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TEMPERATURE EFFECT ON THE YIELD OF METHANE FROM BOG SLUDGE AND REED RAW MATERIALS

Biogas is a gaseous energy resource that can be obtained by anaerobic fermentation using biomass. The main component of biogas is methane (CH₄) and carbon dioxide (CO₂), which also includes other gases with certain physical properties. Biogas is a renewable energy resource that does not pollute the environment and the air. Biogas production reduces landfill growth and reduces water and soil pollution. The trend of biogas technologies is improving every time, thus the supply for biogas production is increasing. Capital investment in biogas plants requires relatively low costs. Their use reduces the greenhouse effect, as decomposing products emit CH₄ and CO₂ gases, which trap infrared (thermal) radiation reflected from the earth's surface [1].

Unlike fossil fuels, biogas is a fully renewable resource because it is produced from biomass. Biogas will not only improve the country's energy balance, but will also make a major contribution to conserving natural resources and improving the environment [2].

The research summarizes information on biochemical processes of biogas production and the parameters that affect the results of its production. The research examines the result of obtaining biogas from bog sludge and a mixture of crushed reed. Particular attention is given to temperature, as a parameter that affects the results of methane and biogas production.

In order to perform the work and obtain biogas, bog sludge from Viļaka region, and bog reeds from Daugavpils Esplanāde park were used in, which were dried and divided into components: stems, leaves, flowers. In order for anaerobic fermentation processes to be possible, digestate from the biogas plant "Skaista", Daugava region, Skrudalienas parish was used. Bioreactor EDF-5.4_2 (manufactured by "Biotehniskais centrs", Latvia) was used for research.

The biogas yield during the bioprocess depends on the effect of temperature, the best results in our study were obtained at a temperature of 40°C. During the experiment, 2.78 L of biogas with an average methane content of 38.7% was obtained from a mixture of bog sludge and crushed reeds. If the content of organic compounds in the sludge was higher, the biogas yield would increase during the process. It is more advantageous to use the raw material mixture for biogas production. The proportion of methane in biogas was the best at a temperature of 38°C – 39.9%, but at this temperature regime the total volume of biogas turned out to be about 15% less. The worst results were obtained at a temperature of 42°C – both in terms of the volume of biogas and the proportion of methane in it.

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