

HOlistic Management of Brownfield REgeneration

Biochars and Green Waste Compost for the Immobilisation of Cu in Contaminated Soil - HOMBRE/Greenland Joint Project

Sarah Jones, Paul Bardos,

r3 Environmental Technology, UK; Petra Kidd, IIAG-CSIC, Spain;

Pierre Menger, Tecnalia, Spain; Michel Mench, University of Bordeaux, France; Wolfgang Friesl-Hanl, Gerhard Soja, AIT, Austria;

Tony Hutchings, Frans de Leij, C-Cure Solutions, UK.



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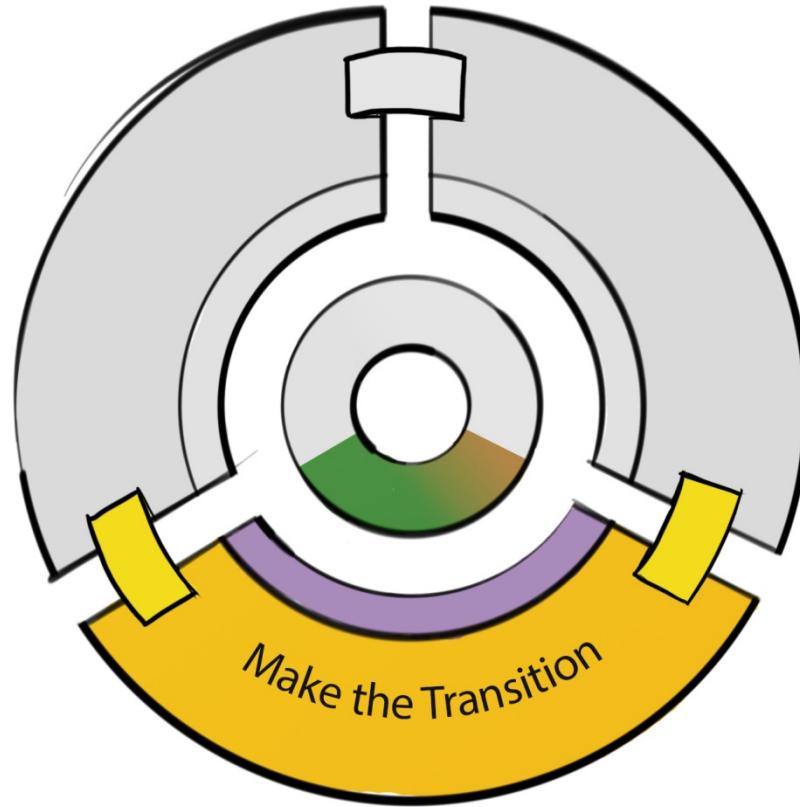


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Presentation Overview

- Project Background and Aims
- Amendments and Analyses
- Results
- Discussion + Conclusions



Project Background

- Collaborative undertaking between two EU projects: HOMBRE and Greenland
- HOMBRE (Holistic Management of Brownfield Remediation)-
Task 5.4 /Deliverable 5.4 – Technology development: operating window investigation for two low input technologies for greening urban brownfield.
- Greenland – Gentle Remediation Options
TASK 4.3/Deliverable 4.27 - Use of amendments for reducing TE bioavailability (phytostabilisation)
- Two supporting MSc projects (University of Reading)
Not reported here

Site

- Former wood-preservation site in South-West France
- Heavily Cu contaminated (also PAH).
- Low OM
- Spatial variability of contamination



Aims

- Evaluate the potential of biochar and GWC as GRO to:
 - Immobilise Cu in soil
 - Aid re-vegetation of contaminated site
- In order to:
 - Assess potential for production of usable biomass for energy on marginal land
 - Add to ongoing work attempting to define operating windows for GRO
 - Assess recycling biomass produced on contaminated sites for further site improvement

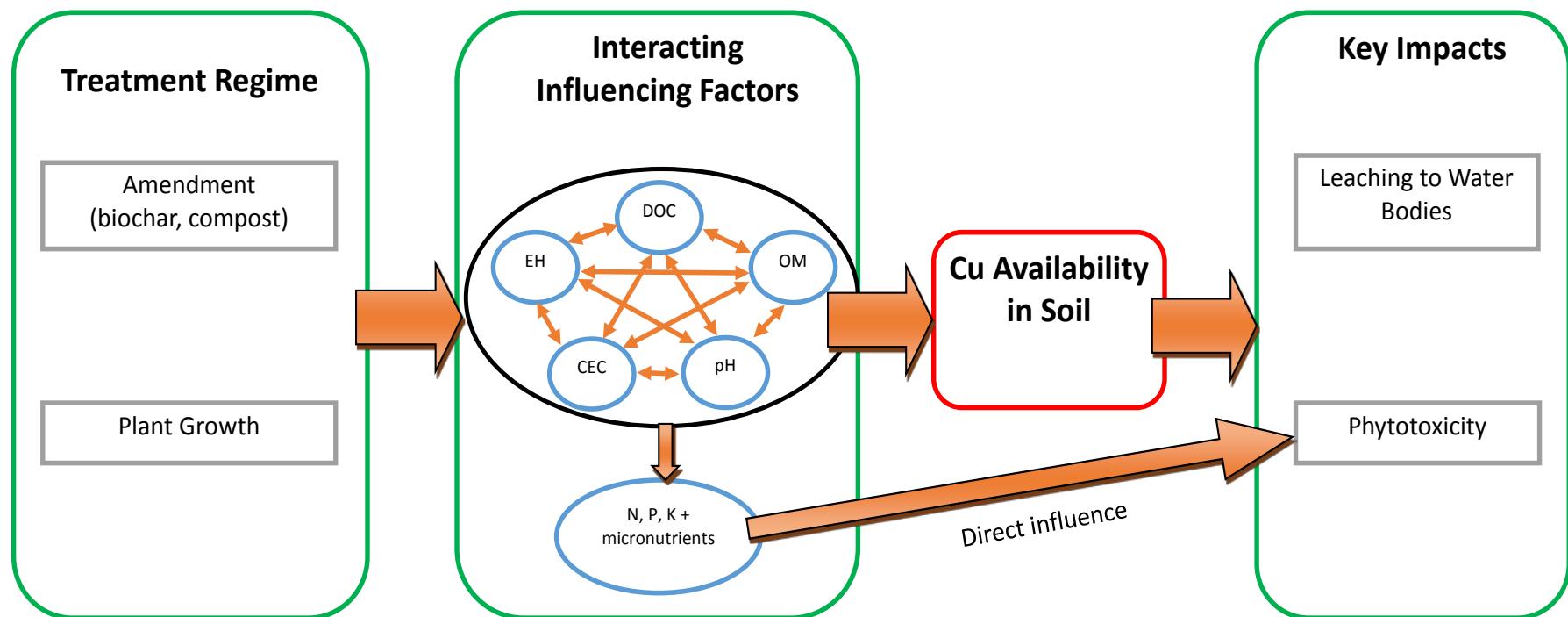
Amendments

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- Three different biochars trialled:
 - BC1 – a specialised biochar product called “C-Cure-Metal” developed for remediation of metal contaminated substrates (C-Cure Solutions Limited, Farnham, UK)
 - BC2 – Biochar produced using poplar grown at the Biogeco site (AIT, Austria)
 - BC3 – Fe-amended poplar char (AIT, Austria)
- Green Waste Compost



