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Compost and biochar for the remediation of PAH and NSO-PAH contaminated soils

Residual soil contaminations

- Hotspots are typically excavated
- Residual soil can remain diffusely contaminated
- Ex-situ treatment too laborious and costly

Compost

- Decomposed biomass
- Recycling of organic waste
- Rich in soil nutrients, so it increases soil fertility
- Can enhance **degradation** of some organic contaminants

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Biochar

- Biomass pyrolysis (< 700°C)
- Increases soil water holding capacity
- Carbon sink
- Strong **sorption potential** for organic contaminants

AIM

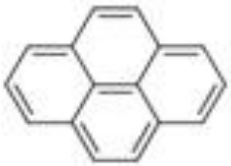
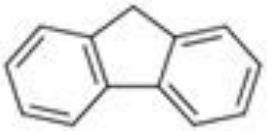
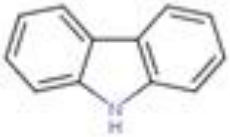
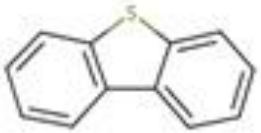
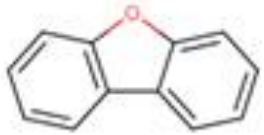
Investigate the remediation potential of compost & biochar, specifically effects on

i. **Sorption** of PAHs and NSO-PAHs

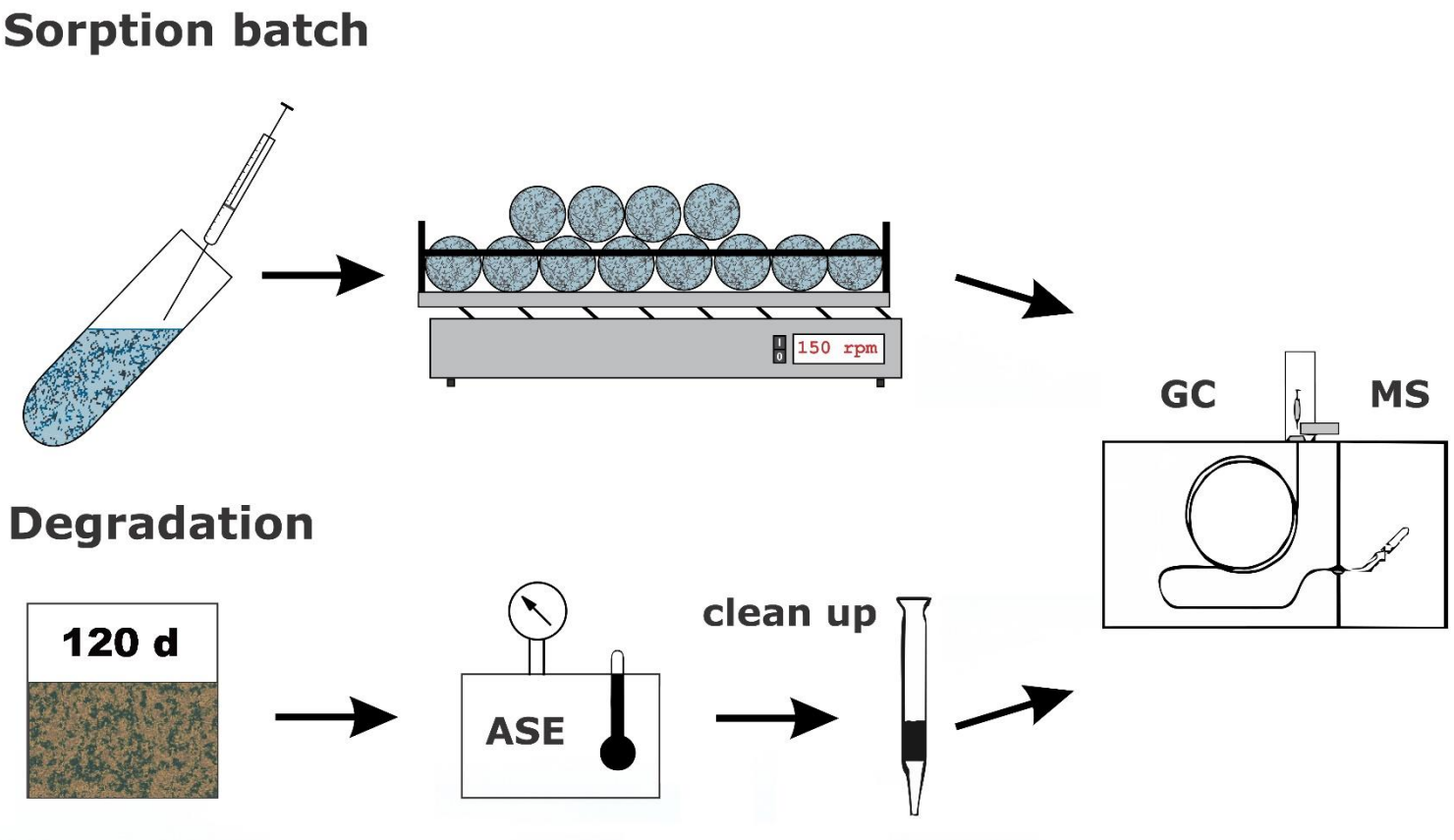
ii. Changes in **microbial community structure**

