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ANALYTICAL & CIRCULAR CHEMISTRY

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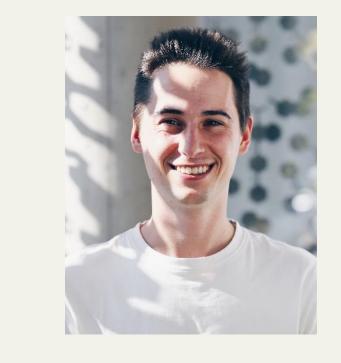
Impact of biomass pretreatment and pyrolysis conditions on common ivy biochar's potential as soil fertilizer

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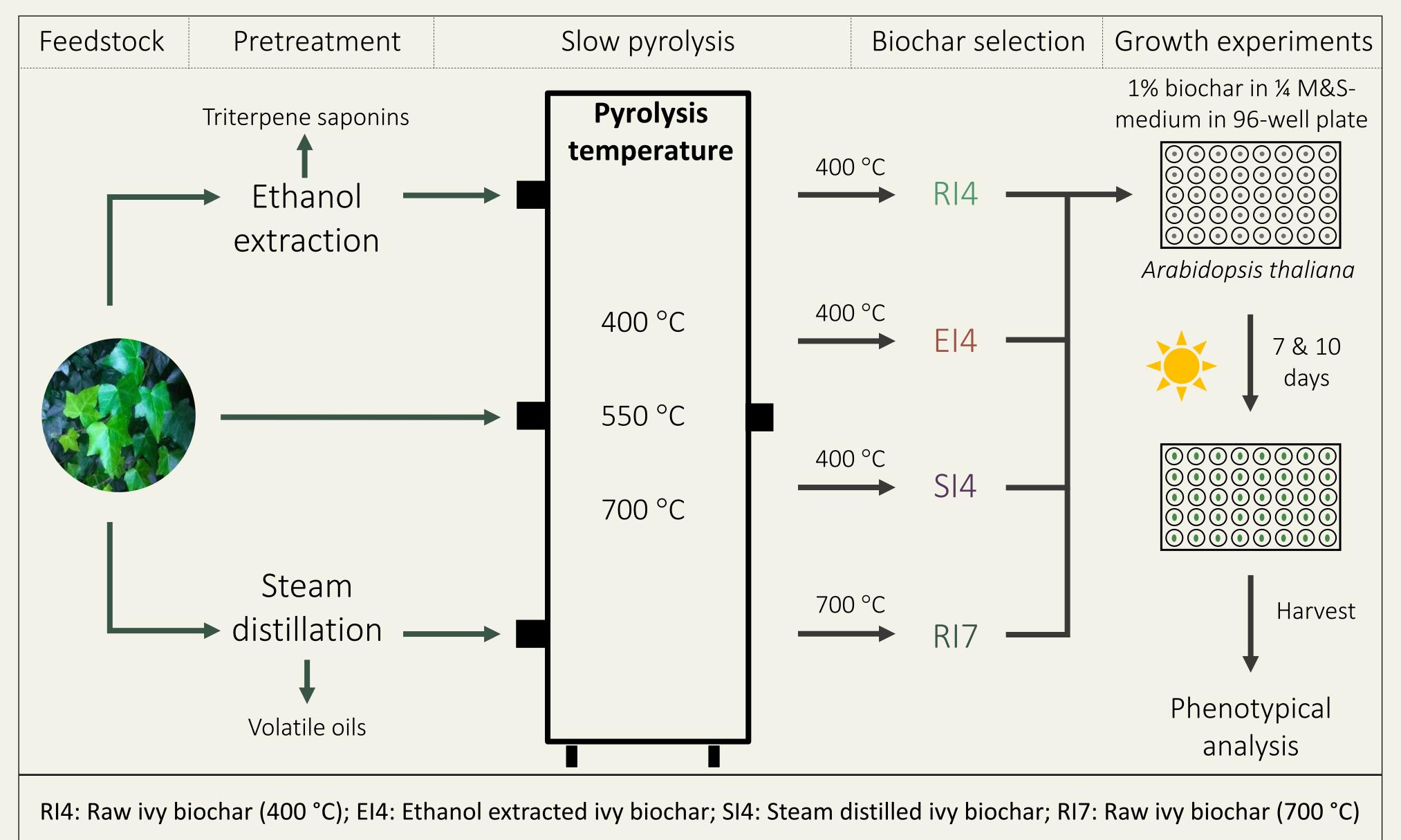




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Introduction

Industrialized farming relies heavily on the use of unsustainable synthetic fertilizers to achieve their required plant production goals, this usage has several negative side-effects e.g. eutrophication of natural waters or the increase of atmospheric nitrogen levels. A possible alternative biobased fertilizer, could be **biochar**. In this regard, we [1] synthesized biochars based on raw and extracted **common ivy** (*Hedera helix L.*) trimmings. The physicochemical characterization indicated their potential as effective soil fertilizers, however this was not supported by **plant-growth experiments** yet.



Materials and methods

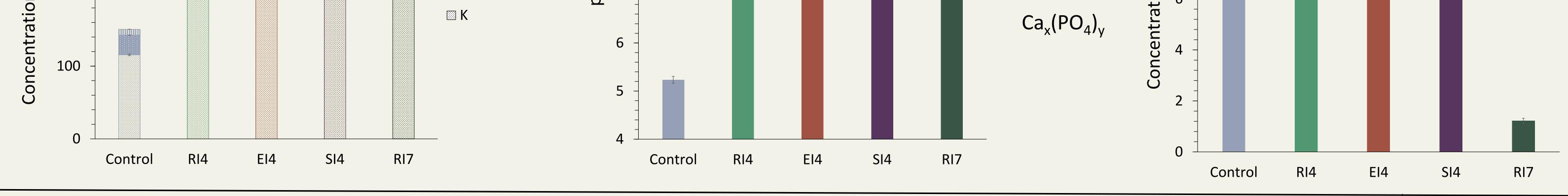
Research goals

- Assessment of common ivy based biochars for their potential use as **soil amendment**
- Investigation of the impact of **pyrolysis** \bullet temperature on plant development
- Evaluation of the effect of biomass valuable **compound extractions** on the applicability of the biochars

Results & Discussion

Biomass valuable compound **Stimulating effects** of biochars (p < 0.05) extractions prior to pyrolysis do not produced at 400 °C are not observed inhibit the biochar performance for biochar produced at 700 °C а Plant fresh weight (mg) 3 2 RI4 EI4 SI4 RI7 Control Alkalinity growth medium Macronutrient availabilty Phosphate availability 12 400 10 utrients (ppm) 10 9 (mdd) PO₄³⁻-300 precipitation 8 III Mg 🔳 Ca ation Ηd 200 6

Common ivy based biochar **improves plant development**



Conclusions

Feedstock: Common ivy based biochars have the potential to be used as soil amendment

Pyrolysis temperature: 400 °C optimal for fertilizer application due to phosphate availability

Ethanol extraction: Not significantly different from untreated biochar **—**

Steam distillation: Not significantly different from untreated biochar

Ethanol extraction and steam distillation suitable pretreatment steps in common ivy-

based valorization process

[1]



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