

The pH and available phosphorus as primary drivers of compost-induced CO₂ emissions from malaysian tropical soil: empirical relationships

Revision report

The study presented in this manuscript is interesting and relevant. In my opinion, the study design is adequate to approach the defined objectives. Especially, I found it interesting that the authors not only measured CO₂ emissions, but also tried to explain it. However, there are some points that should be addressed to improve the manuscript quality, which I present in detail below.

One of the topics is related to several spelling mistakes and inconsistencies. I pointed out some (but not all) below, and I advise the authors to carefully revise the manuscript and correct them.

In general, the manuscript is scientifically accurate. However, in some cases, this could be improved, particularly in what relates to the language used in some parts and to some legends which, in some cases, do not have enough information. Please check my specific comments below for more information.

Abstract

L9-11 – The authors stated that “Multiple regression analyses identified soil available phosphorus (AP) and pH as the key interactive drivers of CO₂ emissions, in the following order: chicken dung compost (CDCS) > sludge compost (SLS) > goat manure-leaf compost (GLCS) > food waste compost (FWCS).” If I am not mistaken, this is not addressed in the Results. Please check this and, if necessary, correct it.

L15 – I believe the correct word is “physico-chemical” and not “physic-chemical”.

Graphical abstract

There is a typo in the word “moisture”.

Keywords

There is a typo in “Available phosphoru”.

There is an overlap between the keywords and the title. I suggest choosing keywords that there are not already in the title.

Introduction

L34 – The authors use the abbreviation SOC to “soil carbon sequestration”. However, this abbreviation is commonly used for “soil organic carbon”. Please check .

L67-74 – The authors presented 3 hypothesis. However, if I am not mistaken, they did not explicitly address them in Discussion.

Materials and methods

L93 – The authors refer that soil was sampled at “10 to 20 cm depth”. Does this mean that the sampling depth was between the surface (0 cm) and a depth between 10 to 20 cm, or does this mean that sampling depth was between 10 cm and 20 cm?

If the latter hypothesis is true, why not start at 0 cm?

L105-108 – I suggest to present this in a table.

L105 – Please remove the blank space after the number (0.42).

L111 – If my interpretation is correct, 1:9 and 1:39 (w/w) are equivalent to 10% and 2.5% (w/w). For better clarity, I suggest that the authors present the ratios in a single way (e.g. 2.5% and 10% (w/w)).

L117-118 – The authors refer 14 measurement times but only 12 are shown.

L119 – This information is repeated from the previous sentence/paragraph.

L122-123 – The authors referred that “The CO₂ emissions from soil were captured with NaOH and subsequently quantified by back-titration.” This was already mentioned in the previous sentence.

L123-124 – The authors mentioned that “This established method involved precipitating the trapped CO₂ as barium carbonate”. However, in the previous sentence they refer that NaOH was used to trap the CO₂. Please clarify/correct this.

L127-131 – The methods that were used should be explained in more detail (here or in Supplementary Material).

L136-138 – Normality of residues is also an ANOVA assumption. Have the authors evaluated it? If so, please add the details. Additionally, have the ANOVA assumptions of homogeneity of variances and normality of residues always occurred? If not, what was the procedure followed by the authors? Have they also used non-parametric tests (e.g. Kruskal-Wallis' test)?

Results

L153 – There is an extra “.” at the end of the sentence. Please remove it. Additionally the reference to Figure 1 occurs in 2 consecutive sentences which, in my opinion, is excessive.

L153-155 – This interpretation should be included in Discussion and not in Results.

L161 – There is an extra “.” Please remove it.

L160-162 – This remark should be included in the Materials and Methods section, not in the figure legend.

Tables 1 and 2 – For better clarity and flow, I suggest including means, standard deviations, statistical letters, F-values, and p-values in the same table.

Additionally, the legend has an extra blank space. Please remove it.

Table 2 – The meaning of “df” should be indicated.

L171-173 – The second part of the sentence (“and for each compost type, the 10 % addition gave significantly higher values than the 2.5 % addition ($p < 0.05$).”) can already be inferred from the first part (“increasing the compost addition rate from 2.5 % to 10 % consistently enhanced the concentrations of all three nitrogen forms”). Please check this redundancy.

Figure 2 – There is a typo in electrical conductivity. Additionally, the unit “siemens” is represented by a capital S (dS/m) and not by a lower case s.

Figure 2 – The authors wrote that “Data are presented as mean $\pm$ SD”. However, this is a figure, not a table. Therefore, the +/- sign should not be included here.

L173-174 – The authors refer that “the original soil showed no significant difference between NH_4^+ -N and NO_3^- -N”. I believe that the meaning of this is understandable. However, in my opinion, it is not accurately expressed as the authors did not statistically compare the levels of NH_4^+ -N and NO_3^- -N. I believe that what the authors meant was that the levels of both variables were similar.

Additionally, this information is supported by Figure 2. However, the reference to that figure was not included here.

L176 – Considering that the authors are moving from the N-related to the P-related variables, the 2 sentences should be divided by a paragraph.

L175-176 – The authors wrote “As shown in Figure 2(b), the ARC-soil had an AP content below the instrument detection limit”. I did not find any information regarding detection limits in Figure 2. Please check this.

L202 – There is a misplaced “.”

L206 – The CEC results should start in a new paragraph.

L211 – The “C” and the “O” in CO₂ should be capital letters.

Figure 3 – Please check the legend, as the “(a)” is repeated and there are 2 “.” at the end.

L212-213 – The authors wrote that “Throughout the first two weeks of incubation, CO₂ emissions from FWCS, GLCS, CDCS, and SLS remained consistently higher than those from ARC-soil”. It was not only during the first 2 weeks but during all the 90 days.

L217 – The “.” is repeated at the end of the sentence.

Figure 3 – For an easier comparison, I would suggest that the 2 figures should have the same y-scale. The same is applicable to Figure 4.

Figure 5 – The legend of this figure should be improved. For example, what does the number inside each correlation matrix represent? Are they Spearman or Pearson correlation coefficients? What do the authors mean with “(b) statistical significance”?

L245-268 – These are technical details that, in my opinion, are misplaced here. Instead, they should be presented in Supplementary Material.

Tables 3 to 6 – More information needs to be added to the legends. Most of the information in these tables do not have enough relevance to be shown in the manuscript. Therefore, I would suggest to extract the most relevant information from those tables and include it in a single one. The remaining information can be moved to Supplementary Material.

Figure 6 – Please check my comments above regarding Tables 3 to 6 and L245-268.

L280 – I believe “Y” represent CO₂ emission. However, this should be clearly indicated. The same is applicable to the Figures and Tables where Y is shown.

Discussion

The adjusted R² is very high. I suggest that the authors briefly explore the implications of this in the Discussion.

L286-300 – The authors did not evaluate microbial activity directly linked to N-cycling. CO₂ production can be related to microbial activity, but not necessarily to microbial activity directly linked to N-cycling. Therefore, in my opinion, this should be revised.

Supplementary Material

I noticed that the authors included Supplementary Material. However, it is not referenced in the manuscript.