iii. **Degradation** of PAH and NSO-PAH

Materials

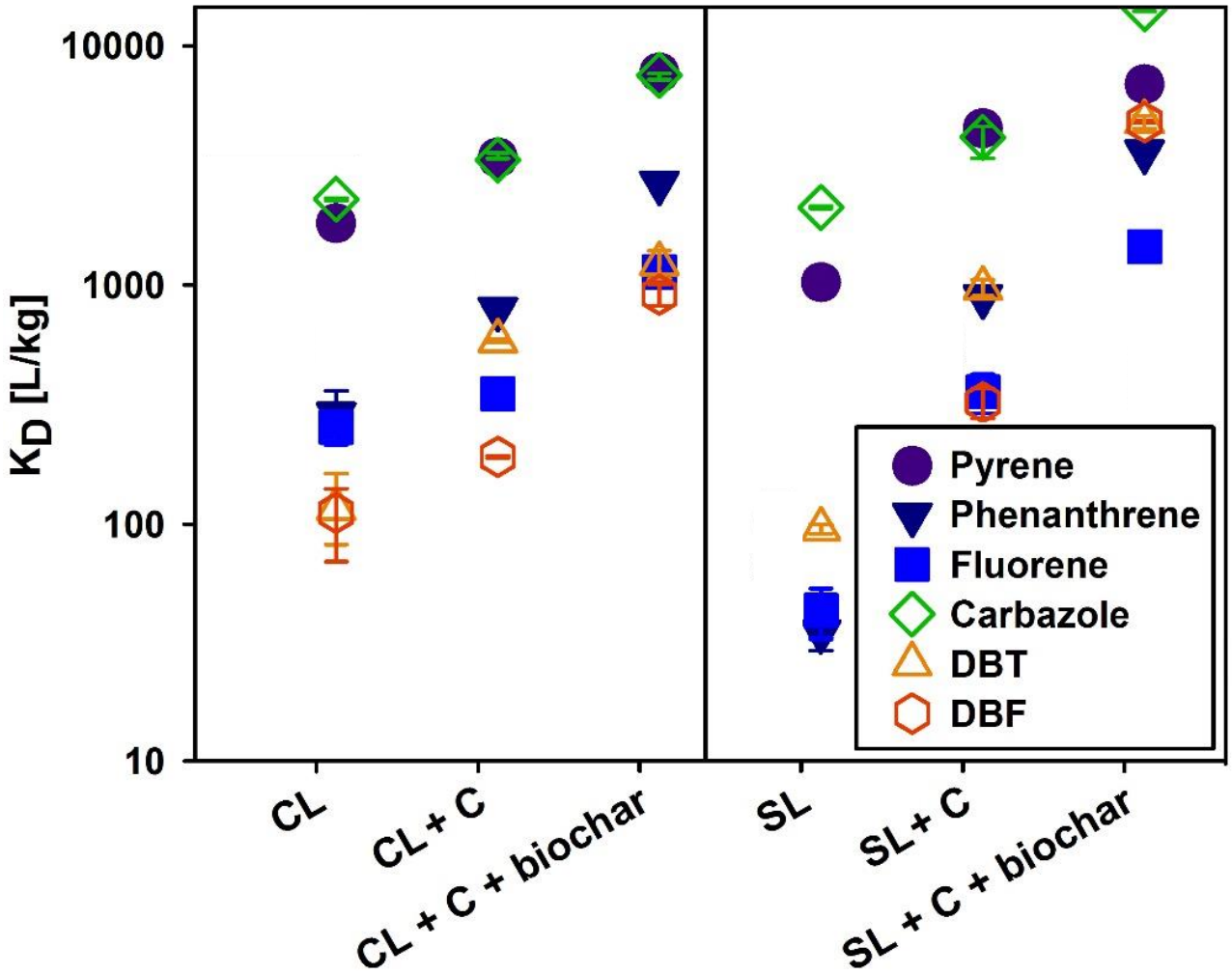
	pyrene	phenanthrene	fluorene	carbazole	DBT	DBF
log K_{OW}	4.88	4.46	4.18	3.37	4.38	4.12
structure						

