CC1: 'Comment on egusphere-2026-1497', Engracia Madejón Rodríguez

This article presents a relevant study on the use of rice straw as an alternative bulking agent for sewage sludge composting and evaluates its agronomic effects under real field conditions in a commercial citrus orchard. A major strength of the work is its practical approach, as it combines industrial-scale compost production with field application over two growing seasons, providing valuable evidence of the potential of RS–SS compost as a sustainable strategy for organic waste valorisation and soil fertility improvement. However, the manuscript also presents some weaknesses and aspects that should be improved before it can be considered suitable for publication in a journal such as SOIL. In particular, the introduction and discussion would benefit from a clearer focus, reduced repetition, stronger synthesis of the results, and a more explicit interpretation of the differences observed between the two experimental seasons.

Response:

We sincerely thank Dr. Madejón for her positive assessment of our work and for her valuable and constructive comments. We greatly appreciate her recognition of the practical relevance of the study, particularly the industrial-scale production of rice straw–sewage sludge compost and its evaluation under commercial field conditions.

Following her suggestions, the manuscript has been extensively revised. The Introduction was shortened and refocused to better emphasise the novelty and practical relevance of using rice straw as an alternative bulking agent for sewage sludge composting. The Materials and Methods section was clarified in several aspects of the experimental design. The Discussion was substantially reorganised to improve readability, reduce repetition and excessive literature comparisons, and provide a clearer interpretation of the results. Particular attention was devoted to the interpretation of the seasonal responses observed throughout the study, taking into account that S1 evaluated the effects of an initial compost application whereas S2 assessed the response to a subsequent application on the same plots. The revised manuscript now more clearly describes the experimental context of each growing season and avoids direct comparisons between composts or between growing seasons. Overall, these revisions have improved the clarity, focus and scientific interpretation of the manuscript.

Introduction

A major strength of this work is the identification of rice straw as an alternative bulking agent for sewage sludge composting. Finding sustainable substitutes for pruning residues as bulking materials is currently an important concern within the sector, and the authors should place greater emphasis on this aspect of the study to:

Reducing the legislative background and focusing only on the most relevant policies. Shortening repetitive explanations about compost benefits that are already well established.

Improving the flow between paragraphs so the narrative moves more directly from the problem (rice straw management) to the proposed solution (RS–SS compost).

Clarifying the novelty earlier, especially the industrial-scale composting and its application in citrus orchards under flood irrigation.

Reducing citation density where possible.

Response:

We thank Dr. Madejón for these valuable suggestions. We fully agree that the identification of rice straw as a sustainable alternative bulking agent for sewage sludge composting represents one of the main strengths of this work. Following her recommendations, the Introduction has been substantially revised and streamlined. The legislative background was reduced to include only the most relevant policies, repetitive explanations regarding the benefits of compost application were shortened, and the overall structure was reorganised to improve the flow from the problem of rice straw management to the proposed solution based on rice straw–sewage sludge composting. Greater emphasis is now placed on the use of rice straw as a sustainable alternative bulking agent for sewage sludge composting and on the agronomic potential of the resulting compost. In addition, the novelty of the study is highlighted more explicitly, particularly the industrial-scale production of RS–SS compost, its agronomic characterisation, and its validation under field conditions in a commercial citrus orchard managed under flood irrigation. Citation density was also reduced where possible to improve readability.

Materials and Methods:

This experimental description is clear, detailed, and generally well structured. It provides essential information about the field conditions, treatments, experimental design, and management practices, which supports reproducibility. The use of a commercial citrus orchard and two growing seasons is also a strong point because it increases the practical relevance of the study.

However, the section could be improved by making it more concise and easier to follow. Some sentences are overly long and contain too many details at once. I would also recommend:

Explaining more explicitly why mineral fertilisation was maintained together with compost treatments, since this is important for interpreting the results.

Response:

We thank Dr. Madejón for her positive assessment of the experimental design and for this valuable suggestion. Following her recommendation, additional information has been incorporated into the Materials and Methods section to explain more explicitly why mineral fertilisation was adjusted during the experiment. As the study was conducted under commercial orchard conditions, mineral fertilisation was initially maintained to ensure adequate crop nutrition and to avoid masking the effects of compost application. In this context, based on the compost characterisation and soil analyses, mineral fertilisation rates were corrected according to the increase availability of nutrients in the soil, leading to a reduction in P fertiliser units during S2 (10%). This information is now more clearly described in the revised manuscript.

Specify the total number of experimental plots used. As I understand the design, there are two composts plus the control, two application rates, and three replicates per treatment, resulting in a total of 15 experimental plots. Is that interpretation, correct?

Response:

We thank Dr. Madejón for pointing out this lack of clarity. The experiment consisted of three treatments (control, single compost dose, and double compost dose), each replicated three times, resulting in a total of nine experimental plots. The same plots were maintained and monitored throughout the two growing seasons. COMP1 was applied in S1 and COMP2 in S2; therefore, the study did not involve 15 independent plots but rather the sequential evaluation of two composts in the same experimental plots over two consecutive growing seasons. This aspect has now been clarified in the revised manuscript.

Results

In the Results section, little emphasis is placed on the differences observed in soil determinations between the two seasons. There is a decrease in almost all parameters except for microbial biomass C. Could a statistical analysis be performed to evaluate the differences between the two seasons?

