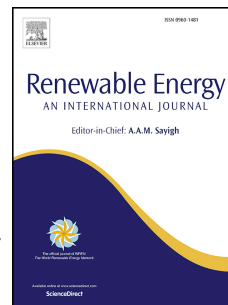


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ABSTRACT

Catalysts C₆₀₀, C₇₀₀, and C₈₀₀ prepared from Ca(CH₃COO)₂ calcination at 600, 700, and 800 °C, respectively, were characterized with an X-ray diffractometer, scanning electron microscope, and specific surface area analyzer. Over the catalysts, bio-oils (BOs) were obtained by the supercritical ethanolysis (SCE) of wheat stalk powder (WSP). Their yields, ultimate analyses, chemical composition and some fuel properties were investigated. WSP and the residues from the SCE of WSP were analyzed with a Fourier transform infrared spectrometer. The results show that C₇₀₀ has a small particle size and large specific surface area, and can effectively catalyze the SCE of WSP. The BO yields from non-catalytic, C₆₀₀-, C₇₀₀-, and C₈₀₀-catalyzed SCE of WSP are 30.1, 22.9, 70.7 and 34.4%, respectively. BO₇₀₀ from C₇₀₀-catalyzed SCE of WSP has relatively higher H/C and H/O ratios and calorific value but lower acidity, kinematic viscosity, and water content. The relative content of alcohols in the BO obviously increased, while the contents of carboxylic acids, ethyl esters, and anhydrides decreased over C₇₀₀.

Keywords: wheat stalk; supercritical ethanol; calcium oxide; bio-oil

1. Introduction

As both renewable energy and chemical feedstock, biomass is the best to replace nonrenewable

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