ClipsMicro

Climate **p**roof **s**oils by steering soil and residue **micro**biomes

Universiteit Utrecht

NWO nationale wetenschaps agenda

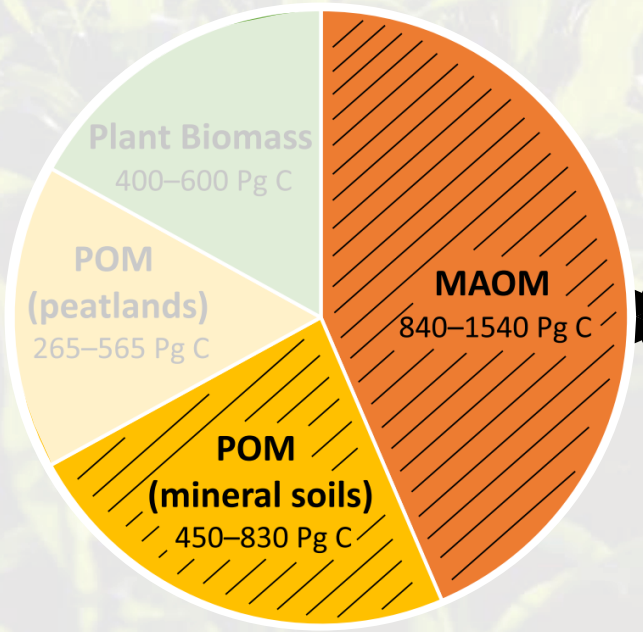
Benedikt Boppré

10.03.2025

WP 2

Carbon sequestration

Utrecht University

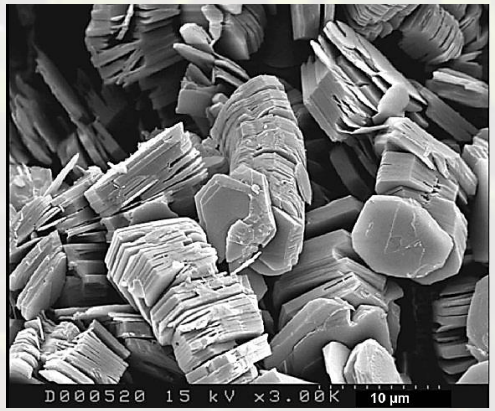


1830 Pg C ≈ 840 ppm CO_2

- Erosion Protection
- Soil Biodiversity
- Primary Production
- Climate Regulation
- Water Quality

