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Combined effects of flow rate and light on characteristics of biofilms grown on three-dimensional elastic carriers

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ABSTRACT

The combined effects of flow rate and light intensity on the characteristics of biofilm grown on three-dimensional elastic carriers were investigated in this study, to assess as well as to provide guidance for *in-situ* remediation of polluted ground water using biofilm method. Four identical biological reactors were used to cultivate biofilm on the carriers made from polyethylene terephthalate (PET), at varying flow rates (0.2, 0.4 and 0.8 $m^3 \cdot m^{-2} \cdot s^{-1}$) and under artificial lighting (approximately 130 μ mol photons$\cdot m^{-2} \cdot s^{-1}$) or dark conditions. The results showed that the characteristics of biofilm, including total biomass, extracellular polymeric substances (EPS), active biomass and microbial activity, were all significantly enhanced with increasing flow rate and under light conditions, indicating that the synergistic effect the high flow rates and stronger light on the improvement of biofilm characteristics.

Keywords: Biofilm; Combined effect; Flow rate; Light; Three-dimensional elastic carrier; EPS; Biomass; Microbial activity

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