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Bio-oil production from dry sewage sludge by fast pyrolysis in an electrically-heated fluidized bed reactor

Renato O Arazo

University of Science and Technology of Southern Philippines, Philippines

The optimization of bio-oil produced from sewage sludge using fast pyrolysis in a fluidized bed reactor was investigated. Effects of temperature, sludge particle size and vapor residence time on bio-oil properties, such as yield, high heating value (HHV) and moisture content were evaluated through experimental and statistical analyses. Characterization of the pyrolysis products (bio-oil and biogas) was also done. Optimum conditions produced a bio-oil product with an HHV that is nearly twice as much as lignocellulosic-derived bio-oil, and with properties comparable to heavy fuel oil. Contrary to generally acidic bio-oil, the sludge-derived bio-oil has almost neutral pH which could minimize the pipeline and engine corrosions. The Fourier Transform Infrared and gas-chromatography and mass spectrometry analyses of bio-oil showed a dominant presence of gasoline-like compounds. These results demonstrate that fast pyrolysis of sewage sludge from domestic wastewater treatment plant is a favorable technology to produce biofuels for various applications.

Biography

Renato O Arazo has completed his PhD in Environmental Engineering from the University of the Philippines Diliman Quezon City. In the course of his Doctorate, he was sent by the Philippine Government to Texas A&M University for a PhD Sandwich Program to specialize in biofuel and bioenergy. He is currently the Director of Project Development Office of his university – the University of Science and Technology of Southern Philippines. He has published more than 10 papers in reputed journals and has been serving as reviewer of some ISI journals.

roarazo@yahoo.com

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