Project Concept

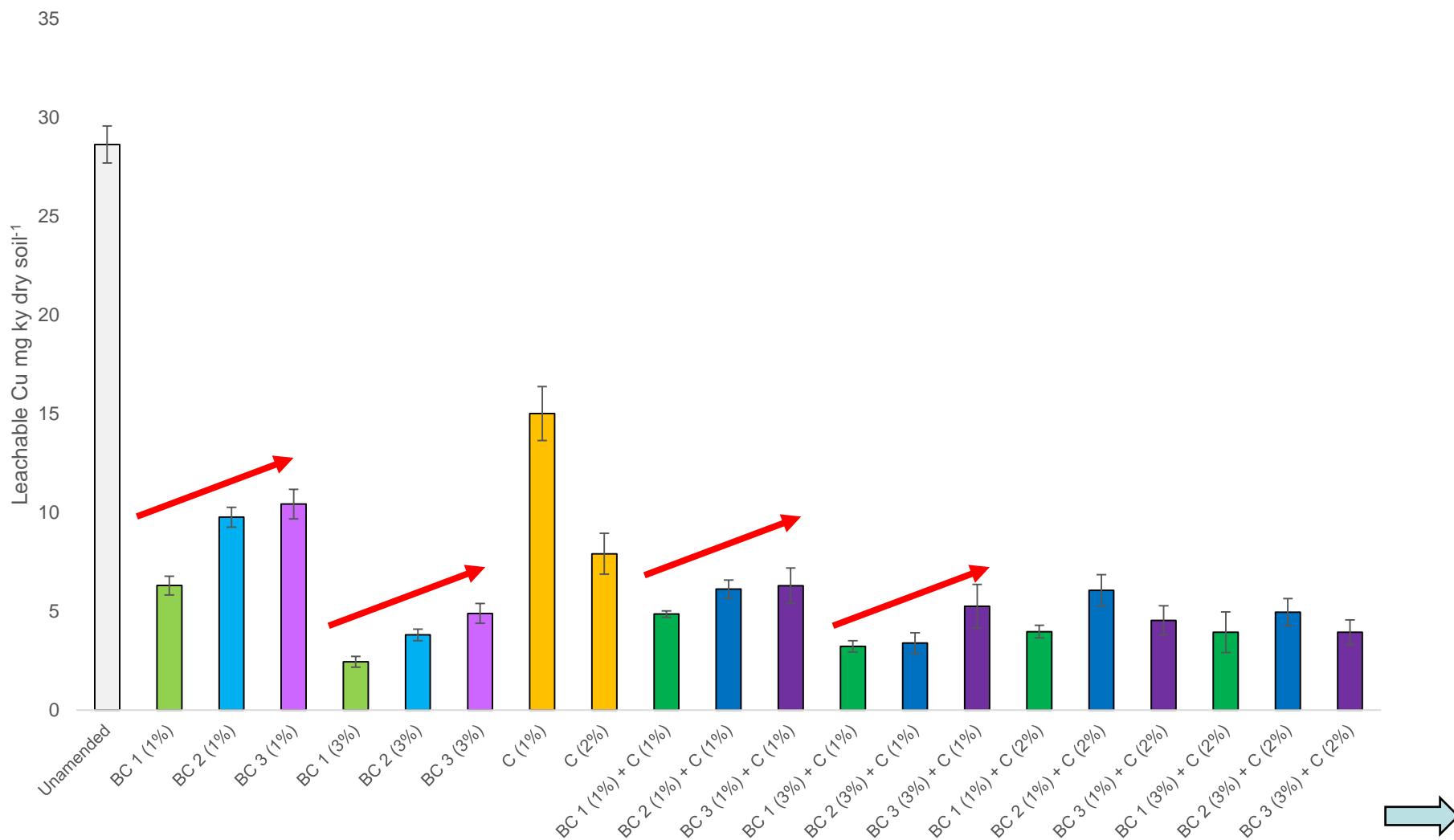


Analysis/Activities

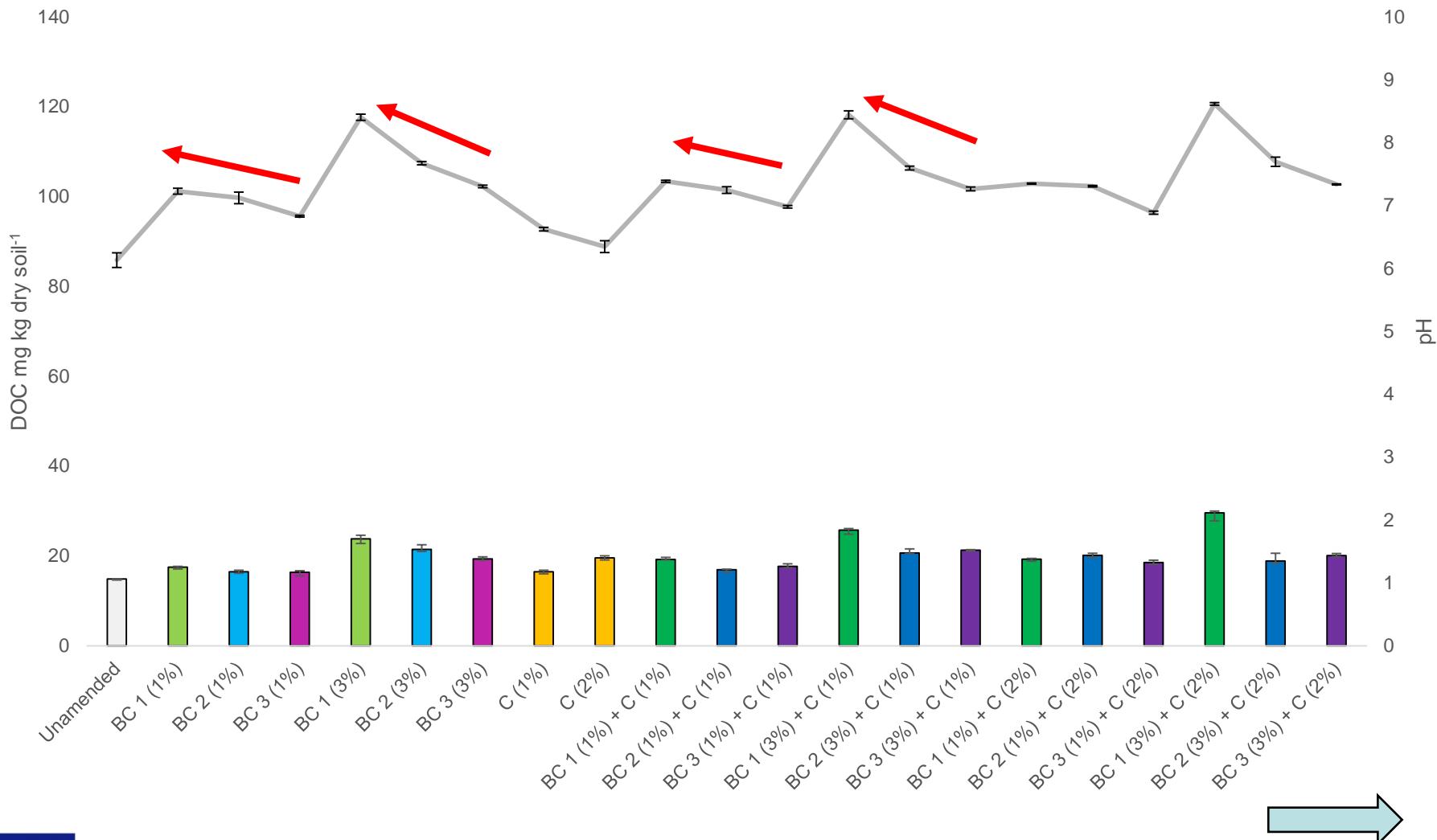
- Background analyses (Technalia – total metals, PAH)
- Leach tests – pre incubation, post incubation, post growth
 - Incubation period (14d, wet/dry cycle)
- pH, EH
- DOC
- Plant trials – biomass and metal uptake



