution. However this suggested method is capable of detecting the presence of some synthetic antioxidants in biodiesel and to evaluate their concentration.

Key words: antioxidant, biodiesel, biofuel, liquid chromatography, oxidation stability