
Evaluation of chemical amendments to control soluble phosphorus losses from dairy cattle slurry

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It is estimated that agriculture accounts for 38% of all pollution in Ireland's waterways. In recent years, there have been improvements in water quality in Ireland. The number of rivers in Ireland with good river status increased from 67% in 1997 to 71.4% in 2008. However, more work is needed in order to ensure that Ireland meets the targets set by the Water Framework Directive. This directive requires that all Irish rivers will achieve at least 'good status' by 2015. In fresh water environments, algal growth is phosphorus (P)-limited. An increase in soluble P concentration in surface water runoff, resulting from land application of dairy cattle slurry, may result in eutrophication of rivers and fresh water lakes. The aim of this study is to identify chemicals with the potential to reduce P and suspended sediment (SS) loss from agricultural grassland arising from the land application of dairy cattle slurry.

The objective of this work is to examine – at laboratory scale - the effect of chemical amendments on dissolved reactive phosphorus (DRP) and total phosphorus (TP) loss from grassland following land spreading of dairy cattle slurry. A laboratory flume was built to accommodate undisturbed grassed soil samples. Three treatments were examined in the rainfall simulator: (i) dairy cattle slurry (control); (ii) alum (1.11:1 Al: TP stoichiometric rate); and (iii) lime (10:1 Ca: TP), each applied at a rate equivalent to 26 kg TP/ha. Lime addition reduced the DRP mean flow-weighted concentration by 53% during Rainfall 1, 70% during Rainfall 2, and by 85% during Rainfall 3. Alum was best at reducing SS loss from the flume, lowering it by 87%, 91% and 81% in the 3 successive rainfall events, compared to 80%, 84% and 74% with lime.