

Characterization of hydrotreated biodiesel (HBD) using GC x GC-TOFMS and reaction pathway of catalytic deoxygenation of triglycerides

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The hydrotreated biodiesel (HBD) from natural triglycerides is a promising renewable fuel because of its similar chemical and physical properties to petroleum diesel. However, complexity and variety of chemical species produced from the natural triglycerides have led to difficulties in analyzing product composition and in investigating reaction pathways. Moreover, studies on reaction pathway using model compounds of triglyceride, e.g. free-fatty acid, have shown inevitable discrepancy in the product from the natural triglycerides. GC x GC-TOFMS technique could segmentalize individual peaks on 2D chromatograms to facilitate deep analyses of reaction products and reaction intermediates. In the present study, hydrodeoxygenation from soybean oil using various catalysts including CoMo/Al₂O₃, NiMo/Al₂O₃, Ni/SiO₂-Al₂O₃, Pd/Al₂O₃ under various reaction conditions was carried out. Reaction pathways were proposed for the deoxygenation of soybean oil based on the statistical investigation of chromatograms obtained by using GC x GC-TOFMS.