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Caroline Carriel Schmitt
Renata Moreira
Renato Cruz Neves
Daniel Richter
Axel Funke
Klauss Raffelt
Jan-Dierk Grunwaldt
Nicolaus Dahmen

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Instituto de Pesquisas Tecnológicas do Estado de São Paulo S/A - IPT
Av. Prof. Almeida Prado, 532 | Cidade Universitária ou
Caixa Postal 0141 | CEP 01064-970
São Paulo | SP | Brasil | CEP 05508-901
Tel 11 3767 4374/4000 | Fax 11 3767-4099

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Carriel Schmitt, Caroline[1,*]; Moreira, Renata[2]; Cruz Neves, Renato[3]; Richter, Daniel[1]; Funke, Axel[1]; Raffelt, Klaus[1]; Grunwaldt, Jan-Dierk[1,4]; Dahmen, Nicolaus[1]

[1]*Institute of Catalysis Research and Technology, Karlsruhe Institute of Technology, Karlsruhe, Germany*

[2]*Fuels and Lubricants Laboratory, Instituto de Pesquisas Tecnológicas, São Paulo, Brazil*

3 Brazilian Bioethanol Science and Technology Laboratory, Campinas, Brazil

**Corresponding author. E-mail:* caroline.schmitt@partner.kit.edu

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Sugarcane is one of the main crops for production of ethanol and sugar worldwide. Around 1.6 billion tons are annually produced, resulting in 448 million tons of sugarcane bagasse as by-product. Brazil alone generates 178 million tons of bagasse due to the 635.51 million tons of sugarcane produced per year [1].

The integration of a 2nd generation thermochemical conversion unit in the sugarcane biorefinery for bagasse valorization shows many advantages: Differently from other types of biomass, collection and transportation are not required; decentralized conversion and transportation of pyrolysis oil usually proposed for other crops is also not necessary, due to the fact that sugarcane bagasse is already centralized in the refinery [2], [3]. Additionally, the high lignin content, considered a limitation for other conversion routes, makes fast pyrolysis an interesting conversion technology, due to the high number of functionalized aromatic products and hydrocarbons which can be obtained [4].

Considering the limited data regarding the valorization of sugarcane bagasse by fast pyrolysis, followed by catalytic upgrading, the present work combines sugarcane bagasse characterization, thermochemical conversion, and catalytic hydrotreatment of the pyrolysis oil comparing two nickel-based catalysts, both successfully tested for other types of pyrolysis-oil in our previous studies.

High yields of pyrolysis oil could be obtained (48.7 % dry basis) by fast pyrolysis, mainly attributed to the low moisture, potassium and sulfur contents, despite the high ash concentration in the sugarcane bagasse.

Oils with improved properties, i.e. low water and oxygen content, could be obtained after hydrotreatment. Reactions conducted with Ni/SiO_2, resulted in upgraded oil with 8.3% water and 20.74% of oxygen. The higher heating value increased 63% in

comparison to bagasse. Distinct selectivities were observed for both catalysts.

Higher hydrogenation and higher conversion of organic acids was obtained with Ni-Cr/SiO_2, whereas higher conversion of aromatics was observed with Ni/SiO_2.

In summary, sugarcane bagasse is a suitable feedstock for pyrolysis followed by hydrotreatment. An overall yield of 30.5 wt.% of upgraded products in regard to the biomass feedstock was obtained. Due to the molecular weight and higher viscosity compared to pyrolysis-oil, further studies should consider to reduce polymerization of upgraded products.

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