

Efficiency of ferric and aluminium sulphate in reducing P load from high soil P -status grassland - SIMU

Kirsi Saarijärvi, Mari Rätty and Perttu Virkajärvi, MTT Agrifood Research Finland, Maaninka Finland

In Finland, most important grass production areas are located on areas with severe winter conditions, soil frost and snow cover that affect the runoff patterns. To study the surface runoff, we developed a surface runoff simulator device (SIMU). With the SIMU it is possible to simultaneously test several methods to reduce phosphorus losses from grasslands in artificial winter/spring conditions.



The amendments (50 g/m² Ferix-3 or ALG dissolved in water) were applied once (51 mg/l P_{AC} in soil) in early autumn 2010 in four replicates.

The grass mats were lifted at the end of the growing seasons 2010 and 2011 by a modified turf grass cutter and stored in outside temperature until the beginning of the SIMU experiment in the laboratory.

Grass mat size 0.33 x 0.90 m, thickness 5 cm



The mats were stored in outside temperature until the beginning of the experiment. Then the mats were covered with 30 kg of snow per mat (equals to 100 mm water) and infrared heaters were used to melt the snow and generate surface runoff. The process (freezing, snow pack and melting) was repeated three times for each mat both years.

The amount of surface runoff was recorded, and the water sample were taken and analyzed for e.g. total P, dissolved (reactive) P (DRP).

Both chemical treatments decreased the concentration of dissolved P during the first year but not in the following year (Table). In the first year the reduction was similar in all periods even though the concentration of dissolved P was low during the second period in all treatments. In contrast, in the second year the concentration of dissolved P decreased in each period as expected.

	Melting period	Dissolved P mg l ⁻¹			P-values			
		Control	ALG ¹⁾	Ferix-3 ²⁾	SE	tr	melting period	tr*melting period
2010	1	0.49	0.21	0.22	0.04	0.001	< 0.001	0.006
	2	0.14	0.04	0.09				
	3	0.27	0.11	0.19				
2011	1	0.46	0.49	0.48	0.07	0.42	0.01	0.67
	2	0.4	0.41	0.35				
	3	0.39	0.3	0.24				

¹⁾ KemWater™, ALG ²⁾ KemWater™, Ferix-3