



Evaluation of kinetic coefficients using membrane bioreactor and active sludge process treating textile wastewater

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ABSTRACT

A long-term experiment with two pilot plants, one of membrane bioreactor (MBR) and the other of activated sludge (AS) process, was carried out in order to treat textile wastewater. Based upon theoretical inference and experimental data analysis, the kinetic properties of the MBR and AS, were comprehensively studied. Consequently, kinetic constants including true yield coefficient (Y), endogenous decay coefficient (k_d), maximum specific substrate utilization rate (k), as well as the half-velocity constant (K_s) were calculated for the two process. The kinetic constants for MBR's biomass founding in the pilot plant, were $Y = 0.39$ mgMLSS/mgTOC·d, $k_d = 0.01$ d⁻¹, $k = 0.47$ d⁻¹ and $K_s = 584$ mgTOC/L. And for AS biomass in pilot plant were $Y = 0.67$ mgMLSS/mgTOC·d, $k_d = 0.03$ d⁻¹, $k = 0.09$ d⁻¹ and $K_s = 108$ mgTOC/L. These results demonstrate that the MBR process is more attractive to treat textile wastewater than a conventional process of active sludge, due the less production of sludge, accept high organic concentrations, and has higher substrate utilization rate.

Keywords: Textile wastewater; Active sludge process; Membrane bioreactor; Kinetic constants

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