Methods



Sorption

- Increased with OC
- Carbazole ≤ Pyrene ≤ Phenantrene < Flurenen ~ DBT ~ DBF



Microbial composition

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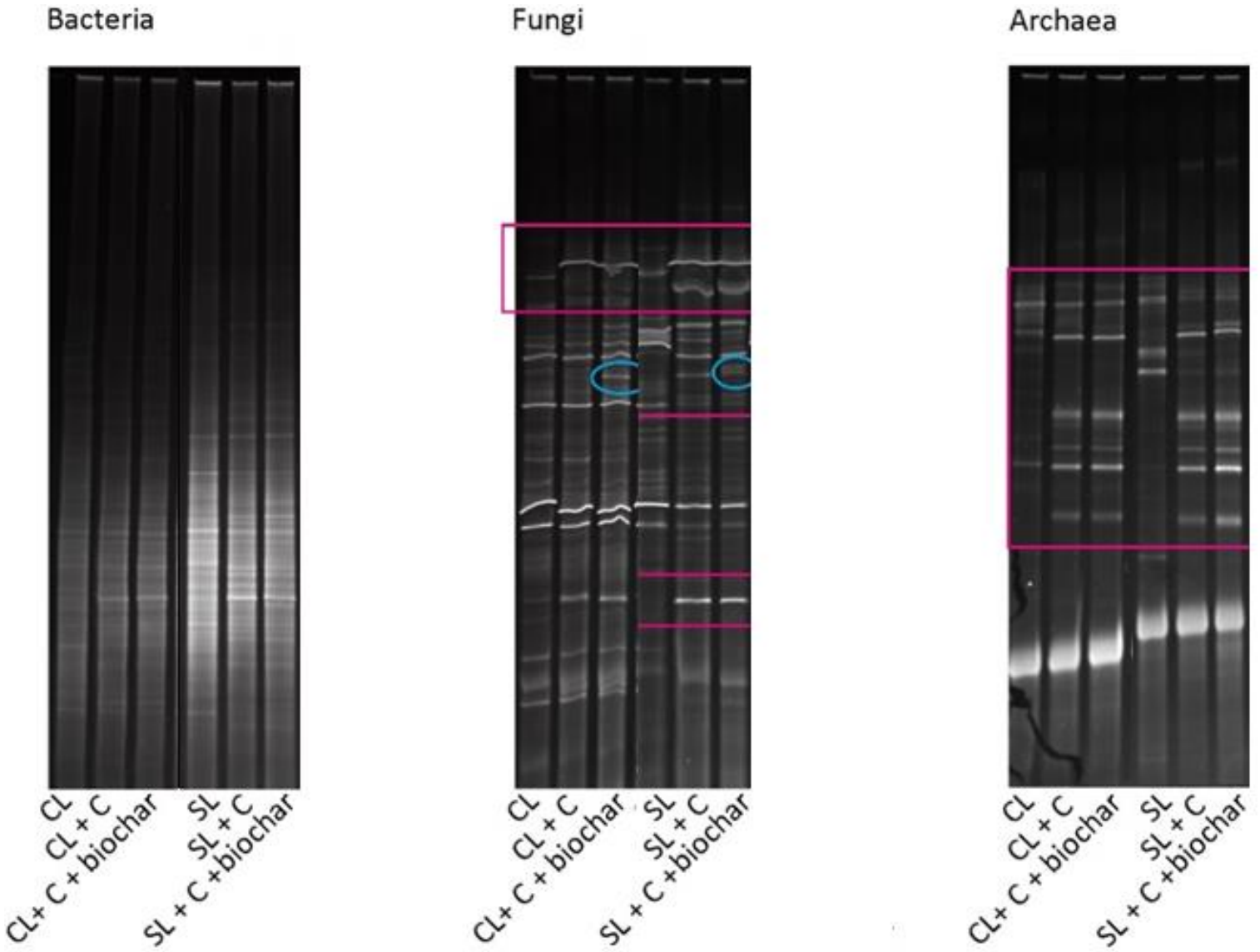
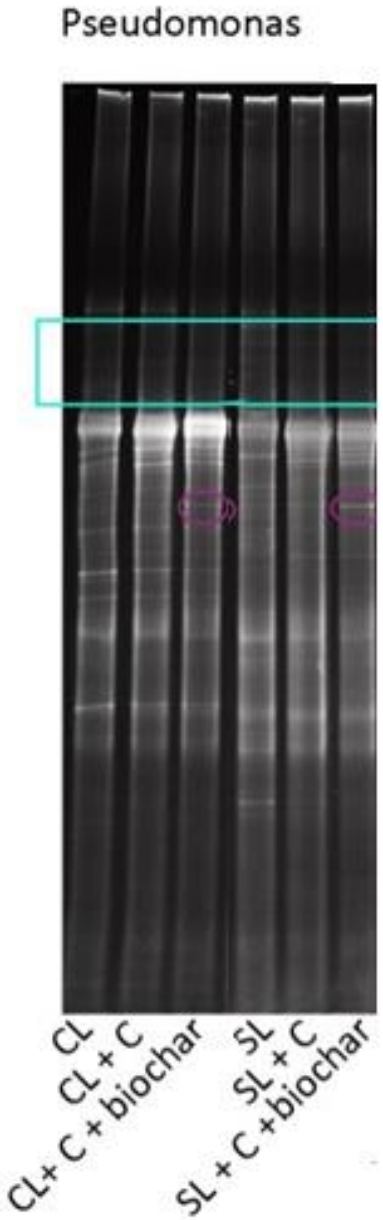
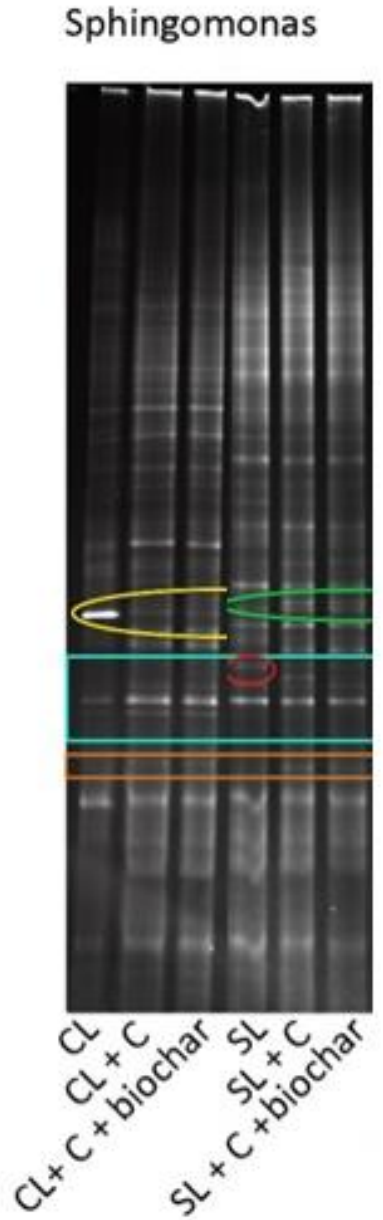


