Application of Multi-Stage Continuous High Cell Density Culture for VFA Production from Common Reed

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VFA (Volatile fatty acid) can be used as an intermediate to make biofuels. Acetic, propionic, and butyric acid are major products of acid fermentation. These acids can be converted to alcohol (ethanol, propanol, and butanol) by hydrogenation. In this study non crop biomass (common reed) was directly utilized as a raw material without enzymatic pretreatment. Through the alkali pretreatment method by calcium hydroxide, lignin and acetyl group were removed from common reed. Batch and multi-stage continuous high cell density culture (MSC-HCDC) were performed to compare the acid concentration and productivity at each culture type. Powdered common reed was pretreated and anaerobically digested in the bioreactor. Volatile solid (VS) content was measured and using this value the production yield was calculated. 100 g/L of biomass was supplied to acid fermentation. In MSC-HCDC system 4 flasks were arranged in series. The maximum total acid concentration in MSC-HCDC was higher than 30 g/L. As a result, MSC-HCDC showed higher VFA concentration and productivity than batch culture.