

## ***Interactive comment on “Can worms be used to produce amendments with reduced CO<sub>2</sub> emissions during co-composting with clay and biochar and after their addition to soil?” by J. Barthod et al.***

### **Anonymous Referee #1**

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This interesting study has as its goal to determine if adding clay, biochar, or both to precomposted wastes can reduce CO<sub>2</sub> emissions during composting or vermicomposting, and “after the use of the final products as soil amendments.” The experiments seem well-designed, and the paper’s results are useful.

I recommend two major revisions to this paper focusing on 1) logical flow and 2) figure quality and clarity.

1. logical flow: The paper struggles with logical flow in a few places, and the paper would be stronger if this were addressed prior to publication. Parts of the paper seem

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to be advancing the argument that clay, biochar, and worms can act together to reduce CO<sub>2</sub>, while in other places the paper stays closer to the data, which mostly do not show this. The paper would still be interesting if the authors argued (as the data seem to) that most combinations of biochar, clay, and worms speed up soil CO<sub>2</sub> loss. However, parts of the text are confusing because of the advocacy for adding worms to reduce CO<sub>2</sub> emissions. Figure 2, which shows CO<sub>2</sub> emissions vs treatment, does not show that worms help reduce CO<sub>2</sub> emissions except in one of the five scenarios, with the other 4 scenarios leading to either increased CO<sub>2</sub> emissions or unchanged CO<sub>2</sub> emissions. This makes sentences like this one, from the end of the abstract (line 28), seem like a non sequitur: “In summary, the addition of worms during co-composting with clay and biochar may be a promising technology for reducing CO<sub>2</sub> emissions and increasing soil carbon storage.”

The paper’s title would benefit from revision for clarity. The use of a question as a title suggests that the authors have not yet decided what the conclusions of the work are. Either a conclusive title (e.g. “Worms can increase CO<sub>2</sub> emissions during co-composting with clay and biochar”) or a declarative title (e.g. “The effects of worms on CO<sub>2</sub> emissions during co-composting with clay and biochar”) would strengthen the paper.

Section 3.3 would benefit from focusing and shortening.

Section 4.1 should be moved to the results section.

Section 4.2 would also benefit from focusing and shortening. For example, the paragraph starting at line 328 (“When biochars were added. . .”) would benefit from a thesis statement – what is the main idea that this paragraph is conveying? The paragraph starting on line 351 would also benefit from similar focusing.

2) Figure quality and clarity: Figure 2 captions: suggest revising “Letters a,b,c, d, e, and f means the statistical difference” to “columns with the same letter are statistically identical,” or “different letters indicate statistically significant differences.”

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Figures 3, 4, and 5: legibility would be improved if the axes numbers were in black font, not gray

Figure 6: this figure is not comprehensible because the text is so highly overprinted.

Other items: Introduction: Paragraph beginning at line 37: this paragraph would benefit from proofreading for clarity. For example, the second sentence does not logically follow from the first. In addition, this paragraph would benefit from proofreading for punctuation (line 45).

Line 127: are the units here of mg/m correct? Should they be mg/mg instead? Lines 142-143: typos: "weighted" should be "weighed," "juvenils" -> "juveniles," and "airdried" -> "air dried."

Line 190: the assumption that biochar does not release any CO<sub>2</sub> during incubation experiments is questionable, as there are many studies showing release of CO<sub>2</sub> during biochar incubation. However, it's possible that the authors have found an outlier condition where this is the case, by choosing a biochar made at extremely high temperatures (1200°C). Please make this clear.

Line 309: provide data supporting the statement that the soil surface area doubled.

Line 402: change "to use" to "of using";

Throughout the text: Eisenia is a genus, not a species.

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