Compost

Clay



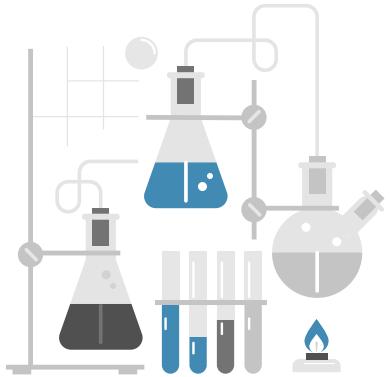
Maize in sandy soil

Sokol et al., 2022

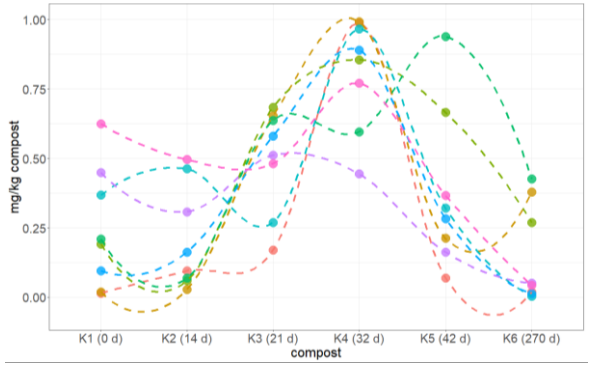
Hoffland et al., 2020

I II III IV V

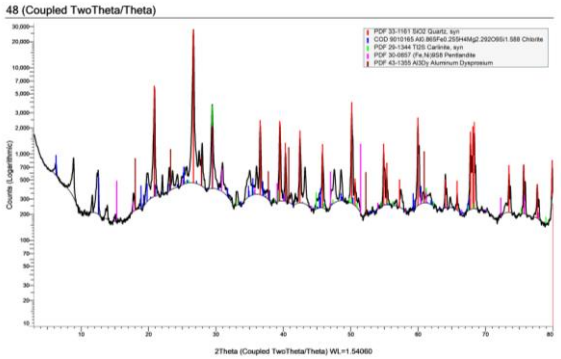
Developing methods



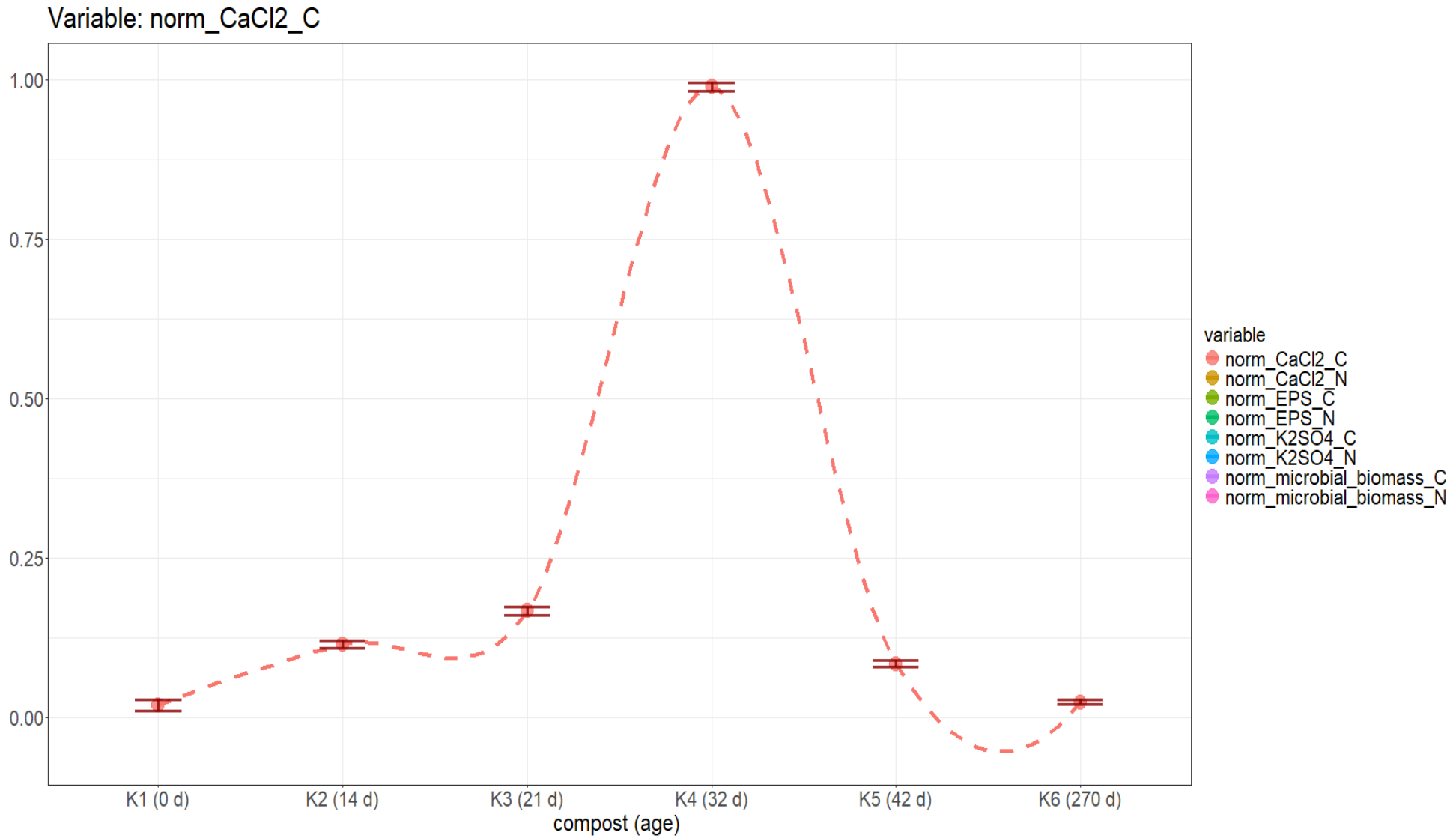
Quantifying labile C & N pools in compost



