A Preliminary Model on *E. coli* Removal in Stormwater Biofilters

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ABSTRACT

If properly treated, urban stormwater is a viable resource which can be harvested to simultaneously reduce potable water demands and provide multiple other benefits. Stormwater biofilters are commonly used to treat urban runoff, but little is known about how these systems remove pollutants of concern to human health, especially pathogens. This paper provides an overview of a laboratory-scale study which investigated how different design and operational conditions impact pathogen removal in stormwater biofilters. This data was then used to develop a modelling tool which can be used to optimise the design and operation of stormwater biofilters. The model uses continuous simulations where adsorption and desorption process were dominant during wet weather periods and first order die-off kinetics were significant in dry periods between the wet weather events. The calibrated model showed good agreement with observed data (Nash Sutcliffe Efficiency 0.53-0.89) and the optimised parameters were comparable with values reported in literature. Analysis revealed that the model's sensitivity is highest towards the adsorption process parameter followed by the die-off and desorption rate parameters, respectively, which implies that the adsorption is the governing process of the model. Changes in adsorption and desorption calibration parameters over different biofilter plant configurations suggest that the vegetation affects the wet weather processes. The model is yet to be tested against field data and needs to be improved to represent the effect of some other biofilter design configurations, such as the inclusion of submerged zones.

KEYWORDS

Biofilters, *E. coli*, modelling, removal, stormwater