

# FYTOLUTIONS

WE CLEAN THE EARTH WITH PLANTS





## Context

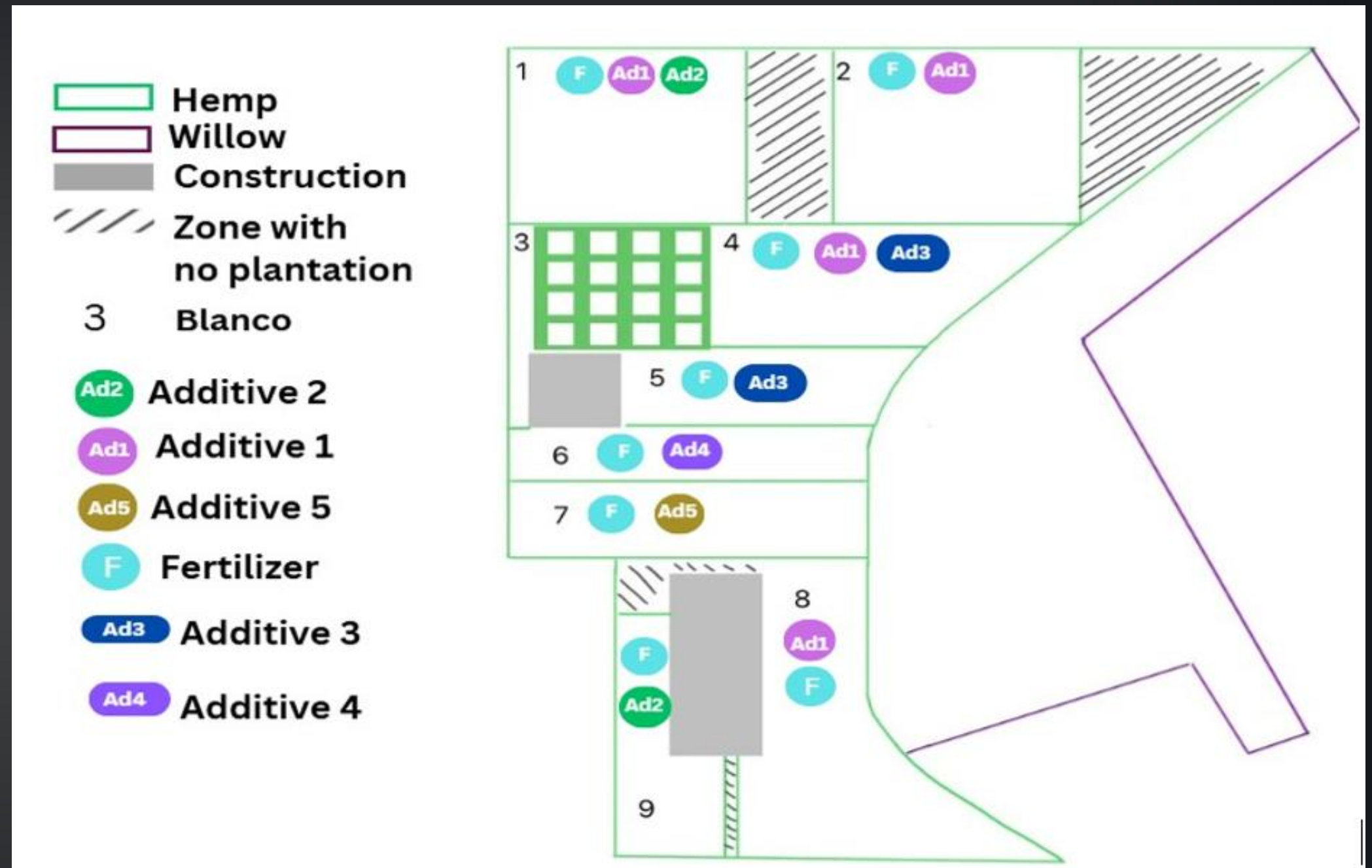
- Training site of Belgian fire department and police.
- Historical PFAS pollution in topsoil due to the use of firefighting foams during past fire drills and tests.

