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HYDROTHERMAL CARBONIZATION OF SLUDGE DIGESTATE – OPTIMIZATION FOR ENERGY APPLICATION

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Abstract – Anaerobic sludge digestate (SD), a by-product of anaerobic digestion, can be used as fuel. However, the high moisture content and poor dewatering properties makes SD unfit for direct energy applications such as combustion and thermal gasification. Hydrothermal carbonisation (HTC) process, which uses water as a reaction medium, is a suitable pretreatment method to enhance the dewatering and fuel properties of SD. Hydrochar (HC) obtained after HTC of SD can be used to substitute some fraction of coal for various energy applications. In the present study, HTC of SD was performed using design of experiment (DoE) approach and the reaction conditions were varied from 158–242 °C and ~10–138 min, respectively. Dewatering assessment of the treated slurry showed that a minimum reaction temperature of 190°C for 34 min was required to substantially improve digestate’s dewaterability. Thermogravimetric analysis revealed enhanced fuel properties of HC compared to initial feedstock.

Keywords – *Design of experiment; hydrothermal carbonization; sewage sludge; sludge digestate; waste to energy*