Influence of flow velocity on the removal of faecal coliforms in horizontal subsurface flow constructed wetland.

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- **Abstract:**

In order to determine the influence of flow velocity on the removal of faecal coliforms (FC) in constructed wetlands (CWs), removal rate constants of FC (k_{FC}) were studied at various flow velocities (U). Membrane filtration technique, was used during analysis. Values of k_{FC} were determined using Reed's equation of pathogen removal; the results were compared with the plug flow equation. According to Reed's equation, k_{FC} values ranged from 1.6 day⁻¹ at a velocity of 4 m/day to 34.5 day⁻¹ at a velocity of 42.9 m/day. The removal rates correlated positively with flow velocity (r = 0.84, p < 0.05). On assuming a plug flow equation, removal rates constants ranged from 0.77 to 11.69 day⁻¹ a more positive correlation (r = 0.93, p < 0.05) was observed. Optimum removal rate constants were observed for the velocity ranging 36 to 43 m/day. Generally, the increase of flow velocity improved FC removal rate constants: implying that pathogen removals are influenced by diffusion of the microorganisms into the bioflims on CW media. The velocity dependent approach together with the plug flow equation is therefore proposed for incorporation in the design of CW in a tropical climate where temperature variations are minor.

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