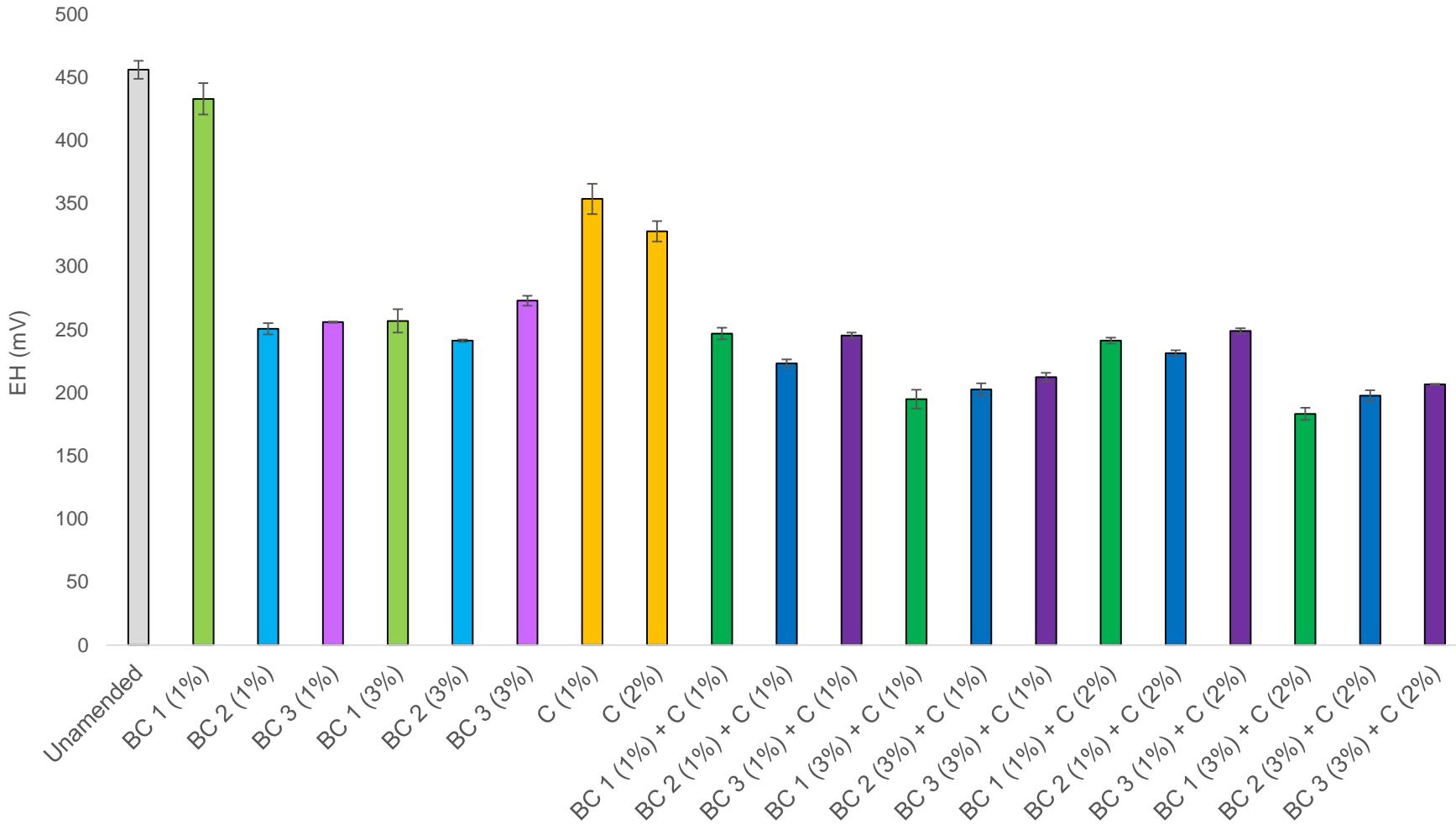
Results: Pre Incubation Leaching Tests



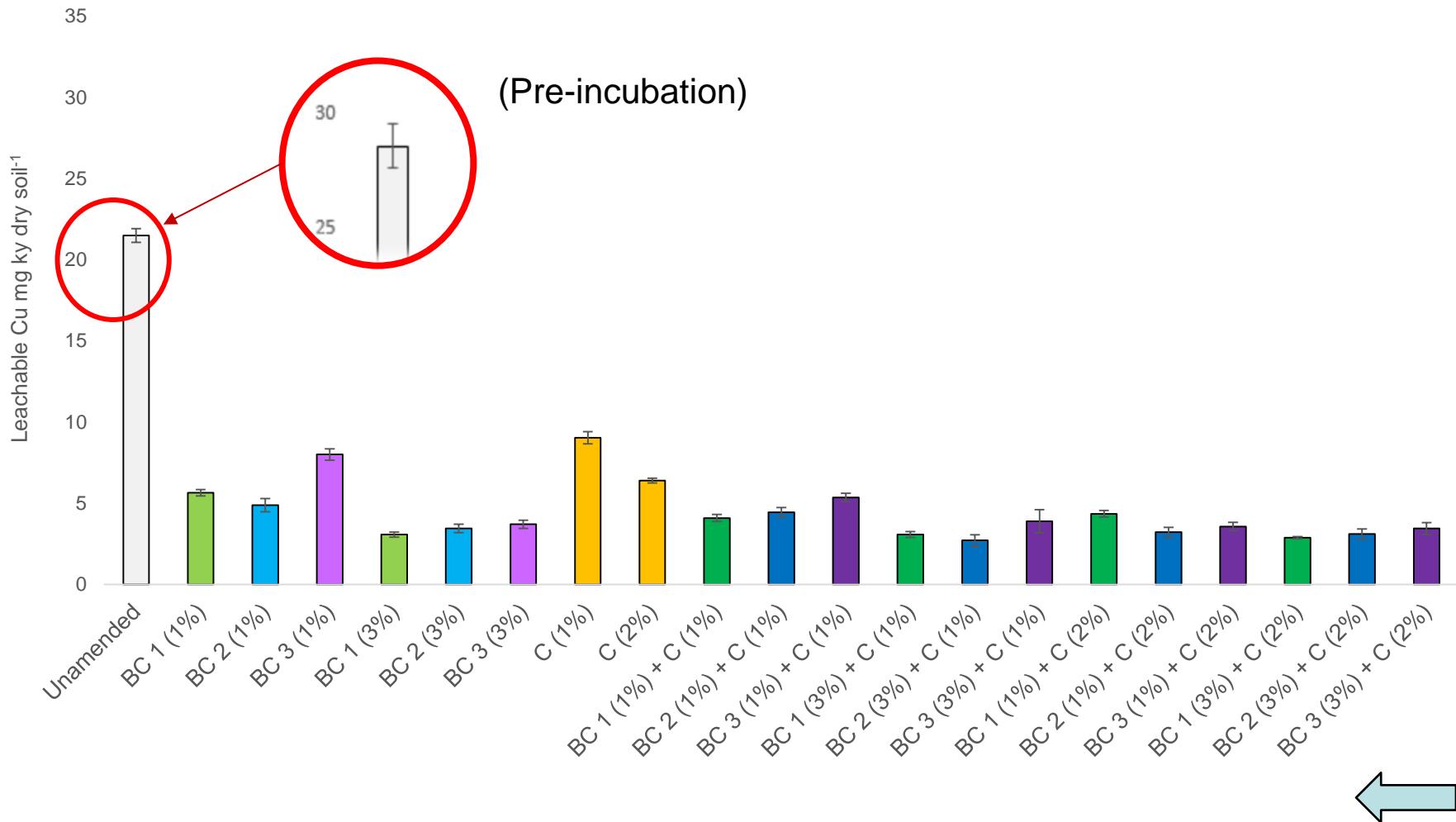
Results: Pre Incubation pH & DOC



