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Hydrothermal carbonization of stabilized sludge and meat and bone meal

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[fulltext]

Hydrothermal carbonization is one of suitable methods for energy recovery of sewage sludge and meat and bone meal. The task of the article is to determine appropriate hydrothermal carbonization process conditions and their impact on the quality of the final product – so called biochar or hydrochar. Parameters of the two main phases – initiation and polymerization – were monitored. The basic fuel properties of the final solid products of hydrothermal carbonization were determined. To produce biochar by hydrothermal carbonization, multifunctional pressure vessel with accessories was used – a batch reactor BR-300. Process parameters of hydrothermal carbonization confirm the effect of increasing temperature to increase the lower heating value (LHV). Neither calorific values of meat and bone meal (17.22 MJ/kg), nor calorific values of digested stabilized sludge (12.14 MJ/kg) showed a significant increase after undergoing processing. The effect of reaction temperature on the LHV of the final product is significantly higher than that of residence time. The results show that the main factor affecting LHV of the fuel sample is the final amount of ash.

Unlike the meat and bone the hydrothermal carbonization of the stabilized wastewater sludge is one of the effective processing methods for subsequent energy use.

Keywords:

biochar; hydrochar; wet pyrolysis; biomass; heating value; stoichiometry

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