

Thermal stability of fatty acid methyl esters in supercritical methanol

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In this study, the kinetic analysis of thermal decomposition of fatty acid methyl esters (FAMEs) in supercritical methanol has been studied using nonisothermal weight loss technique with various heating rates. In order to determine the thermal stability order, the average activation energies at a fixed degree of conversion were calculated and compared with one another. As the reaction temperature increased, pyrolysis and isomerization of FAMEs were detected by identifying the degradation products. It was found that the more saturated FAMEs resulted in the higher thermal stability in supercritical methanol. From the results, the transesterification of vegetable oils in supercritical methanol should be carried out under the temperature at which thermal decomposition of FAMEs doesn't occur, for the sake of high-quality biodiesel production.