

Effect of acetate separation using ion-exchange membrane electrolysis system

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Production of volatile fatty acid (VFA) using CO/CO₂ as gas substrate has been achieved in bioelectrochemical system (BES). The accumulation of these kinds of VFAs inhibit the acetogenic activity and cell growth in BES, thus decrease the system performance and productivity. In this point of view, the ion exchange membrane in BES can provide a useful tool to separate and transfer the produced VFAs by BES-based electrodialysis, and utilize them for further bioprocessing. In this paper, we examine the effect of applied current and media composition on acetate transportation through ion exchange membrane, and its concentration in BES reactor. The operational parameters such as temperature, pH and initial acetate concentration will be examined. From this work, the BES-based electrodialysis can provide a platform for in-situ separation in BES as well as targeted value-added chemical production. Using this process, separation and concentration of acetate produced by microorganisms can be achieved more efficiently. Furthermore we need to study more about a shape of reactor to improve the membrane efficiency.