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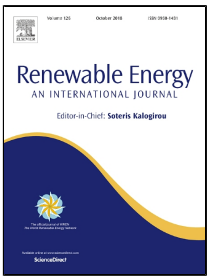

Co-pyrolysis of cotton stalk and waste tire with a focus on liquid yield quantity and quality

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Co-pyrolysis of cotton stalk and waste tire with a focus on liquid yield quantity and quality

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Abstract:

In this study, effect of waste tire (WT) addition to cotton stalk (CS) pyrolysis is investigated with a focus on liquid co-pyrolysis yield quantity and quality. Various blend ratios (i.e. CS/WT 1:0, 4:1, 3:2, 2:3, 0:1) of the two feedstocks were experimented in a fixed bed reactor at 20°C/min heating ramp rate up to 550°C with 50ml/min flowrate of nitrogen as sweeping gas. Blend ratio CS/WT (2:3) showed maximum oil yield (48 wt%) with organic phase (OP) above 78 wt% of the total liquid yield (OP + aqueous phase, AP). OP of CS/WT (2:3) along with those of CS/WT (1:0) and (0:1) were further analyzed qualitatively using analytical techniques including, FTIR, GC-MS, bomb calorimetry and elemental analyzer. Significant increase in carbon and decrease in oxygen content of the CS/WT (2:3) pyrolytic oil was observed which improved its calorific value to 41MJ/kg. Among the three OP samples, only CS/WT (2:3) oil showed significant presence of alkanes in GC-MS results, which is, thus, associated with the synergistic effect of the co-pyrolysis