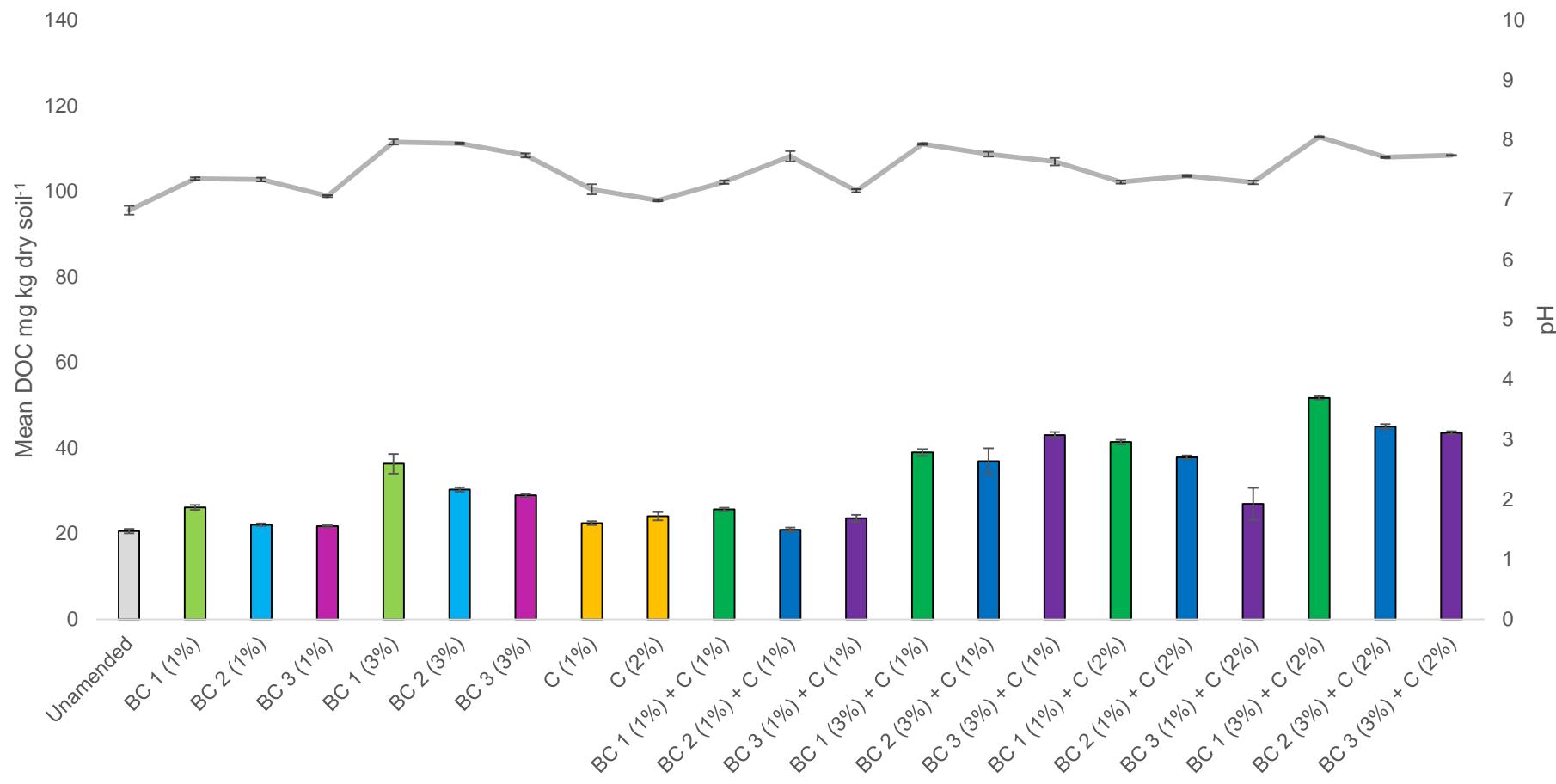
Results: Pre Incubation EH



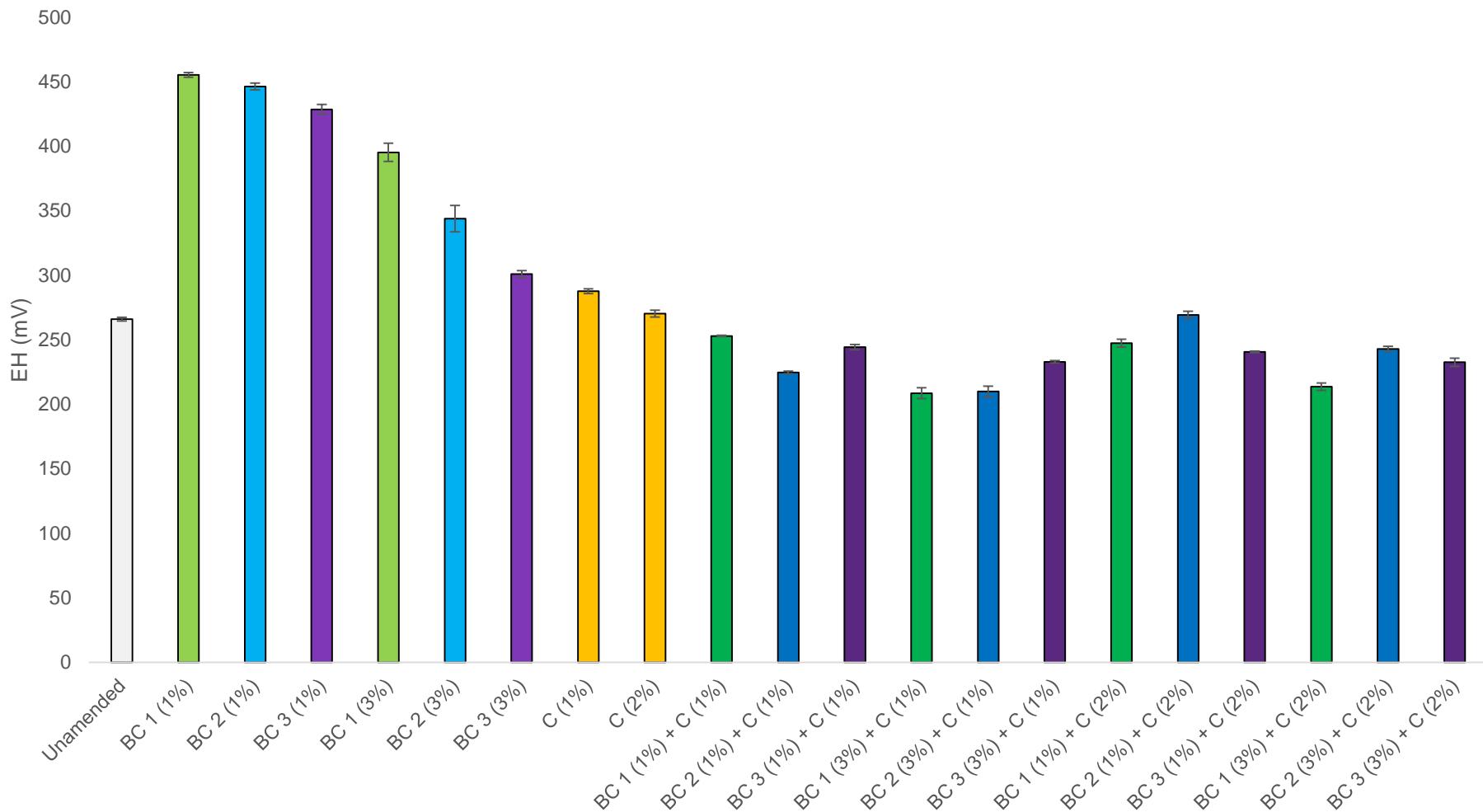
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