Review of: "Valorization of palm oil wastes into oyster mushrooms (Pleurotus HK-37) and biogas production"

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Potential competing interests: No potential competing interests to declare.

This work investigated co-production of oyster mushroom and biogas from palm oil wastes, including palm mesocarp fiber (PMF), palm oil mill effluent (POME), sediment (SD), empty fruit bunch (EFB), palm kernel shell (PKS), and palm press cake (PPC). Nine cultivation media were formulated and tested in triplicates without a based case. The highest mushroom yield and biological efficiency were found at PMF to EFB mass ratio of 1:1 supplemented by POME and SD of 1% (Formulation 3). Whereas, the highest biogas volume, methane content and yield were observed from anaerobic digestion of spent mushroom substrate consisted of PMF to EFB mass ratio of 1:1 supplemented by PPC and PKS of 5% and POME and SD of 1% (Formulation 6). Accordingly, sequential mushroom cultivation and biogas production could not perform under similar conditions to maximize both mushroom and biogas yields. Because of a lack of feedstock characterization, it was not possible to determine the effects of substrate type on mushroom and biogas yields. The authors noted that research on enhancing biogas productivity using mushrooms as a biological pretreatment since 1983. Therefore, discerning the novelty of this study may pose a challenge. The suggestions for improving this manuscript are given below.

Abstract

1. The meaning of abbreviations, e.g., PMF, EFB, and POME did not address in the abstract.
2. Please delete the number of p-value.

Introduction

1. Many references are outdated (more than 15 years old).
2. A flow chart could help the readers understand the palm oil production process and the generated waste streams.

Materials and methods

1. Photographs could provide readers with a visual comprehension of the physical appearance of the samples.
2. Storage temperature and particle size need to be specified.
3. What is DMBB culture collection?
4. Table 1, what is a controlled sample (based case)?
5. Table 1, what are the aims of each blend number? For example, why the authors added 1% of POME and 1% of SD into PMF-based fraction?

Results

1. Tables 3-7, the statistical analysis needs to be applied to justify the difference between each treatment.
2. Figure 1, biological efficiency and mushroom yield bars should not be stacked. They have different unit and could not be summed.
3. The captions of Table 4-7 are incorrect.
4. Figure 3 is the replete data of Table 5.
5. Tables 6-7 could be merged.

Discussion

1. Additional characterizations such as carbon, nitrogen, sugar, lignin, and mineral contents could be benefit for the better understanding of substrate formulation.
2. The cause of lower productivity has not been scientifically proven. Water holding capacity is measurable by gravimetric method. The tough fibrous nature of EFB could be quantified by amounts of cellulose and lignin.

Conclusion

1. The highest mushroom yield and biological efficiency was found at formulation no. 3, but the highest biogas volume, methane content and yield were observed from spent mushroom substrate formulation no.4. The optimal condition for integrating process of mushroom and biogas production has not been discovered.