Nitrogenous compounds removal from recalcitrant wastewaters using biofilms on filamentous bamboo

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\textbf{ABSTRACT}

Two biofilm reactors, one based on the use of filamentous bamboo (bioreactor with filamentous bamboo, (BFB)) and the other on the use of filamentous plastics (bioreactor with filamentous plastics, (BFP)), were used to remove nitrogenous compounds from recalcitrant wastewater that was characterized by a high organic load and a low C/N ratio. The BFP was used as a control bioreactor. Experimental results indicated that when influent COD (chemical oxygen demand associated with a K_2Cr_2O_7 oxidizer) concentrations were in the range of 804–5100 mg/L and BOD_5 maintained at 45.0–1100 mg/L, a total nitrogen (TN) removal rate of 43.06–96.70% and 28.6–82.66% for BFB corresponded to COD levels of 98–251 mg/L and a BOD/TN value of 0.51–1.87, but the corresponding TN rate was only 4.86–39.43% and 3.46–48.72% for BFP. The removal efficiency of nitrogenous compounds of the BFB was thus much higher than that of the BFP. Experimental results indicated that effective denitrification had been achieved, due to the use of filamentous bamboo as a means for removing biological nitrogenous compounds, a system that is suitable for the treatment of high-concentration recalcitrant wastewater in which the C/N ratio is low. The distribution characteristics of the main bacteria indicated that the total bacterial count at the inlet and outlet was roughly the same during the wastewater treatment. Bacteria and nitrifying bacteria were distributed near the outlet, while denitrifying bacteria was evenly distributed in the reactor.

\textbf{Keywords:} Filamentous bamboo; Biocarriers; Removal of nitrogenous compounds; Biodegradability; Most probable number; Nitrifying bacteria; Denitrifying bacteria