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Assessment of *Schizophyllum commune* Treated Oil Palm Empty Fruit Bunches (OPEFB) Incorporated Feed for Red Tilapia, *Oreochromis* sp.

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Structured Abstract

Background: The aquaculture sector, as the fastest-growing protein production sector, faces challenges in sustainable development due to high feed costs. Utilization of local and cost-effective bioresources such as lignocellulosic materials, such as oil palm empty fruit bunches (OPEFB), represent a viable option for the aquaculture sector to provide affordable alternatives to maintain the sector's economic viability and sustainability. However, the primary constraint to the utilizing OPEFB is its chemical composition, mostly composed of cellulose, hemicellulose, and lignin. Although there are a few approaches to the lignin degradation, employing microbes to break down lignin is the least expensive and most ecologically friendly option. The objective of this study is to assess the potential of *Schizophyllum commune* treated OPEFB as a feed ingredient for tilapia. The goal is to promote the circular economy concept in the palm oil industry while providing a valuable feed resource for aquaculture with implications for sustainable aquaculture practices and resource utilization.

Methods: OPEFB was treated with *S. commune* under solid state fermentation. The treated OPEFB then was subjected to proximate analysis to determine its nutritional value. The tilapia feeding treatment was conducted in 200-liter water fish tanks equipped with a recirculating aquaculture system (RAS). The assessment of the feed impacts was determined through the growth performance and meat quality of tilapia. The outcomes will provide valuable insights into the potential of using treated OPEFB in aquafeed formulations.

Results: The goal of the research was achieved as the fermentation process effectively enhance the protein and lipid content of the pellets. Other than that, fibre and lignin content were notably reduced ($p < 0.05$) through the fermentation process proving the ability of *S. commune* to degrade the OPEFB's recalcitrant properties. However, these enhancements in nutritional content did not translate into improved feeding efficacy for tilapia, possibly due to non-homogenous fish culture.

Conclusion: In conclusion, the findings suggest that fungal-treated OPEFB feed could serve as a cost-effective and sustainable alternative for aquaculture species. This strategy has the ability to improve aquafeed formulation techniques, resulting in improvements for both the environment and the aquaculture industry.

Keywords: OPEFB, solid state fermentation, *S. commune,* feed, tilapia

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