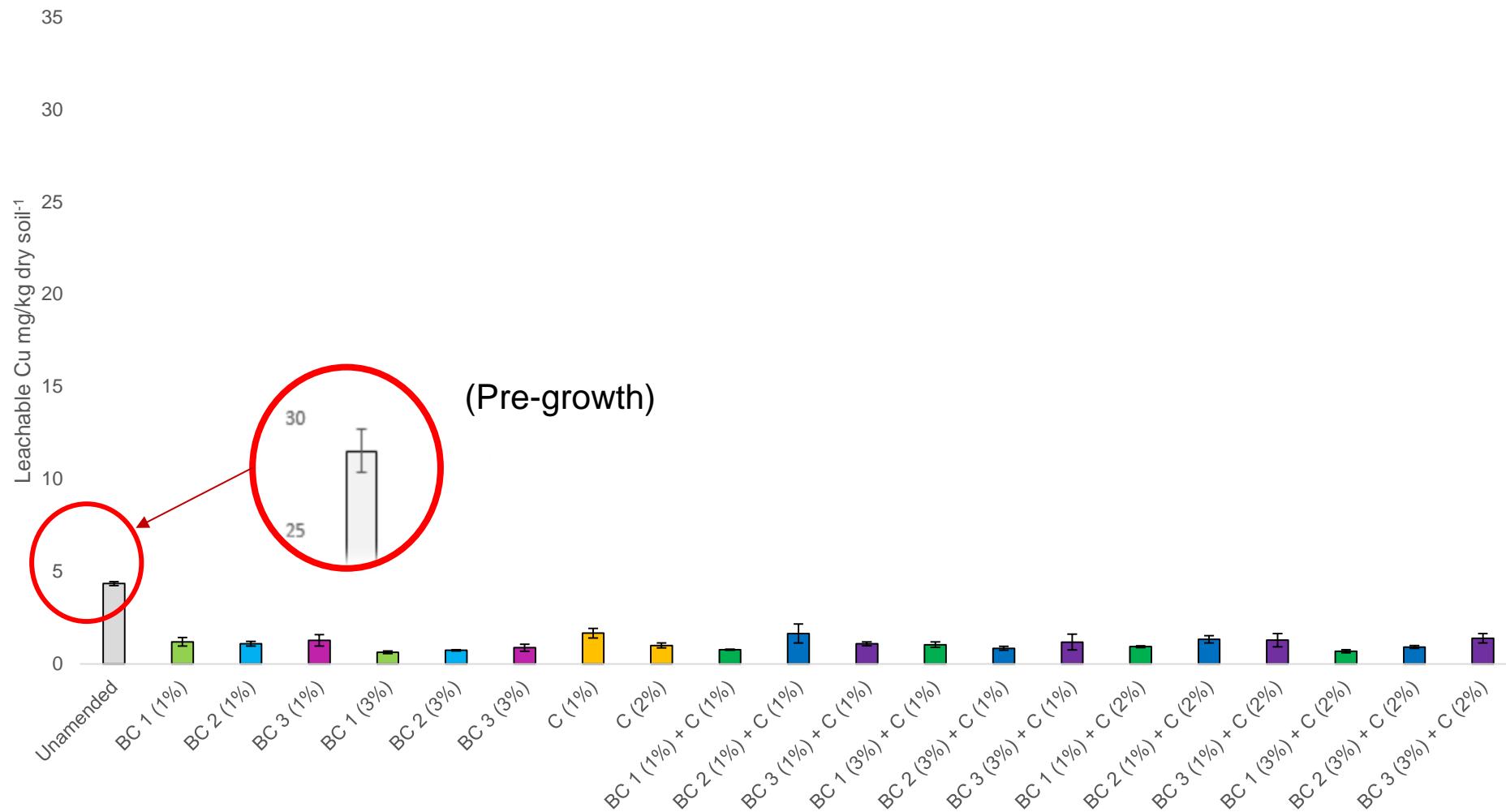
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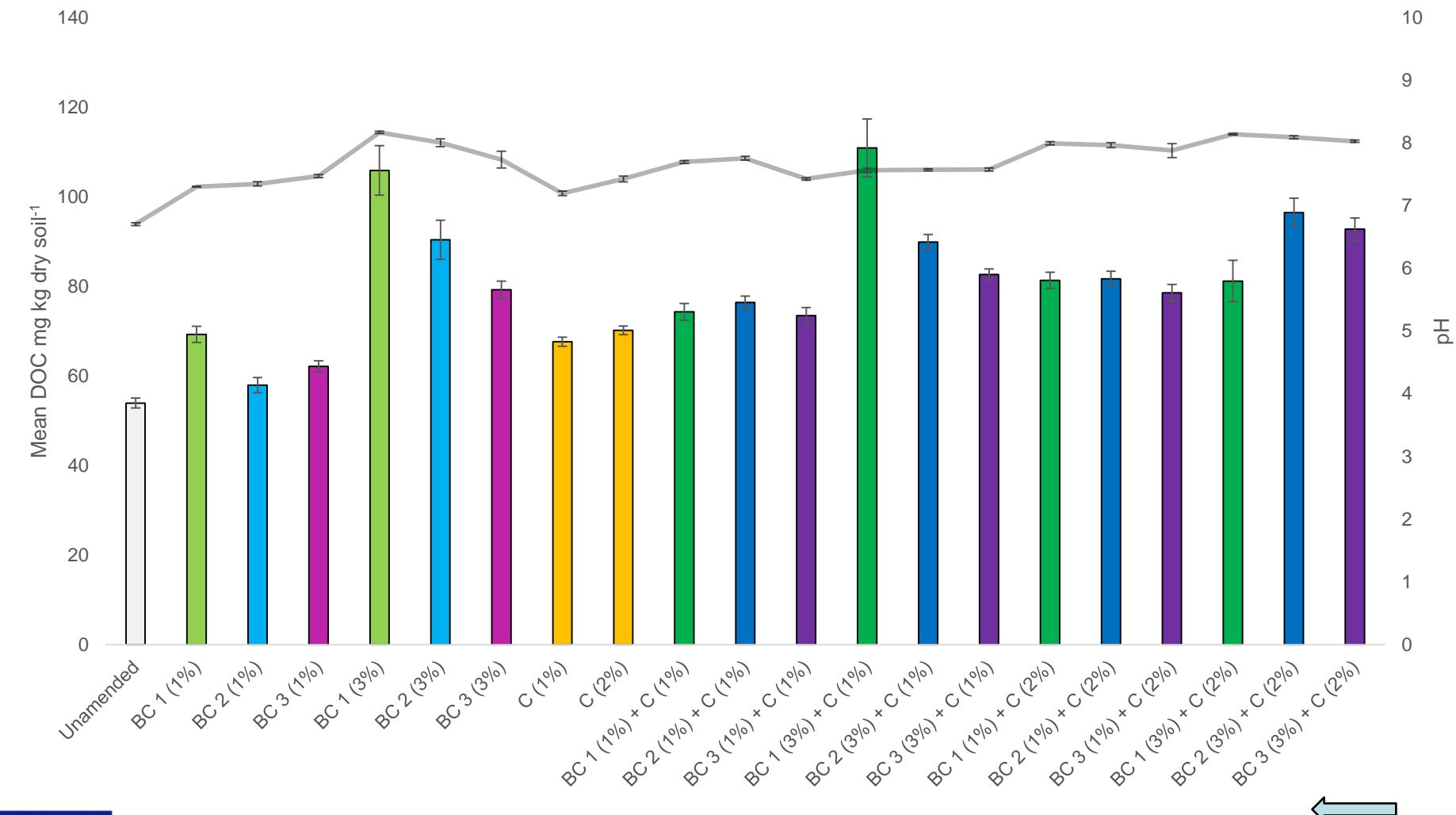
Results: Post Incubation EH



