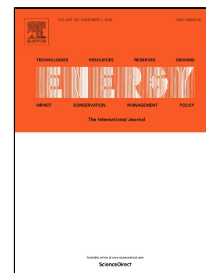


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# Comparison study on fuel properties of hydrochars produced from corn stalk and corn stalk digestate

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**Abstract:** In this study, hydrothermal carbonization (HTC) was employed to upgrade the fuel quality of corn stalk digestate (CSD) ranged from 190 to 240 °C. Meanwhile, a comparison of corn stalk (CS) was investigated to explore the effects of anaerobic digestion (AD) on the fuel property and combustion behavior of hydrochars. The results showed that the HTC increased the carbon content and heating value of hydrochars while decreased the alkali and alkaline earth metals (AAEMs) content and hydrophilicity. Compared to CS, the CSD showed higher low-temperature HTC activity, but lower sensitivity to temperature changes. The improvement of fuel properties on CSD was limited with the HTC temperature increasing. The thermogravimetric analysis displayed the relative low temperature HTC (190 and 215 °C) improved the combustion of CSD, while 240 °C was appropriate for CS. FTIR and SEM analyses confirmed the aromatization and formations of spherical particles in CS hydrochars obtained at 240°C, respectively, but was not observed in CSD hydrochars. The AD process weakened the pyrolysis-like reaction of cellulose in HTC. Considering the energy balance and

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Abbreviations: CS, corn stalk; CSD, corn stalk digestate; CH, corn stalk hydrochar; DH, corn stalk digestate hydrochar; HTC, hydrothermal carbonization; AD, anaerobic digestion.

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