Antibiotics used to treat humans and animals are not fully metabolized in organisms and their residues get into the faeces and to the wastewater treatment plant. Their highest concentration are detected in sewage sludge and animal manure. Both, manure and sewage sludge, often undergo fermentation processes, which lead to the production of environmentally friendly renewable energy in the form of biogas. Processes occurring in biogas plants, however, can be inhibited by the antibiotics contained in the substrate, which in turn affects the amount of biogas produced. The aim of this project will be to determination of antimicrobials influencing on anaerobic digestion (AD) processes and to find new effective microorganisms, which can improve parameters of AD in the presence of antibiotics. To the study, there will be used antibiotics most often used in Poland - beta-lactams, tetracyclines, quinolones, sulfonamides and metronidazole. Both cattle manure and sludge from the local sewage treatment plant will be used to fermentation processes in the experiment. The experiment will consist of three stages. In the first stage antibiotics with strongest influence on the microorganisms associated with the production of biogas will be selected. The second phase of the experiment will be conducted with increasing concentrations of antibiotics until the process ceases to be cost justified (less than 30% methane content in the biogas). In the course of this experiment will be monitored effectivity of biogas production and quality composition of groups of microorganisms associated with the process. Changes in groups of microorganisms will be determined using high throughput sequencing, which is a highly sensitive molecular tool. Microbial activity associated with the fermentations will be determined by the analysis of gene expression. An additional advantage of this part of the project will be possible to estimate changes in the number of bacterial genes associated with drug resistance in microorganisms exposed to antibiotics. These genes are considered as micropollutants of environment. Quantitative analysis of these genes will be done using PCR in real time. The third stage of the project will be to assess the impact of bioaugmentation to optimize the process of production of biogas from substrates containing a high concentration of antibiotics. As the "effective microorganisms" will be used microorganisms obtained during the second phase of the project. The experiment will involve "effective microorganisms" and serving only high concentrations of antibiotics, which should make it possible to verify the hypothesis of a positive impact of bioaugementation on fermentation processes of substrates with increased content of antibiotics. The laboratory analysis applied during the third stage of experiment will be identical as in the second. It is worth to emphasize that the implementation of the bioaugemntation not adversely affect the amount of gene drug resistance spreading to the environment - the project will be applied such technological solutions, which will not allow the spread of drug resistance in the environment and are fully justified economically.