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Title: Subcritical water hydrolysis of sugarcane bagasse: An approach on solid residues characterization

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1 **Subcritical water hydrolysis of sugarcane bagasse: an approach on solid residues**
2 **characterization**

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11

12 **Abstract**

13 Reducing sugars obtained from sugarcane bagasse, as a waste biomass energy
14 precursor, can be further transformed into fuel alcohol by fermentation or gaseous fuel
15 by gasification. In this work, subcritical water process was used as an environmentally
16 friendly solvent for the hydrolysis of sugarcane bagasse with the aim of producing
17 reducing sugars using residue bagasse from a sugarcane biorefinery. Hydrolysis in
18 subcritical water performance was studied under semi-continuous unit conditions in a
19 110 mL reactor. Hydrolysis was carried out using different sample loadings (3 and 5 g),
20 flow-rates (9 and 12.5 mL min⁻¹), temperatures (100, 150, 200 and 250 °C) and
21 pressures (5, 10, 15 MPa). The highest reducing sugar yields were obtained at
22 temperature above 200 °C, with the highest reducing sugar yield reaching 15.5%.
23 Scanning electron microscopy was used to analyze the sugarcane bagasse undergoing
24 hydrolysis. Diffuse reflectance infrared spectroscopy was used to characterize the
25 residual solids, with results consistent with the removal of hemicellulose during
26 hydrolysis.

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