Composition and design of vegetative filter strips instrumental in improving water quality by mass reduction of suspended sediment, nutrients and *Escherichia coli* in overland flows in eastern escarpment of Mau Forest, Njoro River Watershed, Kenya.

Abstract

This study assessed the effect of vegetative filter strip (VFS) in removal of suspended sediment (SS), total nitrogen, total phosphorus and *Escherichia coli* (*E. coli*) in overland flow to improve receiving water quality standards. Four and half kilograms of cowpat manure was applied to the model pasture 14 m beyond the edge of vegetated filter strip (VFS) comprising 10-m Napier grass draining into 20-m Kikuyu grass (VFS II), 10-m Kikuyu grass draining into 20-m Napier grass (VFS III) and native grass mixture of Couch–Buffel (VFS I-control). Overland flow water samples were collected from the sites at positions 0, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25 and 30 m along the length of VFSs. *E. coli* removal by Napier grass VFS was on the order of log unit, which provided an important level of protection and reduced surface-flow concentrations of *E. coli* to below the 200 (CFU 100 mL^{-1}) recommended water quality standards, but not for nutrients and SS. The Napier grass showed highest efficiency (99.6 %), thus outperforming both Kikuyu grass (85.8 %) and Couch–Buffel grasses VFS (67.9 ± 4.2 %) in removing *E. coli* from overland flow. The low-level efficiency of native Couch–Buffel grasses in reducing *E. coli* in overland flow was because of preferential flow. Composition and design of VFS was instrumental and could be applied with a high potential of contracting the uncertainty in improving water quality standards through mass reduction of SS, nutrients and *E. coli* load in watersheds.

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