Biological granulated activated carbon fluidized bed reactor for atrazine remediation

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Water Science and Technology 49:215-222, 2004

Fluidized bed (FB) reactors were operated under atrazine limiting concentrations using *Pseudomonas* ADP as the atrazine degrading bacteria to show that an adsorbing biofilm carrier (GAC) can be advantageous for atrazine bioremediation over a non-adsorbing carrier.

The following interrelated subjects were investigated: (1) atrazine adsorption to GAC under conditions of atrazine partial penetration in the biofilm; (2) differences in atrazine degradation rates; and (3) stability of atrazine biodegradation under non-sterile anoxic conditions in the GAC reactor versus a reactor with a non-adsorbing biofilm carrier. Results from batch adsorption tests together with modeling best described the biofilm as being patchy in nature with covered and non-biofilm covered areas. Under conditions of atrazine partial penetration in the biofilm, atrazine adsorption occurs in the non-covered areas and is subsequently desorbed at the base of the biofilm, substantially increasing the active biofilm surface area. The double flux of atrazine to the biofilm in the GAC reactor results in lower effluent atrazine concentrations as compared to a FB reactor with a non-adsorbing carrier. Moreover, under non-sterile denitrification conditions, atrazine degradation stability was found to be much higher (several months) using GAC as a biofilm carrier while non-adsorbing carrier reactors showed a sharp deterioration within 30 days due to contamination of non-atrazine degrading bacteria.