

# Revision report

## Title

Straw and biochar co-application: A strategy to reduce Cd–Zn bioavailability, alleviate microbial nutrient limitations and enhance soil C stability

## Authors

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## Reference

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## General comments

This paper is well written and deals with a subject that is both scientifically relevant and within the journal's scope. The authors evaluated an extensive list of variables, allowing for a comprehensive treatment of the subject. However, there are some points that, in my opinion, should be improved. The discussion could be strengthened by further comparing the results obtained by the authors with those of other studies. Additionally, some of the conclusions drawn by the authors should be more firmly supported by the results and, in particular, by the statistical analysis. My detailed comments are provided below.

## Specific comments

### Introduction

At high concentrations, Zn can cause several problems, including phytotoxicity. However, it is also a plant micronutrient, which highlights its importance, provided that its soil content remains within reasonable limits. In my opinion, this should be briefly focused.

I also think that the possible effects of straw and biochar on soil microorganisms and soil enzymes are not sufficiently addressed in the Introduction.

## Materials and Methods

L63-71 – Some contextualization regarding soil classification, etc. should be given.

## Results and Discussion

L127 – p-value should be in lower-case letter.

L154 – In my opinion, abbreviations should not be used in titles.

L193-194 – The authors stated that “However, as cultivation progressed, AHN content in straw-treated soil gradually decreased.” This claim should be statistically tested (using an ANOVA and Tukey HSD or Duncan’s post hoc test, or equivalents).

L195-196 – This should be supported by reference(s).

L199-204 – This should be more thoroughly discussed in light of the available literature.

L209-218 – Please check my comment above (referring to L199-204).

L233-234 – In my opinion, saying that “ S4C0 had the most pronounced impact on enzyme activities because microorganisms are more responsive to straw” may be too strong and definitive.

L244-246 – These claims should be checked with a statistical test.

L245-246 – While these are possible explanations, the authors do not have a definitive proof that they were the only cause.

L250-257 – These results should be compared with other studies.

L292 – The authors stated that “Applying straw and biochar at a 1:3 (straw:biochar) ratio effectively decreased the bioavailability of Cd and Zn (...)”. However, Fig. 1 shows that Cd content was not significantly different between treatments S1C3 and S0C4 at all 3 sampling times, and that Zn content was significantly lower in treatment S0C4 when compared with other treatments (including treatment S1C3) at 30 and 90 days.

I understand that this discrepancy arises because the authors used a different analysis in this subsection than in Fig. 1. However, I believe this should also be acknowledged and discussed.

## Conclusions

L296 – The authors stated that “The combined application of straw and biochar effectively reduced (...) greenhouse gas emissions”. However, Fig. 2b shows that the lowest CO<sub>2</sub> emissions occurred in the control treatment (i.e., without biochar or straw) and in the S0C4 treatment (with biochar only).