عنوان مقاله:

Influence of Particle Size and Pressure Drop in Cake Filtration Process on Removal of Suspended Solids in Anaerobically Digested Palm Oil Mill Effluent

محل انتشار:

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خلاصه مقاله:

Palm oil mill effluent (POME) poses a great threat to the environment. However, it contains valuable resources such as energy, water and nutrients that could be recovered for sustainable development. Currently, anaerobic digester has been employed to recover the energy potential in POME. However, the presence of suspended solids in the digestate hinders the downstream nutrients recovery process. In that light, cake filtration process appears to be an attractive option for the removal of suspended solids in the digestate. Hence, this paper studied the performance of cake filtration in removing suspended solids at different pressure condition and particle size of perlite. The effectiveness of cake filtration process was evaluated based on the quality of filtrate (turbidity and total suspended solids (TSS)) and filtration flux. In this study, perlites of different particle size distribution (FP3, FW6, FW20, and FW50) were used as both precoat and body feed. The amount of precoat and body feed were chosen as 1 g each. The filtration process was carried out at different pressure condition (2 – 5 bar). It was found that perlite with the finest particle size (FP3) achieved up to 90% of turbidity and TSS removal due to the formation of more compact cake filtration layer. On the other hand, larger perlite FW50 recorded lowest removal efficiency due to its porous cake layer, though this resulted in higher filtration flux. Generally, the increase in pressure drop resulted in higher flux but at the same time led to drastic initial flux decline due to the quick cover up of filtration voids. The outcomes from this study show that it is wise to consider the effect of particle size distribution and pressure drop in order to achieve high clarity of filtrate as well as high filtration flux.

کلمات کلیدی:

palm oil mill effluent, cake filtration, Suspended Solids, Perlite, anaerobic digestate