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.

The study titled "Valorization of palm oil wastes into oyster mushrooms (Pleurotus HK-37) and biogas production" addresses the critical issue of environmental management challenges posed by the continued growth of oil palm cultivation and palm oil production. While the study explores an innovative approach to add value to palm oil waste fractions and reduce their environmental impact, it also raises certain concerns and limitations.

One of the key strengths of this research lies in its attempt to find sustainable solutions for managing palm oil waste. By employing oyster mushrooms to cultivate Pleurotus HK-37 and subsequently using the spent mushroom substrate (SMS) for biogas generation, the study aims to promote a circular economy, reducing waste while generating energy.

The study provides empirical evidence of the impact of different substrate formulations on mushroom yield and biogas production. Statistical analysis lends credibility to the findings, revealing significant differences among the various treatments. It underscores that specific combinations of palm oil waste fractions and supplements are more effective in both mushroom and biogas production.

However, there are several limitations and areas of concern that require attention:

Applicability: The study's focus is limited to a particular strain of oyster mushroom (Pleurotus HK-37). It would be valuable to investigate whether this approach can be extended to other mushroom species and diverse geographic regions.

Economic Viability: While the research suggests potential benefits for waste management, it lacks a comprehensive economic assessment. It is crucial to evaluate the cost-effectiveness of scaling up mushroom and biogas production under real-world conditions, considering infrastructure, labor, and material costs.

Environmental Impact: The study underscores the need to reduce the environmental footprint of palm oil waste but does not provide a comprehensive evaluation of the overall environmental implications. A thorough life cycle analysis is necessary to understand the complete environmental effects.

Long-Term Sustainability: The sustainability of this approach over the long term should be examined. Research should delve into the regenerative capacity of palm oil waste and assess whether sustained mushroom cultivation and biogas production can occur without resource depletion.

Biogas Quality: While biogas production is mentioned, the study does not offer details about the quality of the produced biogas, including potential impurities, odor, or its usability in various applications.

In summary, the study introduces an encouraging concept for managing palm oil waste through the combined cultivation of oyster mushrooms and biogas production. Nonetheless, it represents a preliminary step requiring further exploration and evaluation to uncover its full potential and practicality. Future research should focus on the economic feasibility, environmental sustainability, and scalability of this approach to address the waste management challenges in the palm oil industry and genuinely promote a circular economy.

This article is good and should be considered to publish with minor revision to emphasize some points above.