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.

Abstract

Continued growth of **oil palm cultivation for palm oil production** has led to higher post-processing wastes that pose environmental management challenges.

1. Underlined text to be revised.
2. Please void using abbreviations in the abstract.

Introduction

1. Please provide citation for the following text.

In Tanzania, these wastes have little use in agriculture and a large part of the wastes is discarded. Communities in Tanzania use palm fronds to cover roofs, make temporary fences, and manufacture household items such as brooms. A considerable chunk of the palm oil extraction and processing wastes are left unattended or burned, causing environmental hazards. The gaseous emissions from incineration and steam boilers produce emissions that compound environmental problems.

The complex lignocellulose nature of the solid wastes from palm oil processing creates environmental problems when they are discarded due to their persistence in the environment. However, these properties are suitable for the production of biological products, such as mushrooms, through the degradation of solid lignocellulose waste and biogas from the organic matter in liquid wastes. Production of valuable biological products such as mushrooms and biogas has been proposed and explored as a viable value-addition pathway for agro-processing wastes.

2. Please provide literature review of the recent years

3. It has **high biological oxygen demand (BOD)** due to high organic matter content, mainly oils and fatty acids (Mumtaz et al., 2008): Please specify the value.

Materials and methods

1. Please provide suitable number format (use separtors): We collected 5094 g palm mesocarp fiber (PMF), 5094 g empty fruit bunches (EFB),……..

2. Please provide units for TS and VS
3. Spawn preparation: What is DMBB? Please elaborate.
4. …….par-boiled in 2 L water until the grains were semi-soft: Please provide temperature.
5. Mean mushroom size was determined: Please specify units.
6. Process performance monitoring: This title is not suitable as it only covers anaerobic digestion. Please revise.
7. Biogas volume, methane content and methane yield: This section needs revision as the protocol is not very clear. How was it confirmed that the gas released has methane?
8. How was data analysis done?
9. Please describe experimental design.
10. Is it possible to provide figure containing methodology flowchart?

Results:

1. Few abbreviations have been used and few terminologies are again expanded. Please maintain consistency.
2. Table 1 contains footnote containing abbreviations. This does not apply to other Tables.
3. Figure 1 title: there is no need to mention the type of chart.
4. Figure 2: Figures are not aligned. Also, please provide labelling for better understanding.
5. Figure 3: Please provide error bars.
6. Space is to be provided or not provided before percentage (%) sign. Please maintain consistency.

Discussion

1. Few abbreviations have been used and few terminologies are again expanded. Please maintain consistency.
2. Please provide a data table/ paragraph comparing the results of this study and earlier reported works.
3. Substrate characterization: Please provide both TS and VS values.
4. Mushroom production: Further, cap diameter and average stipe length **correlated** with mushroom yield; the higher the mushroom yield, the larger the average cap diameter and the longer the average stipe length, indicating the quality of substrates and their utilization: Please support your findings with suitable statistical data.
5. Enhancement of methane yield from palm oil waste fractions:While biogas volume and methane content are also important parameters, methane yield per unit volume of VS is directly related to the amount of energy that can be extracted from the biogas produced: Please support your findings with suitable statistical data / graph.
6. The increase in methane yield may be due to improved susceptibility of the substrates to microbial hydrolysis caused by the degradation of lignin by the oyster mushrooms: Please provide citation.

General:

1. The topic is novel and of great interest to the scientific community.
2. A proper process scheme can be developed as shown in the following research paper:

Srivastava, V. and Balakrishnan, M., 2022. Biorefinery approach for the management of fruit and vegetable waste

generated in hotels: study case in India. *Biomass Conversion and Biorefinery,* pp.1-15. https://doi.org/10.1007/s13399-022-03291-6