Perennial, 2026
Vol. 22 No. 1: 44-52
p-ISSN: 1412-7784

Available Online:
https://doi.org/10.24259/ perennial.v22i1.50727
e-ISSN: 2685-6859

EFFECT OF CORN COB AND BAGASSE COMPOSITION ON THE GROWTH AND PRODUCTION OF WHITE OYSTER MUSHROOM (*Pleurotus ostreatus*)

Pengaruh Komposisi Bonggol Jagung dan Ampas Tebu terhadap Pertumbuhan dan Produksi Jamur Tiram Putih (Pleurotus ostreatus)

S. Sunirma[1], Ira Taskirawati[2]✉, B. Baharuddin[2]

[1]Forestry Study Program, Faculty of Forestry, Hasanuddin University. Jl. Perintis Kemerdekaan KM. 10 Makassar, Indonesia.
[2]Forestry Engineering Study Program, Faculty of Forestry, Hasanuddin University. Jl. Perintis Kemerdekaan KM. 10 Makassar, Indonesia.
✉corresponding author: tasqira@unhas.ac.id

ABSTRACT

The increasing use of wood sawdust in the particleboard industry has encouraged the search for alternative substrates for white oyster mushroom cultivation. This study evaluated the effect of corn cob and bagasse composition as lignocellulosic growing media for *Pleurotus ostreatus*. The experiment was arranged in a Completely Randomized Design with four replications. Growth and production variables observed were mycelial colonization time, pinhead formation time, harvesting time, fresh weight, and number of fruiting bodies. The results showed that mixtures of corn cobs and bagasse can be used as alternative substrates for *P. ostreatus*. Substrate composition significantly affected mycelial colonization time, whereas pinhead formation time, harvesting time, fresh weight, and number of fruiting bodies were not significantly affected. Among the sawdust-free treatments, P5 (200 g corn cob + 600 g bagasse) produced the highest fresh weight (113.16 g), although its production performance was generally comparable to that of the other treatments. These findings indicate that corn cobs and bagasse have potential as sustainable alternative substrates for white oyster mushroom cultivation.

Keywords: Bagasse; Corn Cob; *Pleurotus ostreatus*; Substrate Optimization; White Oyster Mushroom

ABSTRAK

Meningkatnya penggunaan serbuk gergaji kayu pada industri papan partikel mendorong pencarian media alternatif untuk budidaya jamur tiram putih. Penelitian ini bertujuan mengevaluasi pengaruh komposisi bonggol jagung dan ampas tebu sebagai media tumbuh berbasis lignoselulosa bagi *Pleurotus ostreatus*. Percobaan disusun dalam Rancangan Acak Lengkap dengan empat ulangan. Variabel yang diamati meliputi lama penutupan miselium, lama munculnya pinhead, lama panen, berat segar, dan jumlah tubuh buah. Hasil penelitian menunjukkan bahwa campuran bonggol jagung dan ampas tebu dapat digunakan sebagai media alternatif untuk *P. ostreatus*. Komposisi media berpengaruh nyata terhadap lama penutupan miselium, sedangkan lama munculnya pinhead, lama panen, berat segar, dan jumlah tubuh buah tidak menunjukkan perbedaan yang nyata. Di antara perlakuan tanpa serbuk kayu, P5 (200 g bonggol jagung + 600 g ampas tebu) menghasilkan berat segar tertinggi, yaitu 113,16 g, meskipun kinerja produksinya secara umum sebanding dengan perlakuan lainnya. Temuan ini menunjukkan bahwa bonggol jagung dan ampas tebu berpotensi sebagai media alternatif yang lebih berkelanjutan untuk budidaya jamur tiram putih.

Kata kunci: Ampas Tebu; Bonggol Jagung; Jamur Tiram Putih; Optimasi Media; *Pleurotus ostreatus*

Submitted: 22 April 2026; Accepted: 13 July 2026

A. INTRODUCTION

Pleurotus ostreatus is one of the most widely cultivated edible mushrooms because of its nutritional value, market demand, and ability to grow on various lignocellulosic substrates. Recent studies have emphasized that oyster mushroom cultivation is increasingly relevant in sustainable food systems because it combines food production with the valorization of agricultural residues and other organic wastes (Doroški *et al.* 2022; Effiong *et al.* 2024). The use of lignocellulosic biomass as substrate is particularly important because substrate composition strongly affects mycelial growth, primordia formation, yield, and fruiting body quality (Zakil *et al.* 2022; Saidan *et al.* 2023).

The search for alternative substrates has become more important as wood sawdust, the conventional medium for oyster mushroom cultivation, is also needed by other wood-based industries. In this context, agricultural wastes such as corn cobs and sugarcane bagasse have attracted attention because they are abundant, inexpensive, and rich in lignocellulosic components that can support mushroom growth (Zakil *et al.* 2022; Fufa *et al.* 2021). Previous studies have shown that a wide range of agricultural residues can be used successfully for *P. ostreatus* cultivation, including bamboo sawdust, sago pulp, rice husk, pine fruit, and oil palm empty bunches (Taskirawati *et al.* 2020; Taskirawati *et al.* 2021; Maliana *et al.* 2022).

