FYTOLUTIONS

WE CLEAN THE EARTH WITH PLANTS



Forever Chemicals



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Campus Vesta 😿



Context

Training site of Belgian fire department and police.

Historical PFAS pollution in topsoil due to the use of firefighting foams during past fire drills and tests.

Objectives

Demonstrate phytoremediation using industrial hemp.

Speed up PFAS extraction by means of soil additives.



Experimental design

- Site was divided into
 - 9 large plots
 - 16 small subplots: no influence of groundwater and leaching
- Different soil additives were applied
- Sampling of soil and leaves biomass at different time points (monthly)
- Analysis of PFAS concentrations
 - LCMS/MS CMA/3/D (36 compounds)



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Soil PFAS concentration (temporal)



Findings

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PFAS levels were reduced in all plots between June and September

Different plots had different initial concentrations and different removal rates

In 67% of the plots, PFAS levels < legal norm (3.8 μ g/kg) in 1 cultivation cycle

Soil PFAS concentration (spatial)



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- 2/3 of the plot area is now below the Flemish remediation norm of 3.8µg/kgDM
- only one cultivation cycle

Highlights & Next Steps

- Soil PFAS concentrations decreased significantly in the soil \bullet
- PFAS concentration increased in the leaves proving that components were taken up by the plants \bullet
- Hempurizer+ resulted in highest PFAS BAF (27) ullet
- Hempurizer+ plots revealed conversion into shorter chain PFAS \bullet
- Microorganisms, enzymes \bullet
- Stems not polluted industrial applications \bullet
- Further research on different soils and initial PFAS levels ullet

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Conclusion

- We now have a solution for 85% of the PFAS-polluted sites since they are mildly polluted (<100 µg/kg DM) ٠
- Our technology: synergy between plant roots, microorganisms & enzymes \bullet



TESTIMONIALS



PIETER VAN TURNHOUT (VESTA)

Testing innovative soil sanitation techniques to reach a scientific backed solution is in line with our vision of lifelong learning and being a lean organisation with an exemplory function." Director VESTA



"Both CO2 capture and the positive effects of industrial hemp on different contaminated sites for different types of contamination must be seen as a game changer. We support C-Biotech by generating independent and high quality data." Business consult SGS Belgium



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DIRK PONNET

"The innovative PFAS remediation of Campus Vesta in Ranst will provide us with the indispensable knowledge to tackle many similar PFAS contaminated sites in Europe. Together with C-Biotech, DEME is committed to contribute to a cleaner world."

Director Deme Environmental

LUC DE REN (SGS)



