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Characterization of hydrochars produced by hydrothermal carbonization of rice husk

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Abstract. Biochar is the carbon-rich product obtained when biomass, such as wood, manure or leaves, is heated in a closed container with little or no available air. In more technical terms, biochar is produced by so-called thermal decomposition of organic material under limited supply of oxygen (O₂), and at relatively low temperatures (< 700 °C). Hydrochar differentiates from biochar because it is produced in an aqueous environment, at lower temperatures and longer retention times. This work describes the production of hydrochar from rice husks using a simple, safe and environmentally friendly experimental set-up, previously used for degradation of various wastewaters. Hydrochars were obtained at 200 °C and 300 °C and at residence

times ranging from 2 to 16 h. All samples were then characterized in terms of yield, surface area, pH, conductivity and elemental analysis, and two of them were selected for further testing with respect to heating values and heavy metal content. The surface area was low for all hydrochars, indicating that porous structure was not developed during treatment. The hydrochar obtained at 300 °C and 6 h residence times showed a predicted higher heating value of 17.8 MJ kg⁻¹, a fixed carbon content of 46.5% and a fixed carbon recovery of 113%, indicating a promising behaviour as a fuel.

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