Results: Post Growth Leaching Tests

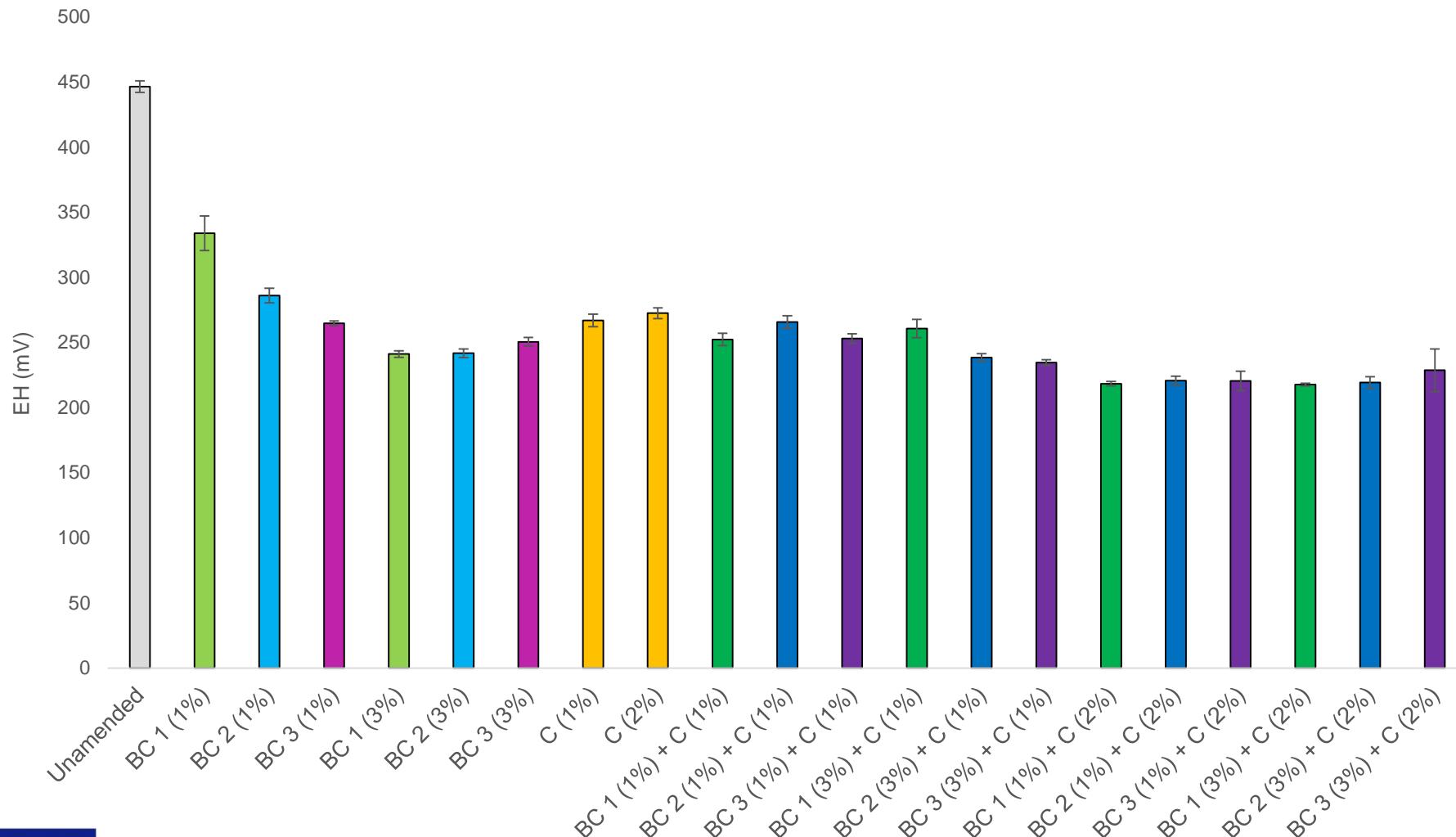


Results: Post Growth pH & DOC

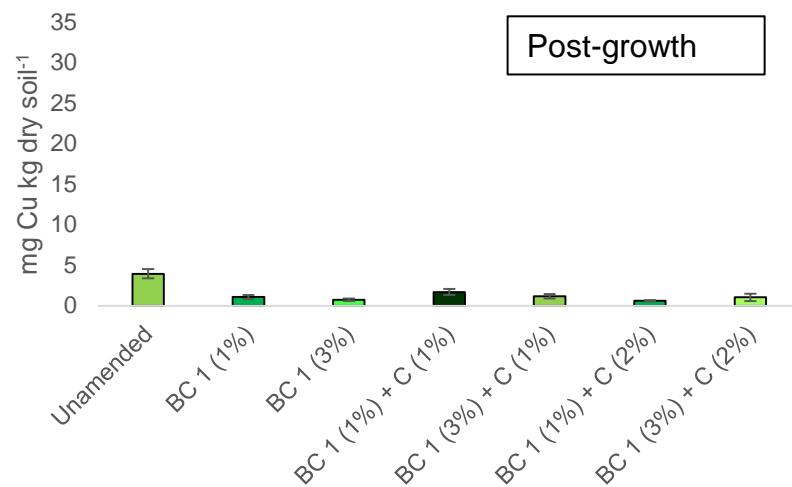
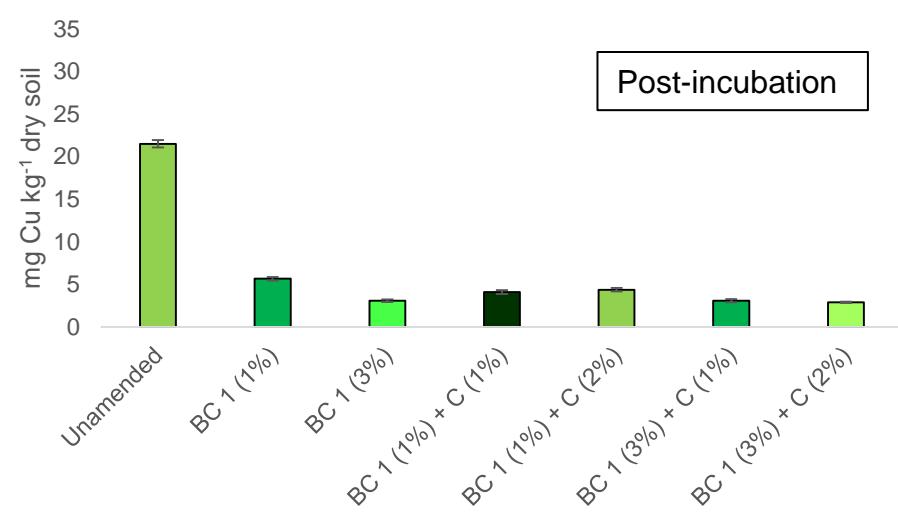
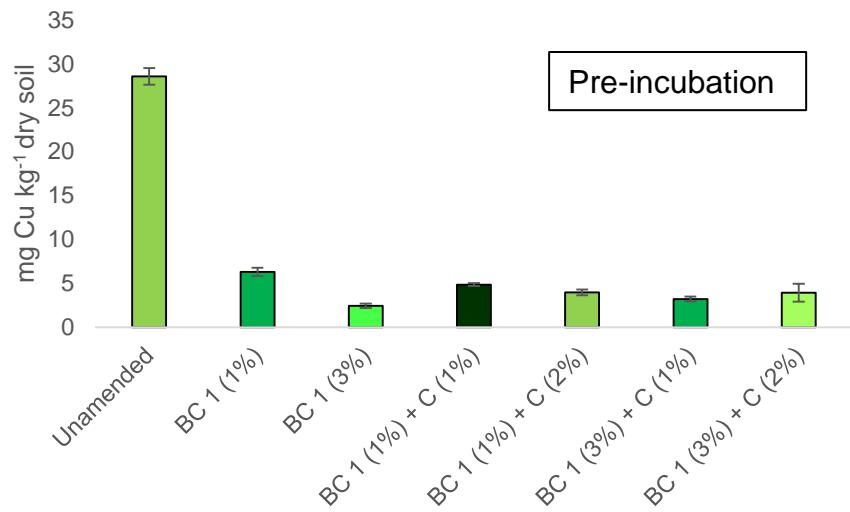


