Dear Editor and Reviewers:

Thank you for your letter and for the reviewers' comments concerning our manuscript entitled "polymers-890310". Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied comments carefully and have made correction which we hope meet with approval. Revised portion are marked in red in the paper. The main corrections in the paper and the responds to the reviewer's comments are as following:

Responds to the reviewer's comments:

Reviewer #1:

Response to comment : *In this manuscript, authors investigated a method of adding binder by high-pressure spraying to improve the biomass densification. This could be an interesting study, however this type of work is already published in this journal (Polymers 2020, 12, 674) by the authors and therefore this study has no much novelty. I have not found any new scientific advancement in this study. Moreover, this manuscript is more suitable for Biomass journal.*

We are very sorry for our negligence of research progress description. Considering the Reviewer's suggestion, we add a detailed account of scientific advancement (Lines no. 91-97): According to the previous research, Kexin Zhang et al. [28] proved that adding brown sugar water by spraying method is beneficial to the densification of biomass pellets, and has a great promotion effect on the improvement of biomass pellets' physical characteristics. What's more the optimal conditions for the densification of biomass pellets under the set factor level are obtained. In this paper, under the condition of known brown sugar water concentration (saturated brown sugar water) with the best densification effect, the influence of increased spraying pressure (10MPa) on pellets quality was further explored, especially on the densification effect at low pressure compaction. This part explains the novelty and difference of this manuscript.

We sincerely hope that the novelty can be accepted for publication in the Polymers.

Reviewer #2:

We are grateful for the suggestion. To be more clear and in accordance with the reviewer concerns, we have added a brief description as follows:

1. Response to comment : *Can you quantify final moisture content? You started with 10% or adjusted every sample to 10%?*

The initial moisture content measured by a rapid moisture meter was 6.4%, but it is not written in detail in the article.

According to the formula (1) for calculating the moisture content, we conditioned moisture of the raw material to 10% by adding water, then every sample was densified at a moisture of 10%. However, after densification, there was inevitably slight loss in final moisture content.

2. Response to comment : *Please justify the experimental design? Why orthogonal test , not a full factorial?*

Orthogonal test is an experiment to explore multiple factors and levels, and the number of experiments is greatly reduced compared with the full factorial. For example, according to the requirements of the full factorial, 32 groups of tests should be carried out for our test of three factors mixed level. And the number of repetitions per combination is not taken into account. In contrast, if the test is arranged according to the orthogonal table L16 (2×4^2) , only 16 groups will be needed, which obviously reduces the workload. Therefore, orthogonal test was adopted in this manuscript.

3. Response to comment : *line no. 80- correct the citation*

Thank you. This was revised according to the comment (Line no. 437).

4. Response to comment : *build and model of sprayer?*

We have added the information required as explained above (Line no. 141). And the build of sprayer is shown in Figure 2 and Figure 3.

5. Response to comment : *Include an image of the starting material? particle size?*

Thank you for the suggestion. We have added this point according to the suggestions (Lines no. 108-109).

6. Response to comment : *Justify the choice of brown sugar?*

We thank the reviewer for the very interesting comment. In fact, Lines 74-84 give many examples to illustrate that sugar can be a binder which is helpful to enhance the hardness and stability of pellets. And line 75 mentions that the viscosity of sugar is caused by molasses. Brown sugar contains about 10% of molasses. Therefore, saturated brown sugar water was selected as a binder in this study.

7. Response to comment : *The discussion needs to be revised by including other works.*

Thank you for the suggestion. We have re-written this part according to the Reviewer's comments (Lines no. 357-359).

8. Response to comment : *For formulation presentation- see this paper*

https://doi.org/10.1016/j.jclepro.2016.09.152

Considering the Reviewer's suggestion, we have added formulation presentation (Lines no. 108-113, 165-166).

We tried our best to improve the manuscript and made some changes in the manuscript. We appreciate for Editors/Reviewers' warm work earnestly, and hope that the correction will meet with approval.

Once again, thank you very much for your comments and suggestions.