Cake compressibility analysis of BIOSM from a hybrid adsorption-microfiltration process

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Abstract

This study investigated the utility of a hybrid adsorption-membrane process for cake compressibility evaluation of biomass post-treatment effluent. A hybrid system using a packed-bed adsorption process followed by a microfiltration process was designed. The Packed-bed adsorption (PS) system was evaluated at various operating conditions of 60% PAC, 60 min mixing time, and 200 rpm mixing speed to reduce the bed's water content and alleviate possible fouling of the membrane. Two polyvinylidene fluoride (PVDF) membranes of 0.1 and 0.12 mm pore sizes were investigated under constant transmembrane pressure (TMP) of 40, 80, and 120 kPa. The compressibility factor (η), which was obtained from the slope of the power law function with specific cake resistance (θ) and pressure gradient were evaluated. The values of 0.31 and 0.51, respectively, obtained for the 0.1 and 0.12 mm film provided compressible and stable values suitable for further power law. The membranes were found suitable for the measurement of η as the results obtained were comparable to those obtained under the set conditions. The membrane compression factor (η) was obtained for the 0.1 and 0.12 mm film and provided compressible and stable values suitable for further power law. The membranes were found suitable for the measurement of η as the results obtained were comparable to those obtained under the set conditions. The membrane compression factor (η) was obtained for the 0.1 and 0.12 mm film and provided compressible and stable values suitable for further power law.