Investigation of the effect of dissolved air flotation on dairy wastewater treatment [1]

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Abstract

The wastewater treatment system of dairy cattle in Taiwan is usually a sequential process from solid-liquid separation (ASL), anaerobic digestion (AAD), aerobic treatment (AOT) and final precipitation to discharge. Dairy cattle are herbivorous animal, so there is large amount of suspended fiber in its manure and wastewater. Some fiber cannot be removed with the solid-liquid separator and precipitated in wastewater treatment system. Therefore, the purpose of this study was to investigate the effect of applying a dissolved air flotation system (DAF) on the efficiency of dairy cattle wastewater treatment system by on-site experiments with continuous flow. The DAF was set up behind the ASL, AAD and AOT processes, respectively, then those of move efficiency of DAF for different stage of dairy cattle wastewater were determined in trial I. The DAF was set up after ASL process, then the COD and SS of influents and effluents of DAF, AAD and AOT were analyzed - in trial II and the data were compared to those of treatments without DAF. The results of trial I revealed that the removal efficiency of SS and COD on ASL was 50.8 and 56.2%, respectively. The removal efficiency of SS and COD on AAD was 8.80 and 4.28%, respectively. The removal efficiency of SS and COD on AOT was 13.7 and 4.63%, respectively. In trial II revealed that the removal efficiency of COD and SS of DAF were 49.8 and 55.8%, respectively. The COD and SS concentrations of AAD effluent with DAF were lower than those without DAF at 51.5 and 83.2%, respectively. The COD and SS concentrations of AOT effluent with DAF were lower than those of without DAF at 41.0 and 62.7%, respectively. In conclusion, DAF could be applied to reduce the COD and SS of dairy wastewater after solid-liquid separation, so the discharge water quality could be improved by the following treatment.

Key words: Dairy cattle, Wastewater treatment, Dissolved air flotation.

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