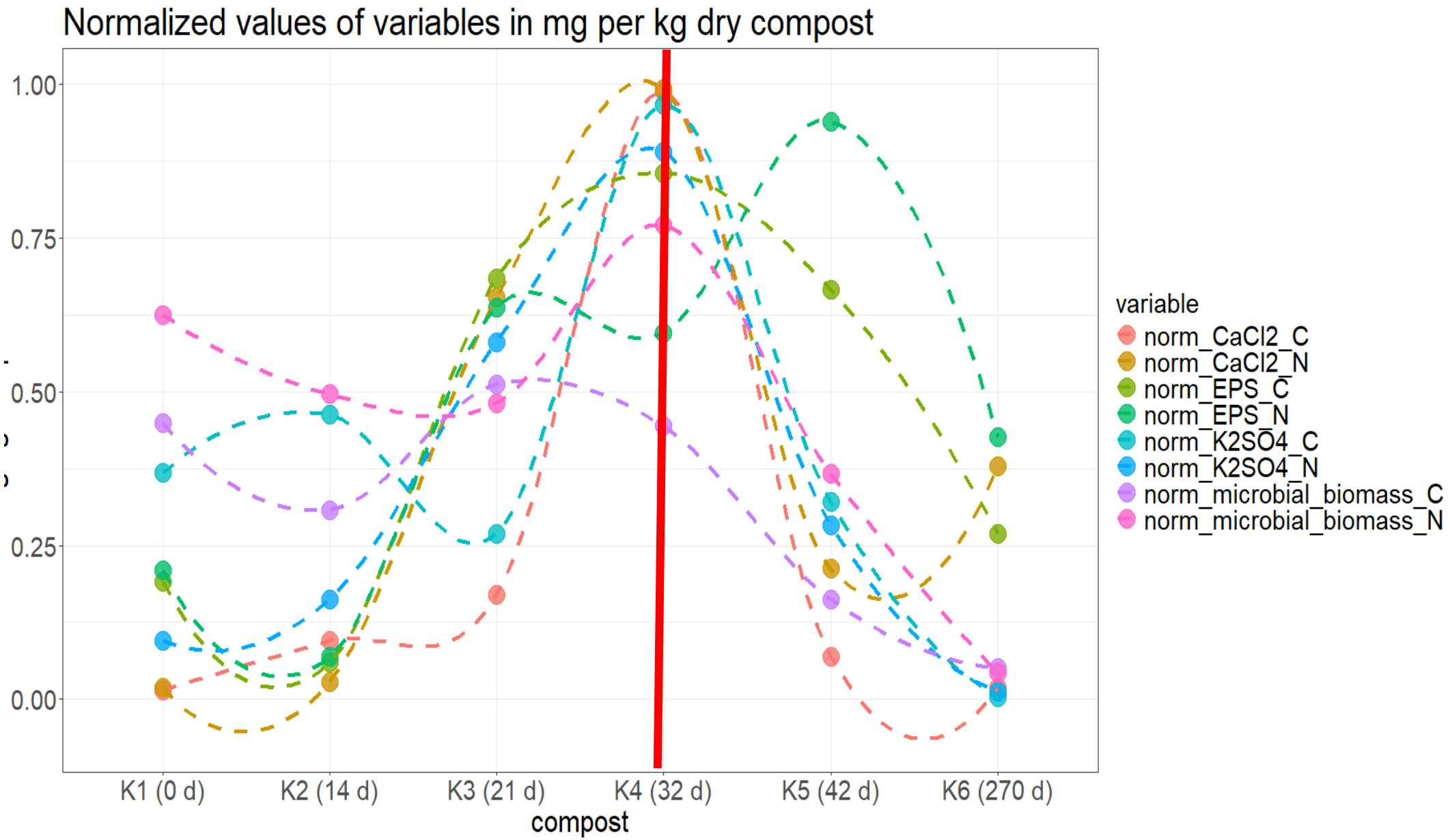
Characterization of clay



Labile Carbon and Nitrogen pools in GFT compost

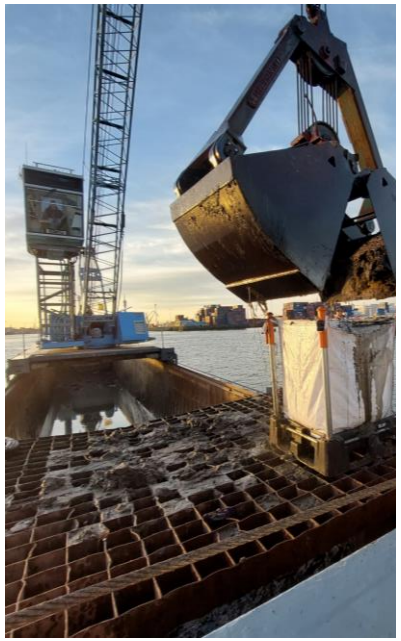


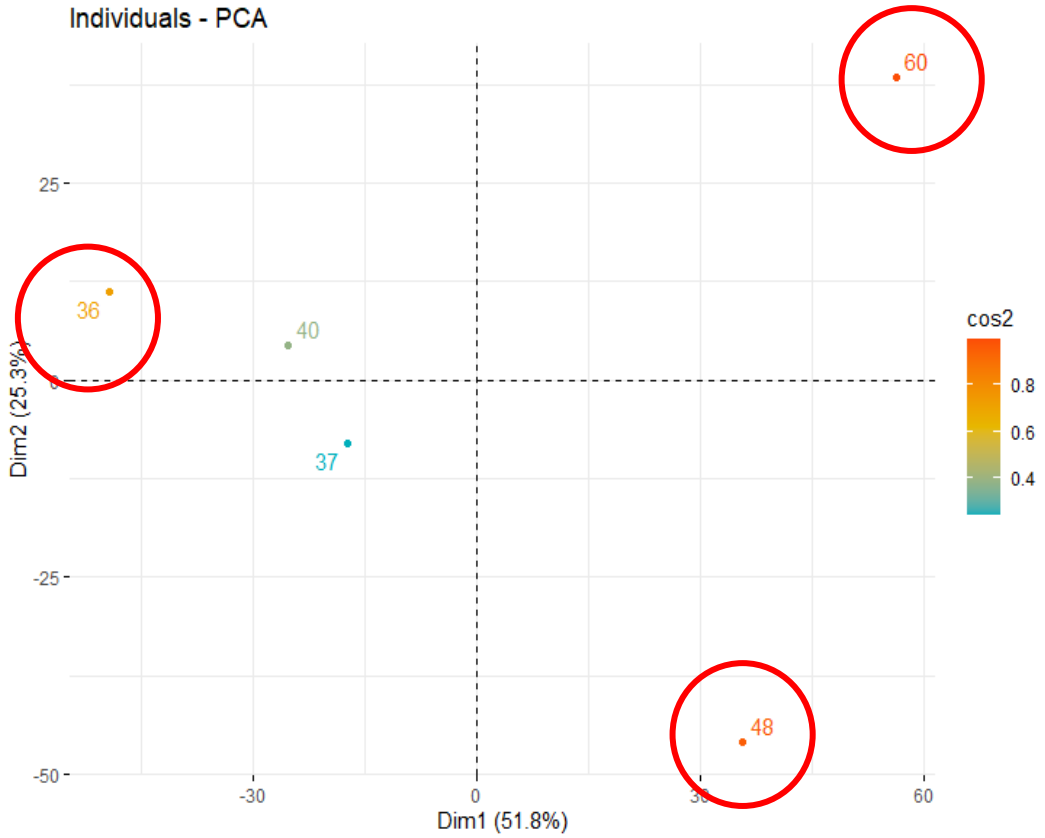
Labile Carbon and Nitrogen pools in GFT compost



Clay characterization

- Clay mineralogy
- Particle size distribution
- Cation exchange capacity
- Specific





Clay	Type	Volume in m^3 per year
G0036	commercial clay pit	900.000
G0037	Construction side	100.000
G0042	Construction side	5.000
G0048	Rotterdam harbor sediment	200.000
G0050	Swedish Bara clay	500.000
G0053	Young marine clay	200.000
G0055	Bentonite drilling mud	50.000
G0060	North Sea sediment	300.000
G0081	Maas deposit	20.000

