

عنوان مقاله:

Increasing biogas production in municipal landfill by waste separation and use of methane gas hydrogen in fuel cells for electricity and heat generation

محل انتشار:

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خلاصه مقاله:

Due to the increased production of industrial, municipal, agricultural and other wastes, optimum utilization of these wastes for green energy production is very efficient. Landfill can have disadvantages. Including that the space required to bury one ton of waste is on average 1.3 cubic meters. Each ton of waste produces 400 cubic meters of greenhouse gas and 250 liters of leachate. Today, it is believed that landfills have many negative effects on the environment, with prominent examples being their ability to contaminate groundwater and greenhouse gas emissions. Separation of municipal waste can be effective in the production of biogas and thus in methane gas, and the separation can increase the amount of methane gas and thus the amount of hydrogen produced. The problem in this study is to find a relationship between the separability of waste in landfills to increase the amount of methane produced to obtain more methane than other gases and to find the amount of energy change caused by it. The change in fuel cell type is to generate electricity. For this purpose, in this study, several different waste samples consisting of different components with different percentages were investigated. In the first step, the effect of fat percentage on methane production was investigated. It was shown that for samples with fat content of 5, 10 and 18% the methane production rate was almost similar. This meant that for wastes that contained less than 18% fat, the fats did not have any limiting effect on the anaerobic digestion reactions. But for higher concentrations, the limiting effect of fats on methane production was observed. So for a 47% fat sample, the delay phase is increased to 60 days (the methane production rate is very low in the first 60 days) and intensified after 60 days of methane production due to the limiting property of It s high in fat. Finally, it was concluded that the optimal state for anaerobic digestion occurs when the residual fat content is in the range of 5% to 18%. Then, for a solid oxide fuel cell with methane inlet fuel, it was shown how much power is generated for the input fuel and the specific air, and the maximum power is related to the state where the current density is in the range of 400 to 500 mA / cm². Finally, the rate of reaction kinetics throughout the catheter was reported

کلمات کلیدی:

biogas, landfill, waste separation, fuel cell

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