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### ABSTRACT

#### EFFECT OF QUORUM QUENCHING ON THE BIOMASS ACCUMULATION DURING VOCS BIOFILTRATION

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#### Summary

The excess biomass accumulation in biofilters during VOCs treatment usually causes filter bed clogging and then decreases the removal performance. Compared with physical and chemical technologies, biotechnology is more effective in controlling biomass accumulation and maintaining removal performance. Previous reports have proved that enzyme quorum quenching is an effective biotechnology to control biomass accumulation. In this study, two biofilters, identified as BF1 and BF2, were established to remove gaseous methanol. The only difference in operating conditions between BF1 and BF2 was that BF2 was continuously added with acylase. The removal performance, biomass accumulation, pressure drop, and microbial community of BF1 and BF2 were investigated and compared. The results suggested acylase addition could retard the increases in biomass and pressure drop. Meanwhile, the addition presented little effects on removal performance and microbial community. Moreover, the biofilm characteristics were analyzed, including the thickness, adhesion, EPS secretion, relative hydrophobicity, and Zeta potential. The thickness and adhesion of biofilms with acylase addition were remarkably decreased. Besides, the EPS secretion, relative hydrophobicity, and zeta potential of biofilms were reduced. Therefore, the enzyme quorum quenching could be treated as an effective way to solve the problem of excess biomass accumulation inside biofilters.

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