## Objectives

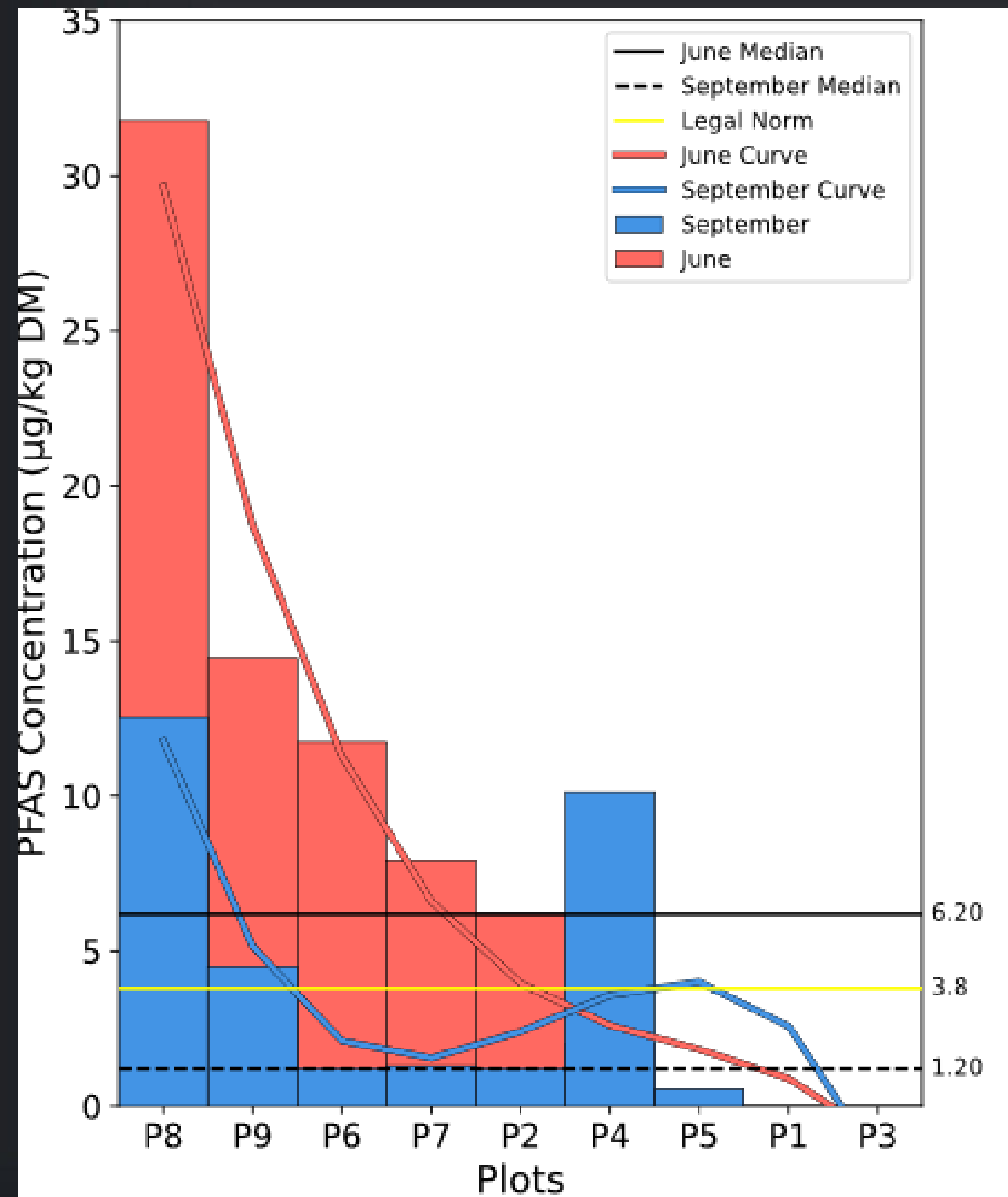
- Demonstrate phytoremediation using industrial hemp.
- Speed up PFAS extraction by means of soil additives.

