

Impact of the composition of kitchen waste for biofuel production under hydrothermal liquefaction condition

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Kitchen waste (KW) are interesting resources of bio-oil production because of their high content of organic matter. Hydrothermal liquefaction (HTL) seems to be a more suitable process since these wastes have a high moisture content. KW result in more than 30 wt.% of crude bio-oil yield with high HHV (>35 MJ/kg) using hydrothermal liquefaction. Thus HTL is identified to be a promising technology for bio-oil production. Carbohydrates, proteins, lipids, and inorganic minerals are the main components of KW and the main sources of the oil products during the HTL process. Due to the high variability and different conversion rate of these components in HTL, it is hard to predict or control the yield and quality of oil products obtained from different KW sources. In this research, the characteristic of bio-oil products obtained from HTL of real KW and optimization of the reaction parameters are studied and compared to simulated KW. 43~46wt.% of bio-oil were produced at 300~360°C, and the gas oil fraction of the bio-oil was over 50wt.%. Simulated KW (a mixture of starch, tryptone, and rapeseed oil) in binary and ternary mixtures was used to study the interactions. The interaction of carbohydrate and protein presents a significant effect, resulting in an increase of 11.1wt.% on bio-oil yield, and a decrease of 10.0wt.% on char yield, respectively. Finally, the interaction method seems to be useful to predict the bio-oil yield from the model compounds, with less than 1wt.% of absolute difference with experiments, while the char yield is slightly higher than the predicted value.

Biography

Elsa Weiss-Hortala is Assistant Professor at IMT Mines Albi in the field of energy and environment issues. She has completed her PhD in 2006, after obtaining a Masters in Chemical Engineering, Chemistry and Materials Science. She is involved in research projects dealing with carbon materials, using wet and dry thermochemical processes. She is currently a member of the WasteEng Organising Committee (International conferences on Waste and Biomass Valorization) and is Vice-President of ETRA (European Tyre Recycling Association) for pyrolysis aspects. She published more than 25 papers in peer-reviewed journals.

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