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COD fractionation based biological treatability assessment of segregated & recovered wastewater streams from denim processing plant

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ABSTRACT

This study evaluated the biological treatability of overall wastewater generated from a denim processing plant located in Çorlu, Tekirdağ, in the NW of Turkey, before and after sub-stream wastewaters' recovery alternatives were performed in the plant processes. It was determined that there are 5 segregated sub-streams composed of 11 segregated single sub-stream wastewaters contribute overall wastewater of the plant. The plant overall wastewater reflects the typical character of denim processing effluents which have a high level of chemical oxygen demand (COD_{Tot}) 1200–1577 mg.l^{-1} (1390 mg.l^{-1}), COD_{Sol} 700–1210 mg.l^{-1} (955 mg.l^{-1}), TSS 2840–6800 mg.l^{-1} (4820 mg.l^{-1}) and quite acidic/neutral pH value such as 5.8–6.5 (6.2). According to the segregated stream characters, 6 segregated single sub-stream wastewaters fitted to be suitable for recovery. After recovery, it was observed that the remaining wastewater character changed as COD_{Tot} 1750–2295 mg.l^{-1}(2020 mg.l^{-1}), COD_{Sol} 1080–1695 mg.l^{-1} (1390 mg.l^{-1}), TSS 3330–9735 mg.l^{-1} (6535 mg.l^{-1}) and pH value 5.3–6.5 (5.9). According to the biodegradability experimental data, the soluble inert fraction (S_I) of the initial total (COD) (S_I/C_T) remain steady by the ratio 3% before and after recovery while particulate inert fraction (X_I/C_T) increased from 1.6% to 3.4% ratio, as it can be considered as a specific case of COD fractions for recovery. But when the all biological treatability characteristics were evaluated as a private for this plant, it was observed that there is no any difficulty for biological treatability of remaining wastewater after recovery.

Keywords: COD fractionation; Biological treatability; Denim processing effluents; Oxygen uptake rate (OUR); Stream segregation; Recovery

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