SLUDGE DERIVED BIOCHAR IN BIOGAS PRODUCTION

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Project website: https://www.hamk.fi/rahi/

Background and aims

The introduction of novel treatment methods is considered necessary in order to find new and long-term solutions for the utilization of sewage sludge.

The pyrolysis of sewage sludge is one solution of the future. The end product of the process is a very stable charcoal-like sludge char, which can be utilized in the AD of municipal biowaste. **The aim of the study was to:**

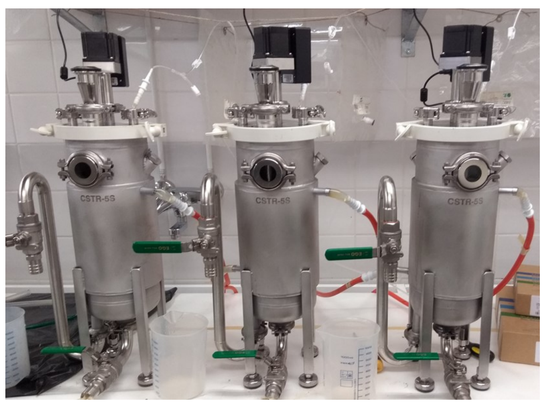
1. demonstrate the effects of the addition of the Fe-rich sludge biochar on the AD of municipal biowaste
2. to distinguish between the addition of the Fe-rich sludge biochar (from the pyrolysis of sewage sludge digestate) and the addition of the biowaste char (from the pyrolysis of biowaste digestate)
3. to conduct a preliminary survey on the amount of the added sludge biochar needed to achieve the effects.

Material and methods

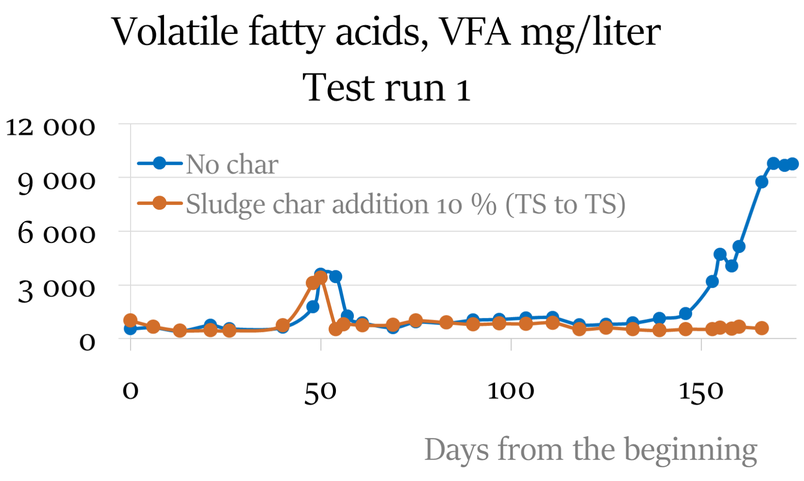
The addition of the Fe-rich sludge biochar on the AD of municipal biowaste was tested in three separate test runs of six, seven and ten months.

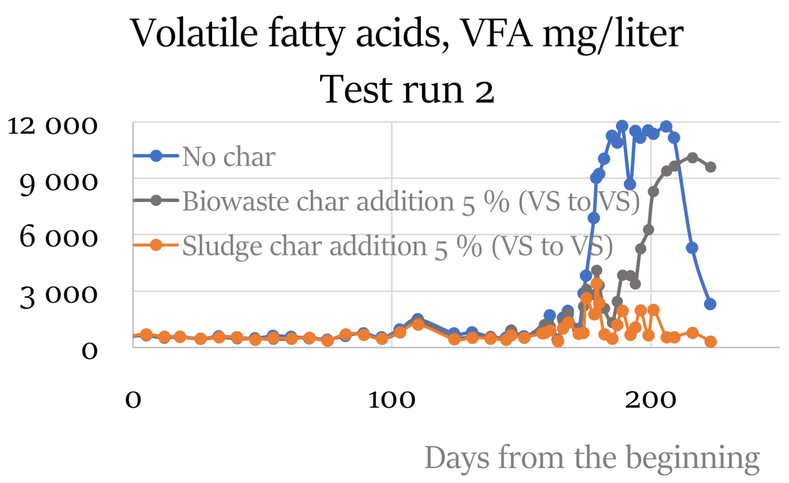
The 5-liter CSTRs was fed five times a week. The biogas production and the content of the biogas was measured regularly.