Bacterial composition

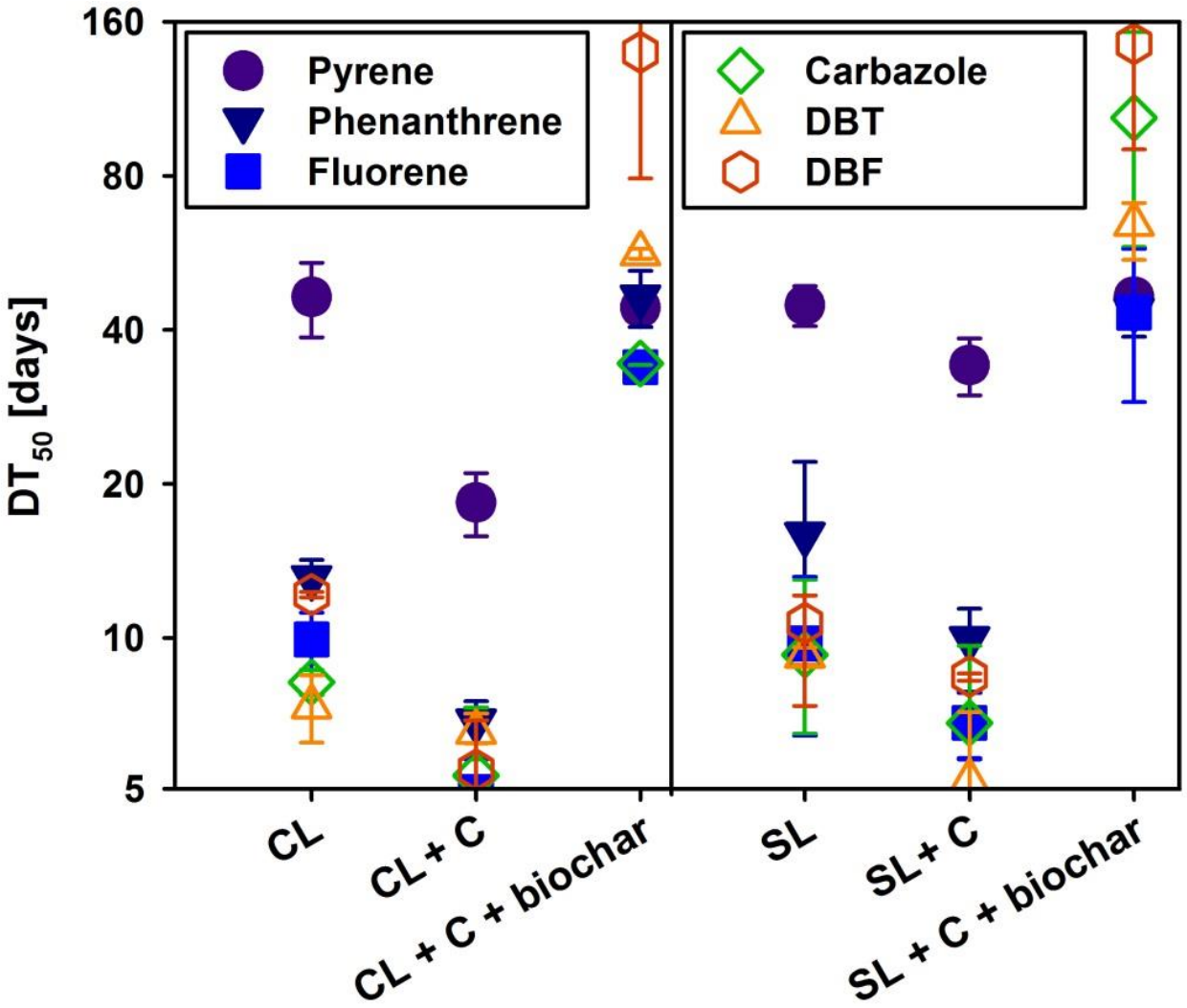
- Additional bands after compost addition
- Only small changes after further BC addition





