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The filtration characteristics of hollow fiber microfiltration — Effect of various kinds of solids in the excess activated sludge

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ABSTRACT

The submerged membrane separation activated sludge process has some benefits such as small installation area and good quality of treated water (effluent) etc. We made constant pressure filtration of the excess activated sludge using the microfiltration hollow fiber (pore diameter size: 0.1 μm). Solids in the activated sludge are consisted of two elements, suspended solids (SS) and dissolved solids (DS), and we define DS as the solids contained in the filtrate from glass fiber filter (pore diameter size: 0.6 μm), in this paper. Three sludge samples were used in this work: activated sludge, supernatant by 1600 g centrifugal settling and filtrate with glass fiber filter. Thereby, we could widely examine the effect of various kinds of solids in the activated sludge on the filtration characteristics of this hollow fiber microfiltration. As a result, the followings were obtained. The filtration characteristics of the three samples are very different from each other, affected differently by various kinds of solids, and the total filtration resistance for the filtrate with glass fiber filter is much larger than the filtration resistance of membrane only. Filtrate with glass fiber filter, which contained only DS, made the cake that produces the filtration resistance. Therefore, it is guessed that the cake filtration resistance is greatly affected by not only SS but also DS. The discussion of the contribution of the various solids to cake filtration resistance leads to the fact that the SS and DS remaining after centrifugal settling had a considerable effect to the cake filtration resistance of this microfiltration.

Keywords: Filtration characteristics; Hollow fiber membrane; Activated sludge

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