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The potential phosphorus absorbents for grass field application

– tested in surface runoff simulator, SIMU

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The study aim and background

- The aim of this study was to find cost-effective and environmental-friendly methods for effective management of surface runoffs in spring time
  - Application on grass field surface to prevent phosphate runoff to sensitive waterways

- 80 % phosphorus surface runoff during spring
  - 80-95 % of P in dissolved form
  - One kilogram of phosphorus may produce 1 000 kg algae!
- Total phosphorus lost varies between 0,1-2,6 kg/ha/y
  - Higher from clay soils, lower from coarser soils
- Nutrient load is estimated to be 12 times higher from agricultural areas than from forested areas.

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Savonia pilot site on video

https://drive.google.com/file/d/1nrQNxhARDT-1eb86Y-6l_gLQX4o4Nc_M/view

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The experiment set up

- Study site:
  - isolated part of a pasture
  - 60 % Meadow fescue
  - Soil pH 5,9
  - 19 mg P/l
- Test substances Application rate

1.	Kemira ALG	549 kg/ha
2.	Aluminum hydroxide	289 kg/ha
3.	Aluminum chloride	904 kg/ha
4.	Al-WTR	20 Mg/ha
5.	Fly ash	4 Mg/ha
6.	GeoTrap	5 Mg/ha
7.	Control	- -

- Al 10 g/m²
- Three replicates in each treatment

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About Aluminum Chloride

- Decreased phosphorus, PO4-P and phosphate concentration in the SIMU runoff waters
  - 90 % reduction in TP
  - Lower P but higher Ca concentration in plant samples
- Questions arose:
  - Is phosphorus available for the plants?
  - How tightly is P tied into the soil?
  - How long this effect lasts?
  - Where aluminum chloride can be used?
    - Aluminum is harmful to plants
    - Border strips?
  - Is it safe to use due to acidity?

Table: TP loss in runoff waters from the grass mats and reduction % when compared to the control treatment.

Treatment	Loss, mg TP/m^2	Reduction, %
Control	26,5	0
Kemira ALG	16,9	35
$Al(OH)_3$	20,5	22
$AlCl_3$	2,7	90
Al-DWTR	28,2	-8
Fly ash	20,4	22
GeoTrap	24,6	6

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Thank you for your attention!

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