I

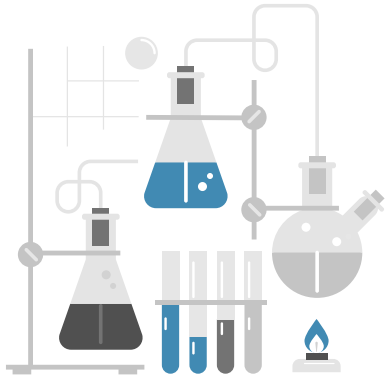
II

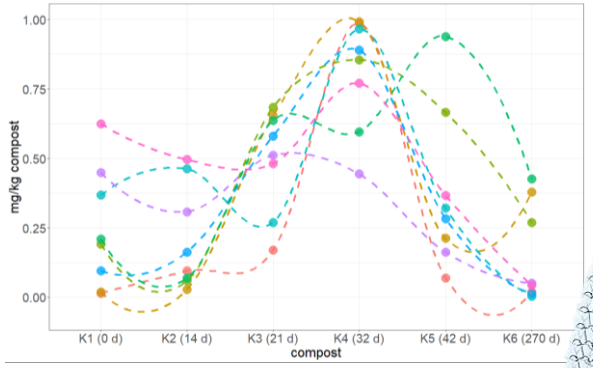
III

Developing methods

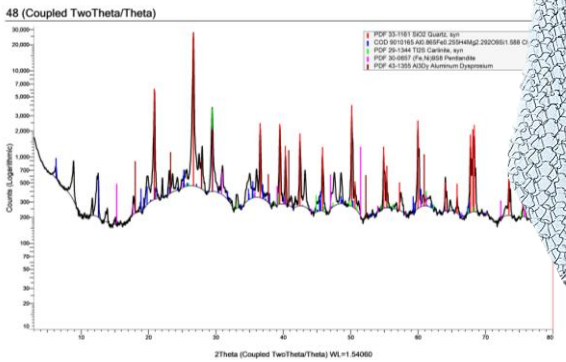
Quantifying lable C & N pools in compost

