

Soil

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Manuscript title: The cooperative application of oyster shell and biochar efficiently enhanced in-situ remediation of cadmium contaminated soil around intensive industry

Article type: Research paper

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Reviewer 1:

The authors of the manuscript Soil-2021-145 “The cooperative application of oyster shell and biochar efficiently enhanced in-situ remediation of cadmium contaminated soil around intensive industry” addressed an interesting and important topic by using amendments (biochar and oyster shell) to achieve the safe-production of crops in the Cd contaminated soil following the rice-oilseed rape rotation. Indicators reflected soil quality including soil fertility and enzyme activities were also investigated by authors. Cd contaminant in farmland has been causing a great concern on human health. Overall, the authors present a well-designed study with appropriate methods, and this study provided a practical method to reduce the Cd contents in crops and reduce the remediation cost. I think that this study is well-worth to be published. However, some issues should be carefully considered before publication.

Response: *On behalf of all authors, I would like to thank Referee 1 for his/her time, helpful and overall enthusiastic comments, which are very helpful for the improvement of our manuscript. All comments have been taken into account and we attempted to answer all questions.*

Specific comments:

1. Introduction: Highlight the advantages of biochar and oyster shell on the immobilization of Cd in soils.

Response: *Thank you for your advice, which is very helpful for the improvement of our manuscript. The advantages of biochar and oyster shell will be added in our revised manuscript. Biochar derived from bio-wastes has widely recommended as a soil amendment in Cd contaminated soil. Amounts of nutrients (such as C, N, P, K, and Mg*

etc.) in biochar could improve soil fertility and promote plant growth. Moreover, biochar has a large surface area and plenty of functional groups, which are reactive to immobilize heavy metals. Oyster shell is a low-cost and largely available bio-waste product from oyster farming, which is a promising slow-release alkaloid has outstanding effects on pH adjustment and Cd immobilization in soils. Moreover, oyster shell as a low-cost product that can be largely applied in farmland.

2. L70 functional groups, please specify it.

Response: *The functional groups on the surface of biochar mainly include -OH, -COOH, C-O, C=O and C-H et al. The functional groups were will added in our revised manuscript.*

3. M&M: L107, I think that there should add a sentence “The main properties of biochar and oyster shell were presented in Table S1.”.

Response: *Thank you for your kind advice. The sentence “The main properties of biochar and and oyster shell were presented in Table S1.” will be added in our revised manuscript.*

4. M&M: More details should be provided in the experimental setup, such as water management.

Response: *Thank you for your kind advice. Detail experimental method will be provided in our revised manuscript.*

5. M&M: L133, Full name of the AAS abbreviation should be provided in the first time.

Response: *The full name of the AAS abbreviation (Atomic Absorption Spectroscopy) will be provided in our revised manuscript.*

6. M&M: L141-142, The format of references was incorrect, please check.

Response: *We will carefully check the format of references, which will meet the requirements of this journal.*

7. L175: I think that this part should be “Results” rather than “Results and discussion” because “Results” and “Discussion” in this manuscript were separated.

Response: *We are sorry for our carelessness. This mistake will be corrected in our revised manuscript.*

8. Results 3.1: The Cd concentration in farmland soils should be addressed.

Response: *The Cd concentration in farmland soils is 0.8 - 1.2 mg/kg. The Cd concentration in farmland soils will be addressed in our revised manuscript.*

9. Result 3.5: Why authors determine the dehydrogenase, urease, acid phosphate and β -galactosidase but not other soil enzyme?

Response: *Dehydrogenase, urease, acid phosphate and β -galactosidase were the important indexes to reflect the soil biological properties. Dehydrogenase unusually reflects the microbial degradation capacity for organic matter. Urease was often used as a biochemical indicator to reflect soil fertility, which played a crucial role on soil nitrogen mineralization. Acid phosphatase plays a vital factor in controlling P mineralization and it reflects the capacity of P mineralization potential in soil. β -galactosidase can catalyze the cellulose into glucose, which play an important role in the microbial glycometabolism. In our revised manuscript, the reasons why choose these enzymes will be carefully explained.*

10. Discussion: The discussion of immobilization mechanisms of Cd can be addressed according to literatures.

Response: *Thank you for your kind advice. The immobilization mechanisms of Cd will be carefully addressed according to literature in our revised manuscript.*

11. L325-326: Authors should provide the composition of oyster shell.

Response: *Thank you for your kind advice. The composition of oyster shell will be added in our revised manuscript.*

12. Figure 6a: The SD might be incorrect, please check.

Response: *Thank you for your kind advice. The incorrect SD will be revised in our revised manuscript.*

13. References: The format of some literature was incorrect. Such as: Line 412; Line 416

Response: *Thank you for your kind advice. The format of literature will be revised according to the requirement of Soil.*