

One-pot process for high-quality biodiesel production from highly unsaturated feedstock via simultaneous transesterification and partial hydrogenation in supercritical methanol

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In this study, a supercritical one-pot process combining transesterification and partial hydrogenation was developed for high-quality biodiesel production from highly unsaturated feedstock. Simultaneous transesterification of soybean oil and partial hydrogenation of polyunsaturated compounds over Cu catalyst in supercritical methanol was performed. Hydrogenation proceeded simultaneously during the transesterification of soybean oil in supercritical methanol, and hydrogenation occurred during the reaction despite the absence of hydrogen gas. Further, the polyunsaturated methyl esters obtained in the biodiesel were mainly converted to monounsaturated methyl esters by partial hydrogenation. From these results, it is clear that the proposed supercritical one-pot process successfully produced high-quality biodiesel in the absence of hydrogen.