

VACUUM DISINTEGRATION OF ANAEROBIC BIOGAS DIGESTATE

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ABSTRACT

Activated sludge produced by treatment is a valuable biomass resource in wastewater treatment plants. The organic substances contained in the activated sludge are converted into biogas by the anaerobic digestion process.

In this study, the biogas production potential of digestate was investigated with constant temperature, constant pressure, and constant mixing. It has been observed that vacuum application provides both high disintegration efficiency and increases the amount of biogas produced.

The amount of sCOD and methane to be composed of digestate and WAS samples were compared with using a vacuum application. An average of $57\pm 8\%$ sCOD increase was observed in the experiment with digestate. In the experiment with WAS, an average increase of $326\pm 8\%$ sCOD was observed. Therefore, based on the increase in sCOD, it is concluded that the increase in methane production was similar to sCOD.

As a result of this study, it has been observed that vacuum application increases the amount of sCOD in active sludge and accelerates hydrolysis. With the acceleration of the hydrolysis process, the heating cost of the reactor was reduced as the reactor's SRT decreased. This cost could not be compared with a pilot scale facility because energy losses must be calculated to compare them.

This study shows that the SRT will decrease with the application of vacuum in anaerobic digestion plants, so the amount of energy spent decreases and renewable energy can be produced from biomass. Disposal of biomass is a major problem. Since this biomass will be used in energy production harmless to the environment and nature, the disposal problem will be eliminated.