

Biological hydrogen production from food waste

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Biological methods are potential hydrogen production from various renewable resources and less intensive energy than chemical or electrochemical ones since they are carried out at ambient temperature and pressure. Especially, dark fermentation from organic compounds is a feasible process for the sustainable hydrogen production. Since food waste has a high organic content and can be used for hydrogen production in dark fermentation, dark fermentation can be a promising process to treat food waste. In this study, we aimed to produce hydrogen from food waste by dark fermentation. Three experiments were conducted. One was to investigate feasibility of hydrogen production from food waste and how it changed with the variations in influent COD concentration. Another was to compare hydrogen yield and hydrogen production rate from real food waste with those from synthesized food waste. Finally, the other was to identify the dominant microorganisms responsible for hydrogen production. The butyrate-type fermentation was carried out in the reactor under the condition of pH 5.2-5.5 and HRT 12.5-4.17 days. The hydrogen content reached up to 40% in the experiment using food waste diluted with water at the ratio of 1:1.