Post Growth EH

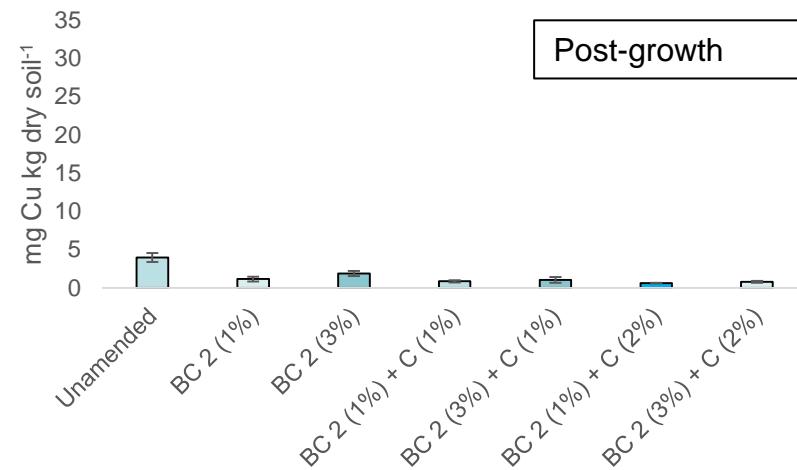
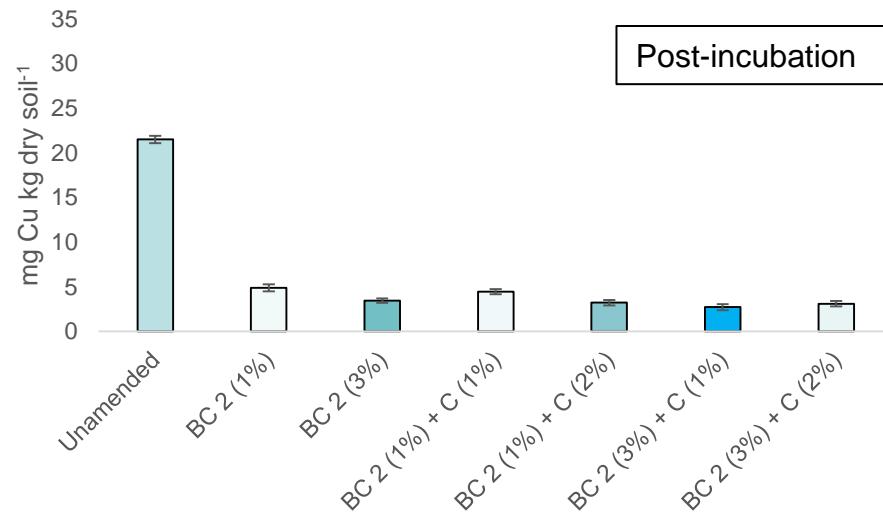
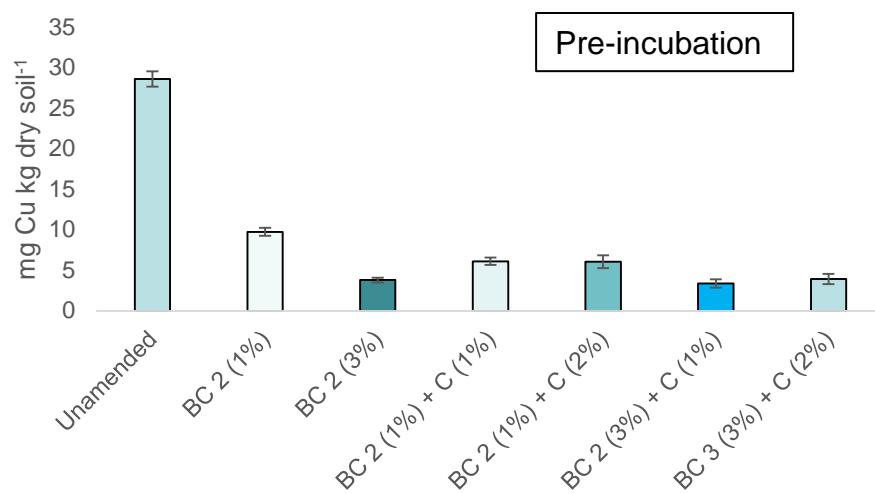
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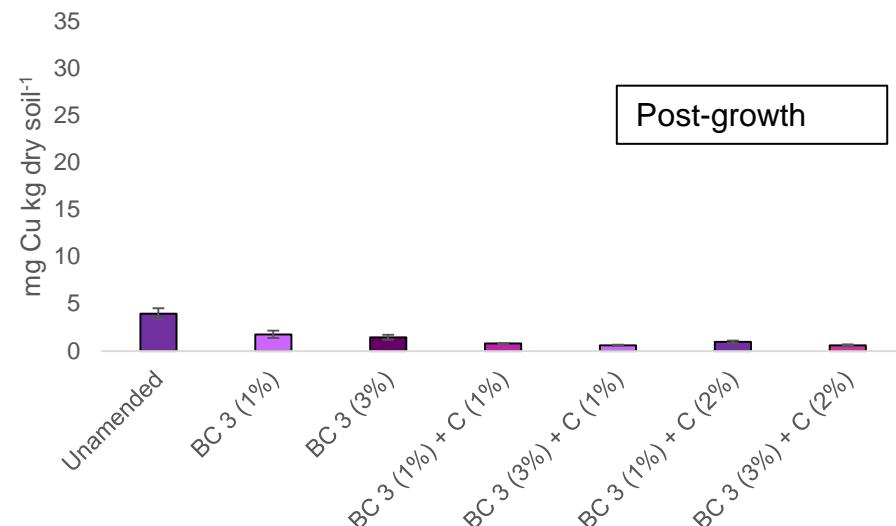
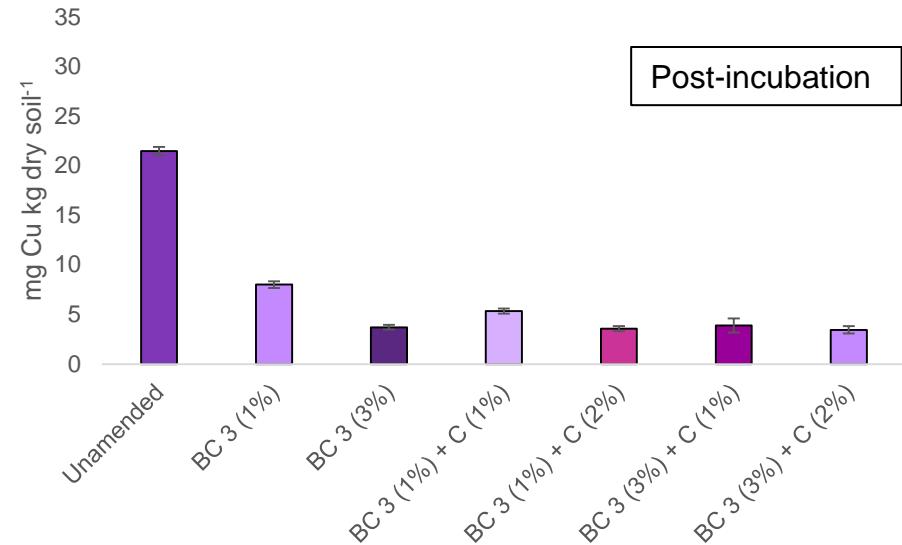
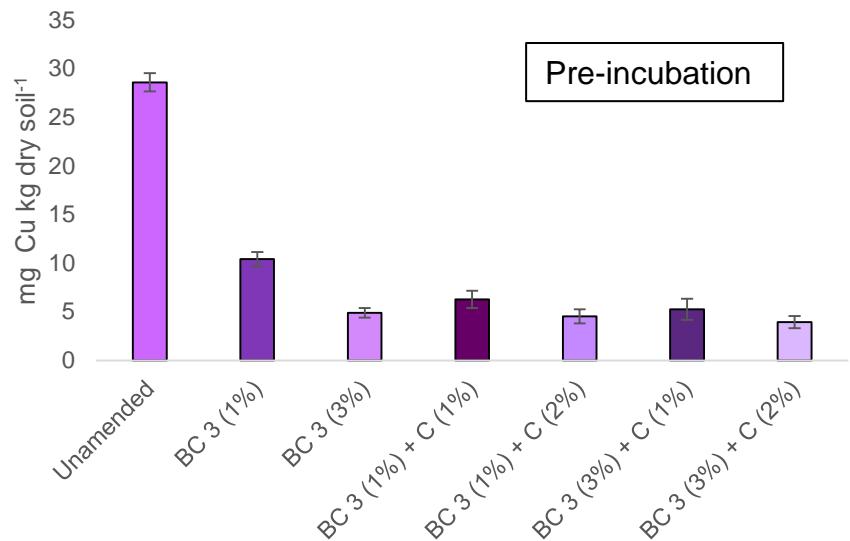
Leaching Tests: BC1 (C-Cure)



Leaching Tests: BC2 (poplar)



