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In situ transesterification of wet activated sludge under subcritical conditions

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Commercial production of biodiesel uses refined vegetable as feedstock with base as the catalyst. However, pure vegetable oil contributes up to 80% of the overall biodiesel production cost. Activated sludge is a rich source of lipid and a potential feedstock for biodiesel production. It was estimated that drying constitutes about 50% of the cost of biodiesel production from wet activated sludge. In this study, wet activated sludge was directly used as feedstock to react with methanol under subcritical water condition. At 250°C and a methanol to wet sludge ratio of 3.0 mL/g, a fatty acid methyl ester (FAME) yield of 33% can be achieved in 4 h. Acetic acid was employed as a catalyst to improve FAME yield as well as to decrease the amount of methanol and reaction time to 2.25 mL/g and 1 h, respectively required to reach the same FAME yield (33%). This process can be applied to maximize biodiesel conversion of feedstock with high FFA and moisture contents.

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