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Editorial

Special Issue "Biogas as Renewable Energy Source"

Agnieszka A. Pilarska [1,*] and Krzysztof Pilarski [2,*]

[1] Department of Hydraulic and Sanitary Engineering, Poznań University of Life Sciences, ul. Piątkowska 94A, 60-649 Poznań, Poland
[2] Department of Biosystems Engineering, Poznań University of Life Sciences, Wojska Polskiego 50, 60-627 Poznań, Poland
* Correspondence: pilarska@up.poznan.pl (A.A.P.); pilarski@up.poznan.pl (K.P.); Tel.: +48-61-846-65-93 (A.A.P.)

With the development of civilisation, the demand for energy is increasing. According to popular opinion, traditional energy resources, primarily fossil fuels (coal, oil, natural gas), are running out and their use causes an increase in environmental pollution, mainly through greenhouse gases. For this reason, renewable energy sources (RESs), which are harmless to the world around us, are gaining in importance. Biomass and its varieties currently represent the third largest RES in the world. The result of the anaerobic processing of biomass, including but not limited to organic waste of various origins, is biogas. Chemically, it consists mainly of methane and carbon dioxide, although its composition largely depends on the type of raw materials from which it is derived. It should be noted that energy production in biogas plants operating under optimal and monitored conditions is highly efficient. The combined production of heat and electricity makes it possible to achieve high conversion efficiencies of up to approximately 87%.

This Special Issue collects and presents significant research on biogas as a renewable energy source in five papers. The first paper covers a comprehensive approach to the management of olive mill wastewater (OMW) [1]. The research carried out identified, among other things, the biomethane potential of different OMW-derived samples and organic solid market waste as co-substrates. The digestate was also investigated for phytotoxic properties using the germination index. In the next study, the main aim was to determine the specific methane yield (SMY) of anaerobic digestion (AD) of four different fruit and vegetable residues (FVRs) [2]. In addition, the reduction in greenhouse gas (GHG) emissions was calculated based on the assumption that maize will be replaced by FVRs as a feedstock for biogas production. In the third article, Szymańska et al. [3] presented the results of a study on the effect of digestate treatment methods on their chemical composition and the effect of the resulting products on the yields and chemical composition of plants. The objective of the study by Alshawaf et al. [4] was to theoretically estimate the biomethane potential of wastewater sludge, together with the identification of the role of biomethane in the region. The prediction of biomethane potential was based on the theoretical stoichiometry of biomethanation reactions, using the R-based package "Process Biogas Data and Predict Biogas Production". The last publication discusses the technology for doping hydrogen into the fermenter to increase methane production and the amount of energy in the mixture [5]. Hydrogen doping was anticipated to enable more carbon to be used to produce methane.

Although the submission of papers for this Special Issue has now been completed, detailed research in the field of RES continues due to the ongoing challenges of climate change, the energy crisis and waste management issues.

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