Activity of toluene-degrading Pseudomonas putida in the early growth phase of a biofilm for waste gas treatment

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A biological trickling filter for treatment of toluene-containing waste gas was studied. The overall kinetics of the biofilm growth was followed in the early growth phase. A rapid initial colonization took place during the first three days. The biofilm thickness increased exponentially, whereas the increase of active biomass and polymers was linear. In order to investigate the toluene degradation, various toluene degraders from the multispecies biofilm were isolated, and a Pseudomonas putida was chosen as a representative of the toluene-degrading population. A specific rRNA oligonucleotide probe was used to follow the toluene-degrading P. putida in the multispecies biofilm in the filter by means of number and cellular rRNA content. P. putida appeared to detach from the biofilm during the first three days of growth, after which P. putida was found at a constant level of 10% of the active biomass in the biofilm. Based on the rRNA content, the in situ activity was estimated to be reduced to 20% of cells grown at maximum conditions in batch culture. The toluene degraded by P. putida was estimated to be a minor part (11%) of the overall toluene degradation. (C) 1997 John Wiley & Sons, Inc.

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