# 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)



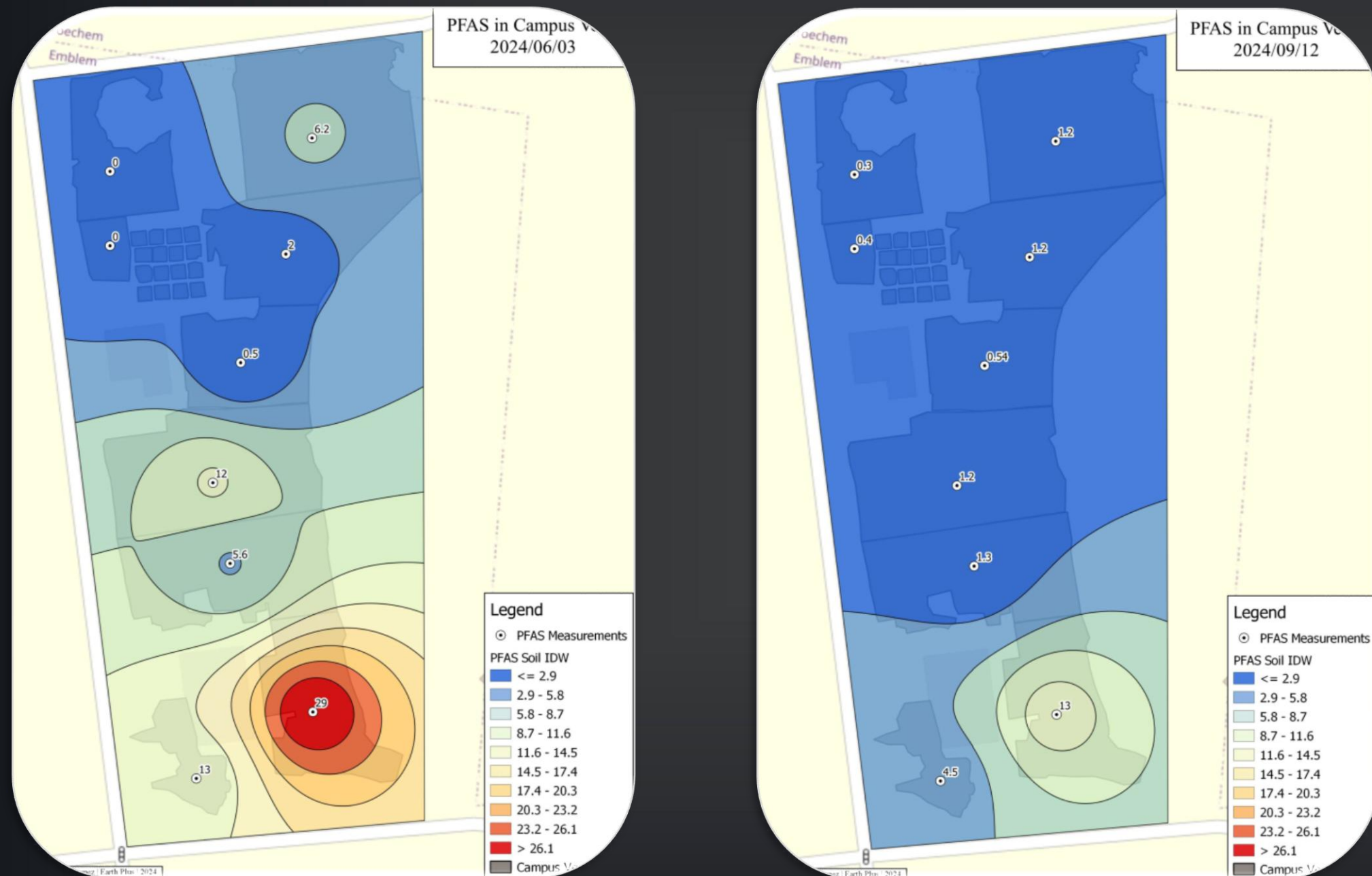
# Soil PFAS concentration (temporal)



## Findings

- 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 µg/kg) in 1 cultivation cycle

# Soil PFAS concentration (spatial)



- 2/3 of the plot area is now below the Flemish remediation norm of  $3.8\mu\text{g}/\text{kgDM}$
- only one cultivation cycle

# Highlights & Next Steps

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

# Conclusion

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- We now have a solution for 85% of the PFAS-polluted sites since they are mildly polluted ( $<100\text{ }\mu\text{g/kg DM}$ )
- **Our technology: synergy between plant roots, microorganisms & enzymes**

# 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 exemplary function.”

*Director VESTA*



**LUC DE REN (SGS)**

“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*



**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*