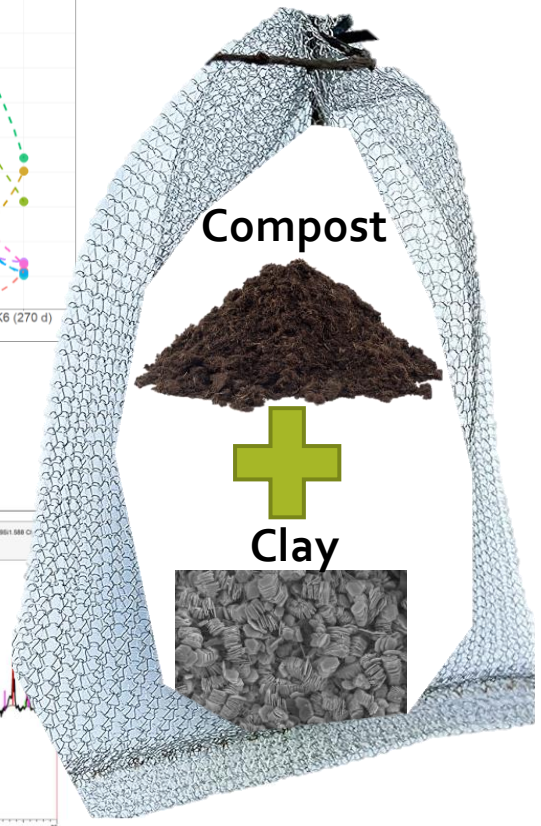
Compost Engineering





Characterization of clay





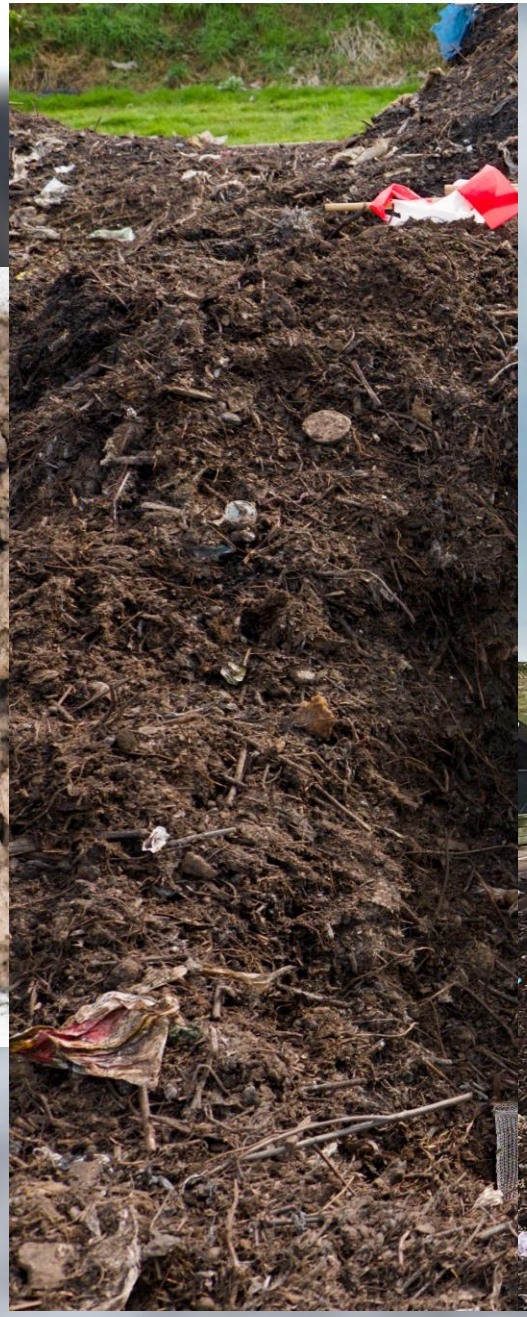
Compost-clay incubation 25.02.25 – 13.03.25

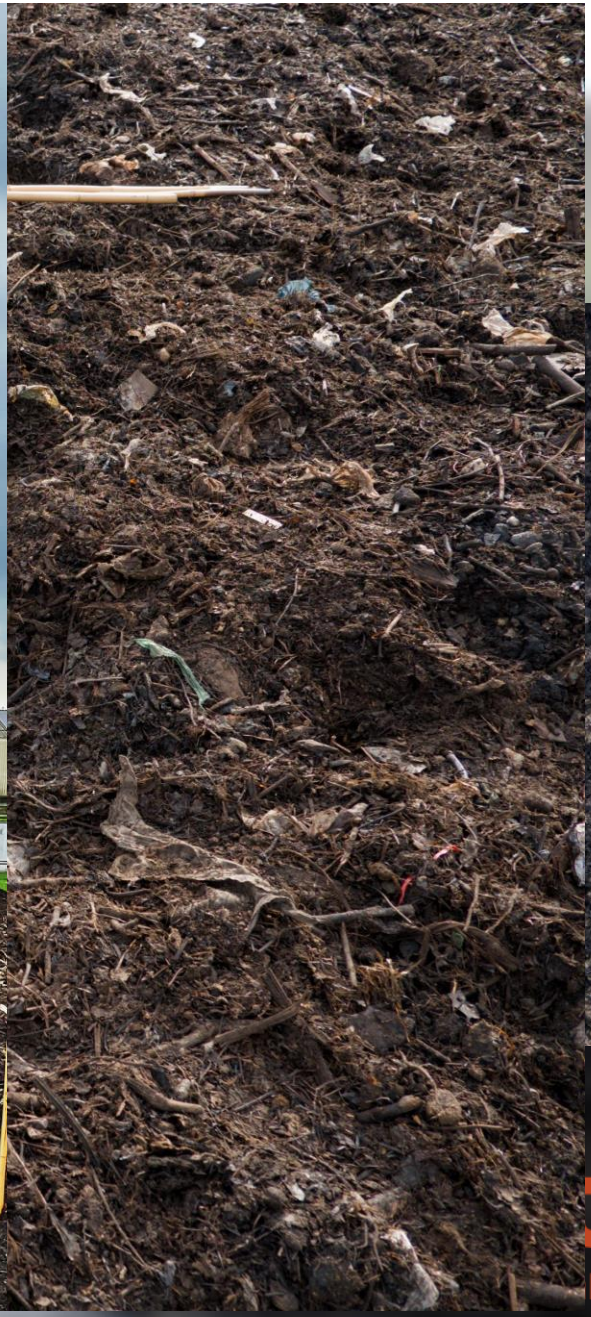
Experimental design:

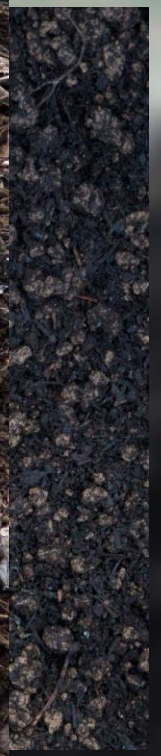
- 10 treatments
  - 5 clays
  - 2 concentrations
- 6 replicates

What is the “best combination”?