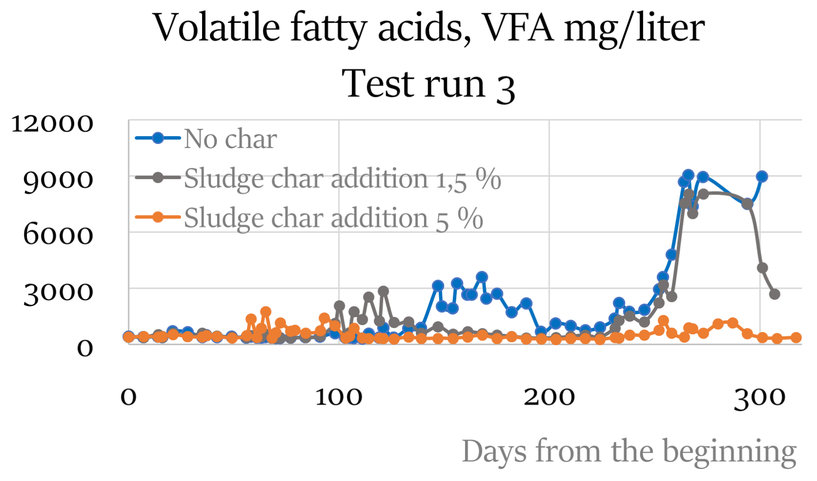
The digested sludge was analyzed regularly: pH, alkalinity, volatile fatty acids VFA, TS, VS, COD soluble, ammonia and total nitrogen.

