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THEORETICAL BIOGAS POTENTIAL PREDICTION FROM ORGANIC FRACTION OF MUNICIPAL WASTE IN BANJA LUKA REGION

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In the Banja Luka region (Republic of Srpska/Bosnia and Herzegovina) dominant fraction in municipal waste is the organic fraction (>40%). The organic fraction of municipal solid waste (OFMSW) consists of kitchen waste from households and restaurants, and garden and park waste. All collected waste is disposed of in the regional landfill in Banja Luka. OFMSW is a part of biomass (biowaste) that has the potential as a feedstock for anaerobic digestion. Anaerobic digestion implies the degradation of OFMSW, including the generation of methane-rich biogas. Produced biogas is a renewable energy source that can replace conventional fuels to generate electricity and heat or can be converted to fuel by upgrading it. Recent studies show that biogas produced by anaerobic digestion provides significant advantages over other forms of bioenergy as anaerobic digestion presents energy-efficient and environmentally friendly technology. The potential of biogas generated from waste is influenced by process parameters (organic loading rate, C/N ratio, pH, temperature, moisture content, and retention time), the chemical characteristics of the waste (pH, total solids, volatile solids, Kjeldahl nitrogen), as well as elemental composition of the waste (C, H, O, N, S). This study predicts biogas potential based on data on the elemental composition of the waste and uses a simplistic model to define the theoretical amount of biogas that can be generated from OFMSW. The obtained value of theoretical biochemical methane potential (TBMP) calculated by Boyle's formula is 398 ml CH_4/g volatile solids.



Besides the biogas potential for energy production, the benefits of anaerobic digestion of OFMSW are multiple considering environmental aspects: reduction of waste disposal, organic waste treatment, reduction of greenhouse gas emissions and water pollution reduction, green energy production, increasing resource efficiency, etc. The results of this theoretical study can be a driver for further research of biogas potential from waste with the aim to establish sustainable waste management in the Banja Luka region.

Key words: organic fraction of municipal solid waste, anaerobic digestion, biogas, sustainable waste management.