- Does clay amendment stabilize C and N during composting?
- Are stabilized products plant or microbial derived?
- How strong is the binding to the clay?
- What clay and compost properties are favorable?
- How much clay is optimal?







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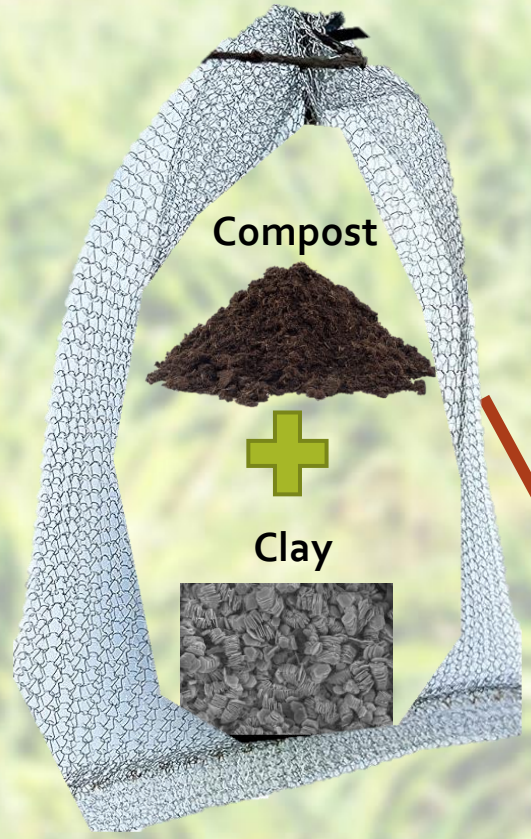
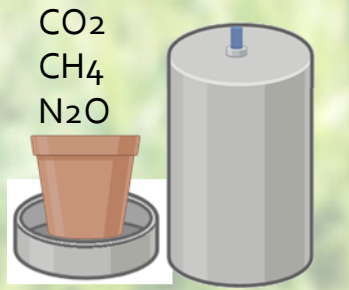
Follow up experiment



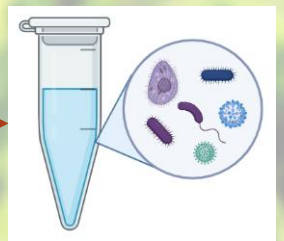
Sandy soil

Pot experiment for 120 days



GHG sampling

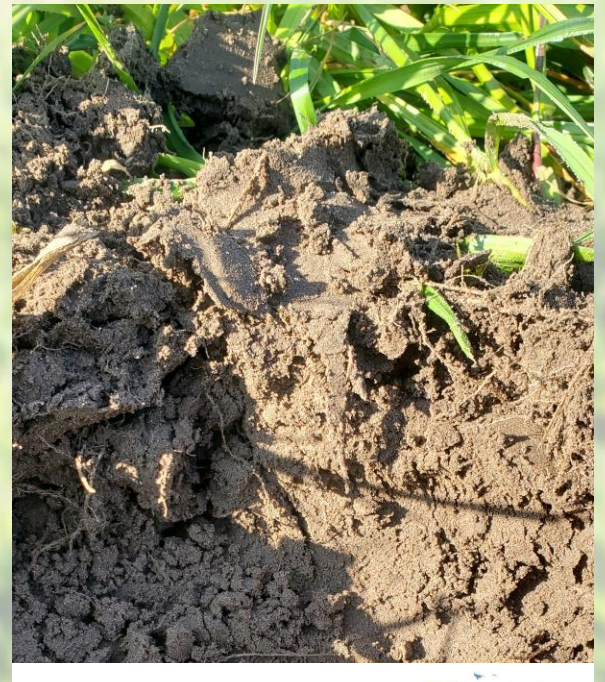
Soil samples



Microbial community and functional genes

Jing Wang

Field Experiment




Questions?