

Shear Enhanced Flotation Technology Applied to Treat Winery Wastewater

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Abstract : The agricultural sector is one which requires and consumes large amounts of water globally. Commercial wine production, in particular, uses extensive volumes of fresh water and generates significant volumes of wastewater through various processes. The wastewater produced by wineries typically exhibits elevated levels of chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), acidic pH and varying salinity and nutrient contents. This study investigates the performance of a shear-enhanced flotation separation (SEFS) pilot plant as a primary treatment stage during winery wastewater processing by modifying a conventional Dissolved Air Flotation (DAF) system. The SEFS pilot plant achieved a 99% reduction in both turbidity and TSS in comparison to the 97% achieved with the conventional DAF system. The COD was reduced by 66% and 51% for the SEFS and DAF systems, respectively. SEFS shows the advantages of hydrodynamic shear to enhance the coagulation and subsequent flocculation processes with a significant reduction of coagulant and flocculant (36% and 31%, respectively).

Keywords : shear enhanced flotation, suspended solids, primary wastewater treatment, zeta potential

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