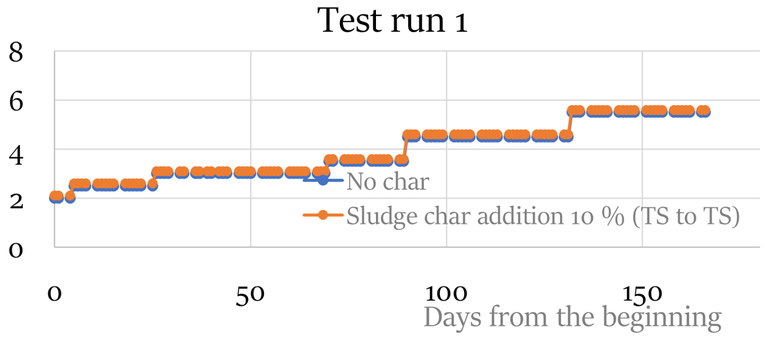


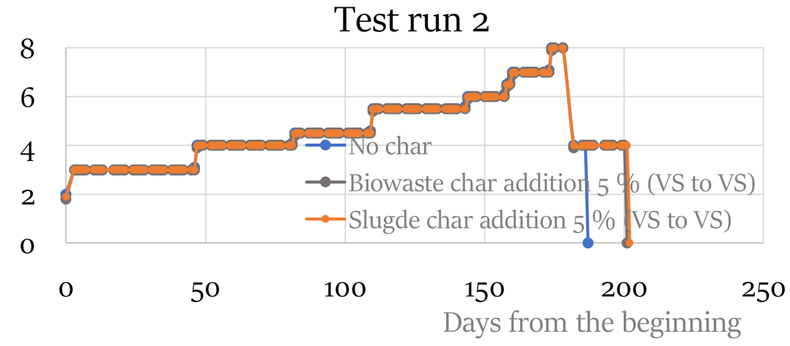
Results

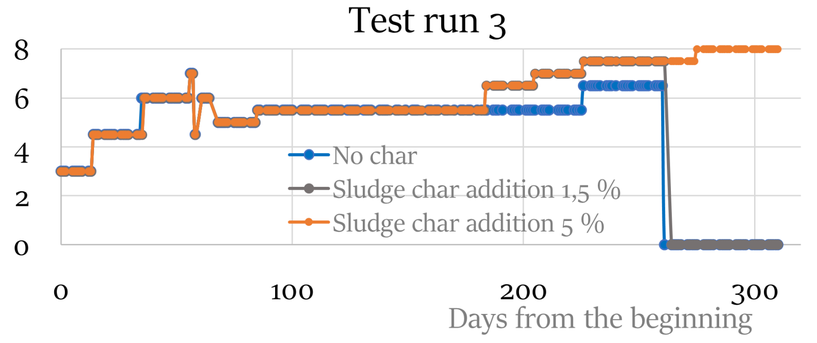


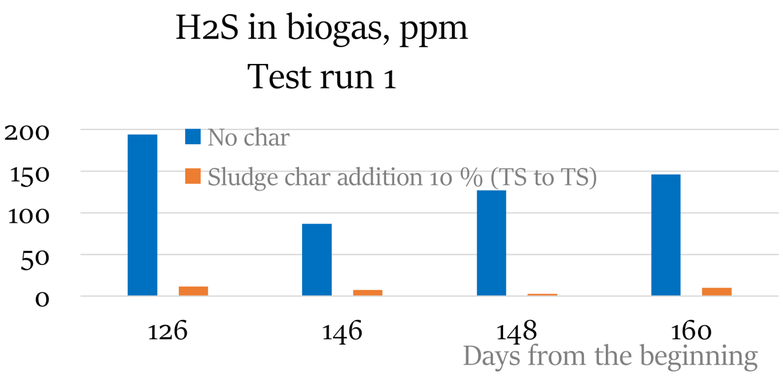


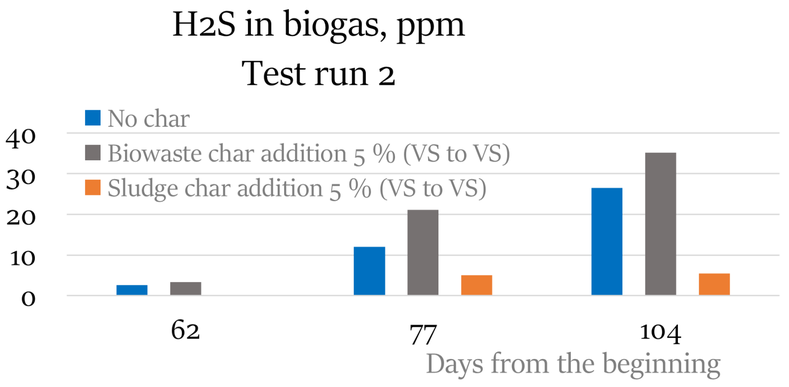


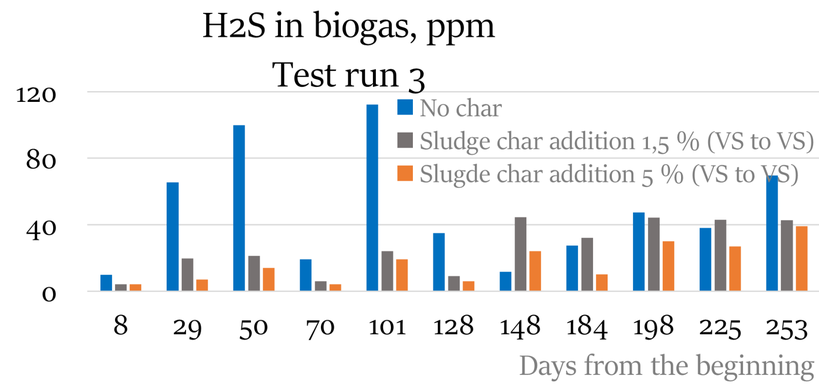












Based on VFA results, sludge biochar addition clearly increased the stability of the AD process of municipal biowaste. An addition of 5 % of sludge char to AD process was efficient enough while 1,5 % was not. No effect on methane content of biogas was observed while H_2S concentrations were lower following sludge biochar addition.

A high Fe content in sludge char probably limited H_2S concentrations in biogas.

Acknowledgements

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