Response:

We thank Dr. Madejón for this valuable observation. We agree that the differences differences observed in several soil parameters between S1 and S2 are of interest and deserve consideration. However, statistical comparisons between seasons were not performed because the two seasons addressed different experimental situations. While S1 evaluated the effects of the initial compost application, S2 assessed the effects of a subsequent application on plots that had already received compost during the previous growing season, thereby incorporating cumulative effects. In addition, mineral fertilisation management differed between seasons, particularly due to the reduction in P fertiliser units implemented in S2. Consequently, the two seasons represent different experimental conditions and objectives, and cannot be considered directly comparable for statistical purposes.

To address this concern, the manuscript has been revised to clarify the experimental design and statistical approach. In addition, the Results and Discussion sections were revised to provide a more detailed qualitative interpretation of the trends observed across growing seasons. Given that S1 and S2 were analysed independently and do not represent directly comparable experimental conditions, these observations are discussed descriptively rather than statistically. Particular emphasis has been placed on potential explanations for the general decrease observed in several soil parameters and the contrasting behaviour of microbial biomass C and other biological indicators, as well as their relevance for the overall interpretation of the results.

Discussion:

The discussion is scientifically solid and very well referenced, but it is excessively long, repetitive, and sometimes reads more like an extended literature review than a focused interpretation of the results. Many ideas are repeated several times (especially regarding OM, salinity, nutrient availability, and previous studies), which weakens the overall impact of the discussion.

A major weakness is that the discussion does not sufficiently emphasize the differences between S1 and S2, despite the two-season approach being one of the strengths of the experiment. The seasonal responses are mentioned, but they are not deeply interpreted. For example:

Why were microbial effects significant in S1 but not in S2?

Why did some soil parameters respond only in S2?

Did the second compost application produce cumulative effects?

Were climatic or management differences between seasons relevant?

These aspects should become central to the discussion because they provide the most interesting biological and agronomic interpretation of the study.

Response:

We thank Dr. Madejón for this detailed and constructive assessment of the Discussion section. Following her recommendations, the Discussion has been substantially revised to improve its focus, readability, and interpretative value. Repetitive sections were shortened, several literature comparisons were reduced, and the text was reorganised around the main themes addressed in the study, including soil fertility, microbial activity, plant nutrition, and crop performance.

Particular attention was devoted to the interpretation of the seasonal trends observed throughout the study. Although direct statistical comparisons between S1 and S2 the two growing seasons represented different experimental situations and objectives, the revised Discussion now includes a more detailed qualitative interpretation of the observed responses. In particular, additional discussion has been incorporated regarding the contrasting behaviour of microbial biomass C and dehydrogenase activity, the occurrence of treatment effects only in S2 for some soil parameters, the potential contribution of succesive compost applications over time, and the influence of environmental and management-related factors on observed seasonal patterns. These observations are discussed descriptively and are not intended to represent statistical comparisons between growing seasons.

In addition, the novelty of the study, namely the industrial-scale production of rice straw–sewage sludge compost and its validation under commercial citrus orchard conditions, is now highlighted more clearly throughout the Discussion. Overall, these modifications have resulted in a more concise, focused, and interpretative discussion with greater attention given to the seasonal trends observed throughout the study and the potential effects of successive compost applications on soil and crop responses.

I would improve the discussion by:

Reducing repetition and shortening literature comparisons.

Focusing more on interpretation rather than describing every result again.

Structuring the discussion around key themes (soil fertility, microbial activity, plant nutrition, yield).

Explicitly comparing S1 vs S2 responses throughout the text.

Highlighting the novelty of the RS–SS compost and the industrial-scale validation more clearly.

Shortening considerably. secondary explanations and excessive citations

Overall, the discussion contains valuable information, but it needs stronger synthesis and clearer emphasis on the temporal dynamics between the two campaigns.

Response:

We thank Dr. Madejón for these valuable recommendations. Following her suggestions, the Discussion has been thoroughly revised and condensed. Repetitive sections and secondary explanations were reduced, several literature comparisons were shortened, and excessive citations were removed where they did not contribute directly to the interpretation of the results.

The Discussion was also reorganised into thematic sections addressing soil fertility, microbial activity, plant nutrition, and crop performance, which improved the overall structure and readability of the manuscript. Greater emphasis is now placed on the interpretation of the results rather than on the description of individual findings. In addition, the revised text incorporates a more explicit discussion of the of the seasonal patterns observed across the two growing seasons highlighting the different responses observed during each season and exploring their possible causes, including the potential influence of successive compost applications as well as environmental and management-related factors. As noted above, these observations are discussed qualitatively, acknowledging the limitations associated with direct statistical comparisons between growing seasons.

Finally, the novelty of the study, including the industrial-scale production of rice straw–sewage sludge compost and its field validation under commercial citrus orchard conditions, has been highlighted more explicitly throughout the Discussion. Overall, these revisions have resulted in a more concise, focused, and synthesised discussion with a stronger emphasis on the biological and agronomic interpretation of the results.

We would like to sincerely thank Dr. Madejón once again for her careful reading of the manuscript and for her valuable comments and suggestions. Her observations have been extremely helpful in improving the clarity, structure, and interpretation of the study. We hope that the revisions made in response to her comments have substantially strengthened the manuscript and improved its overall quality.