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Influences of Limited Ammonium Nitrogen and Water Temperature on the Urban Stream Restoration Using Bacterial Technology – View from the Perspective of Numerical Modelling

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ABSTRACT

To complete the previously information issued on the feasibility study and some technical challenges identified from the application of bacterial technology, this study presents another characteristics of numerical output as the bacterial growth is now also limited to ammonium nitrogen and water temperature. Based on the results obtained, it is found that the degradation of readily biodegradable COD will be much slower because of lower bacterial growth. At certain period, the COD concentration will increase and be plotted higher later on compared to the model which is limited only to substrate and oxygen. Besides the ammonium nitro-gen, other parameters i.e. particulate products from COD decay and particulate degradable organic nitrogen will also increase soon after certain time. Considering the increase of ammonium nitrogen as it is also con-verted to nitrate nitrogen, it can be predicted that some algae may show up during the treatment processes. When the model is simulated under different water temperature, slower biodegradation process is presented at lower water temperature. Because the bacteria grow better at higher water temperature, more oxygen is then required. Finally, from this study, it is also identified that the artificial mixing and addition of oxygen at initial stage of treatment will considerably influence the restoration.

KEYWORDS

Stream Restoration, Bacterial Technology, Polluted Urban Streams, Numerical Modelling, MATLAB

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