Degradation

- Increased 2* with compost
- Decreased 10* with biochar
- Changed order after BC addition



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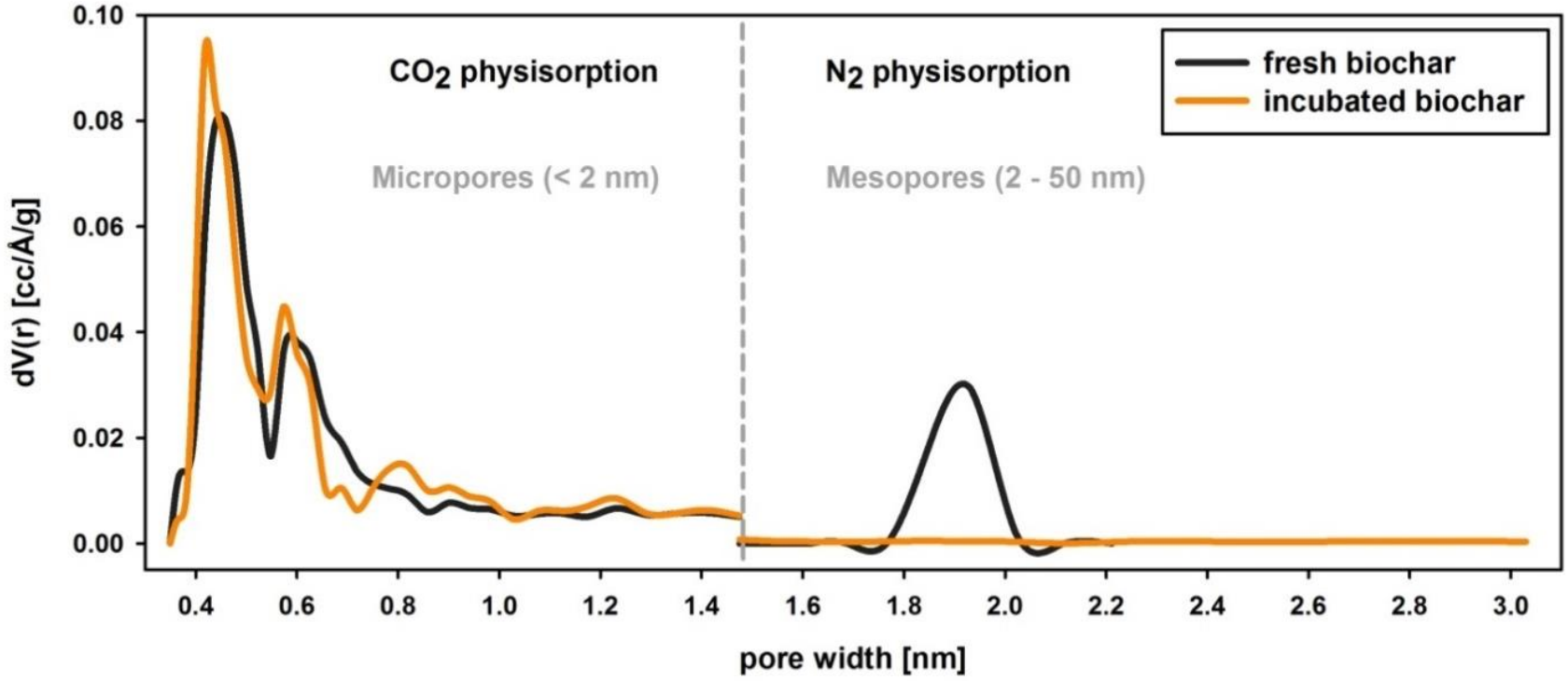
Biochar poresize distribution



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Conclusion

- **Sorption** increased with both compost and biochar
- **Microbial diversity** increased with compost
- **Degradation** increased twofold with compost and decreased up to tenfold **with biochar**, thus **desorption** was a rate limiting step

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Thank you for your attention!

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