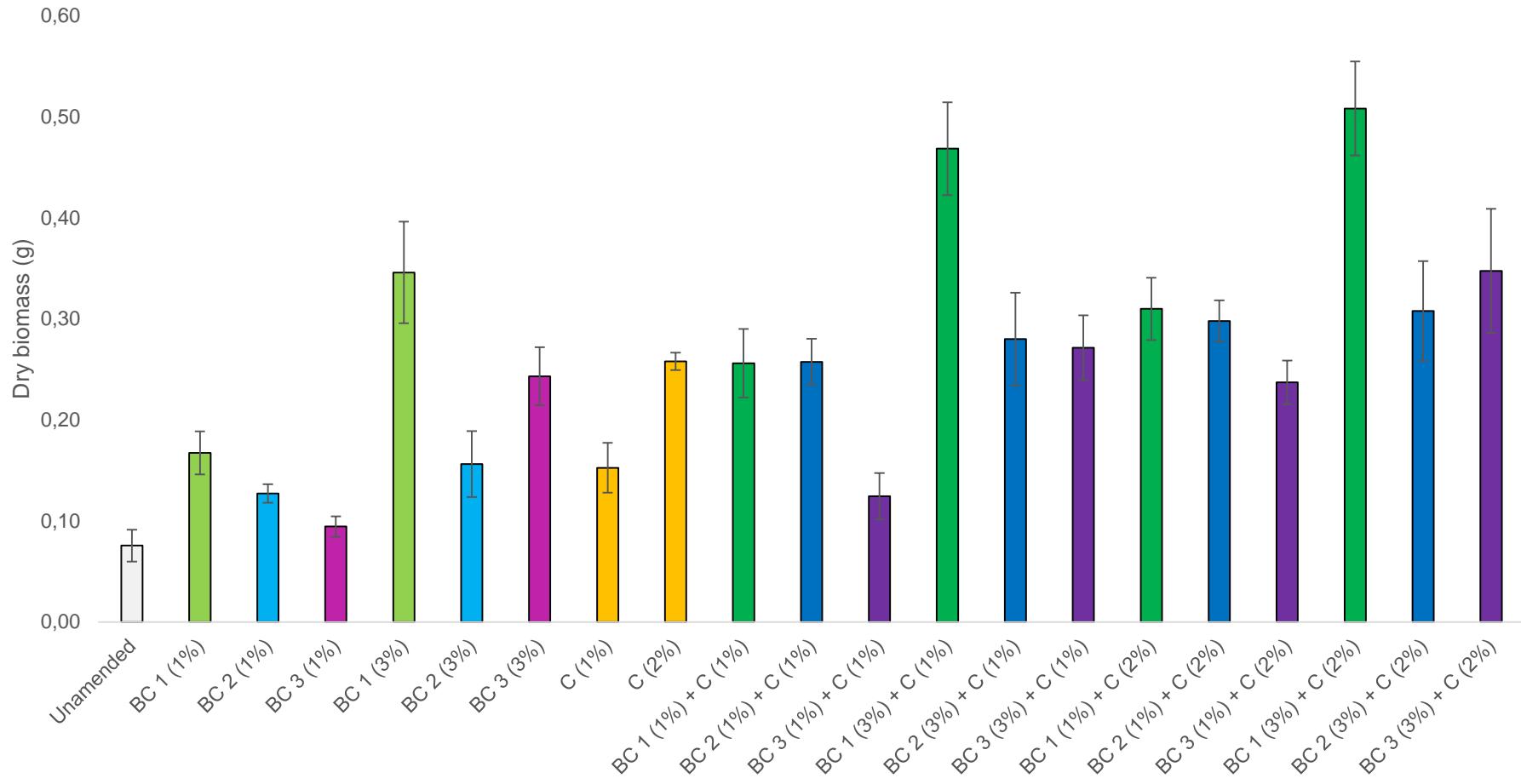
Leaching Tests: BC3 - (poplar+Fe)



Plant Growth – at 7 weeks



Results: Above Ground Dry Biomass



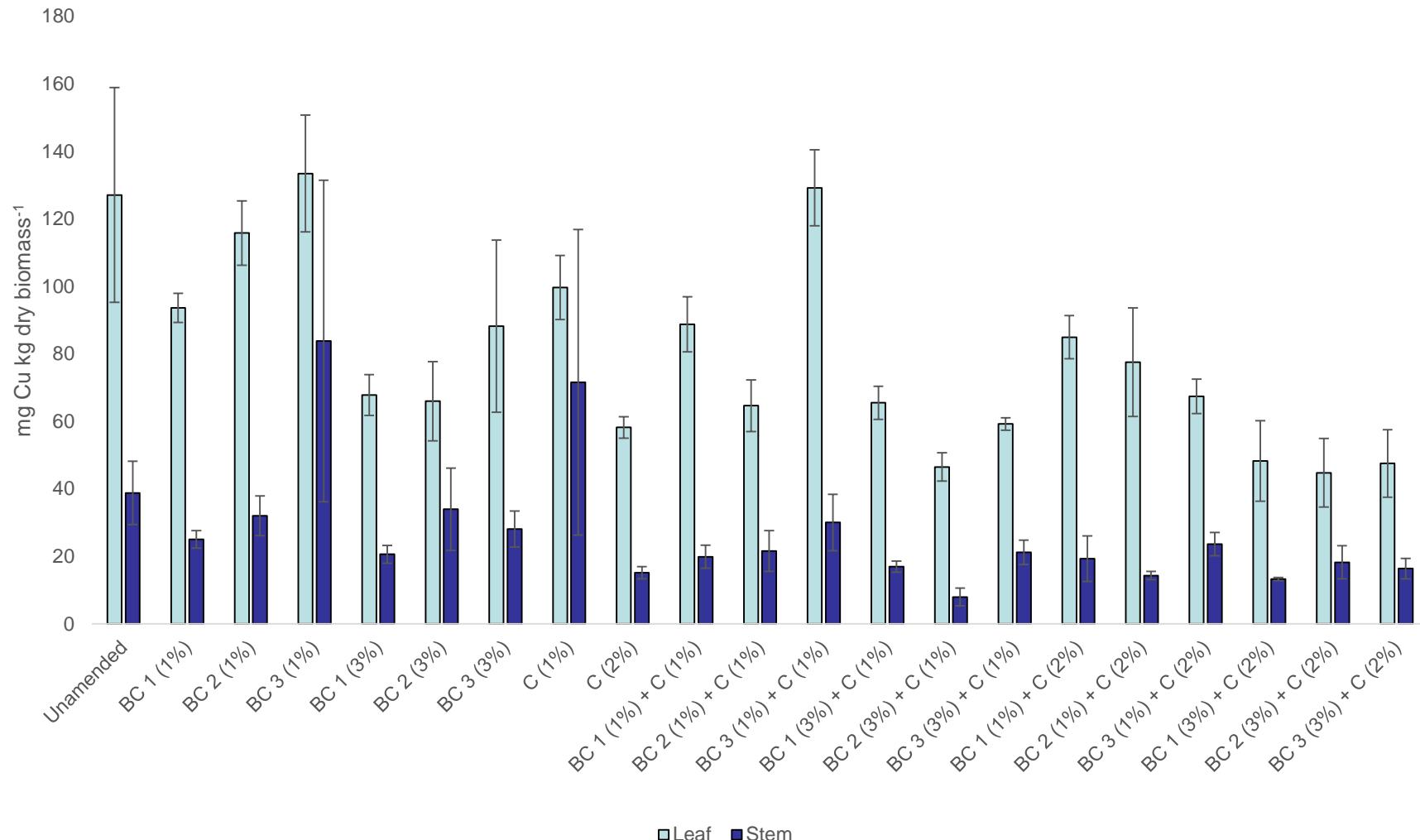
Result: Plant Growth



Result: Plant Growth



Results: Metal uptake



Discussion + Conclusions

- BC1 overall reduced leachable Cu before growth (clear distinctions between treatments and controls; less obvious after the growth period)
- BC1 increased plant growth most significantly
- Generally, higher application rates and combination with compost improved results for all biochars for both phytotoxicity and leachable Cu reduction
- Discussion point: dramatic reduction in leachable Cu post growth – where has the leachable Cu gone?
 - Leached from soil?
 - Taken up by plants?
 - Changed to a less available form? If so, what were the determining factors?



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This presentation reflects only the author's views and that the European Union is not liable for any use that may be made of the information contained therein.

Greenland: Under Grant
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Thank You

- Contact:

- Sarah Jones, sarah@r3environmental.co.uk, www.r3environmental.com
- Paul Bardos, paul@r3environmental.co.uk, www.r3environmental.com
- Petra Kidd, pkidd@iiag.csic.es, www.iiag.scic.es
- Pierre Menger, pierre.menger@tecnalia.com, www.tecnalia.com