Corn cob and bagasse are two promising agricultural by-products for substrate development. Corn cob has been recognized as a useful lignocellulosic material in mushroom cultivation systems, while bagasse is also widely regarded as a potentially valuable substrate due to its fiber-rich composition and availability in sugar-processing regions (Zakil *et al.* 2022; Zhou *et al.* 2023). In addition, recent evaluations of agricultural-waste substrates have shown that substrate mixtures often perform differently from single-material substrates, indicating that formulation and proportion are critical factors in determining production performance (Biswas *et al.* 2023; Saidan *et al.* 2023).

However, despite the growing body of literature on oyster mushroom substrates, studies that specifically evaluate the combined use of corn cob and bagasse in a focused formulation are still limited. Much of the recent literature discusses these materials either separately or as part of broad multi-substrate comparisons, leaving insufficient information on the optimal composition of both materials for white oyster mushroom production (Zakil *et al.* 2022; Biswas *et al.* 2023). This creates a practical gap, particularly for developing low-cost alternative substrates based on locally available agricultural residues.

Although corn cob and bagasse have each been evaluated separately as alternative substrates for oyster mushroom cultivation, studies specifically examining their combined formulation in controlled proportions remain limited. Most previous studies have focused on single-material substitutions or broader comparisons among several agricultural residues, leaving insufficient information on the combined effect of corn cob and bagasse on both vegetative growth and production performance of *P. ostreatus*. Therefore, the novelty of this study lies in evaluating defined combinations of these two locally available lignocellulosic residues as sawdust substitutes and identifying their relative performance across mycelial colonization, pinhead formation, harvesting time, fresh weight, and number of fruiting bodies.

Therefore, this study aimed to evaluate several combinations of corn cob and bagasse as alternative growing media for white oyster mushroom (*P. ostreatus*) and to assess their effects on mycelial colonization, pinhead formation, harvesting time, fresh weight, and the number of fruiting bodies. The study is expected to contribute to the development of more efficient and sustainable mushroom cultivation through the utilization of agricultural waste.

B. METHODS

Materials and Substrate Preparation

The main materials used in this study were sawdust, corn cobs, and bagasse. Additional materials included rice bran, agricultural lime ($CaCO_3$), gypsum ($CaSO_4$), water, polypropylene bags, and white oyster mushroom spawn (*P. ostreatus*, F2). Corn cobs and bagasse were first dried, chopped, ground, and sieved to 18 mesh to obtain a uniform particle size before substrate formulation.

Six substrate treatments were prepared. The control treatment (P0) used sawdust as the sole main substrate, whereas the other treatments used corn cob and bagasse either singly or in combination. Sawdust was not included in treatments P1 to P5. Each treatment was prepared at a total main-substrate weight of 800 g and replicated four times. The detailed composition of the growing media used in each treatment is presented in Table 1.

The substrate mixture was supplemented with bran, lime, and gypsum, then mixed thoroughly with water at 750 mL kg^{-1} of substrate. The mixture was composted for 10 days, packed into 1-kg polypropylene bags, compacted manually, and sterilized at 100 °C for 10 h. The sterilized bags were then cooled for 24 h before inoculation.

Table 1. Composition of growing media used in each treatment

Treatment	Sawdust (g)	Corn Cob (g)	Bagasse (g)	Bran (g)	Lime (g)	Gypsum (g)	Total Substrate Weight (g)
P0	800	0	0	170	20	10	1000
P1	0	800	0	170	20	10	1000
P2	0	0	800	170	20	10	1000
P3	0	400	400	170	20	10	1000
P4	0	600	200	170	20	10	1000
P5	0	200	600	170	20	10	1000

Inoculation, Incubation, and Maintenance

Inoculation was carried out aseptically in a clean and enclosed room to minimize contamination. Before inoculation, the room and working surfaces were cleaned, and the required tools and materials were prepared under hygienic conditions. After sterilization and cooling, each baglog was inoculated with white oyster mushroom spawn (*Pleurotus ostreatus*, F2), then immediately closed and arranged on incubation racks.

The inoculated baglogs were incubated until the mycelia fully colonized the substrate, which generally required approximately 5–8 weeks. During this stage, temperature and relative humidity were monitored using a thermohygrometer. Environmental conditions during incubation followed the recommended requirements for oyster mushroom cultivation, namely 28–30 °C with 60–80% relative humidity (Parjimo & Andoko 2007).

After full mycelial colonization, the baglogs were transferred to the fruiting area for maintenance and fruiting-body development. During this stage, temperature and relative humidity were also monitored regularly using a thermohygrometer and maintained at 16–22 °C with 80–90% relative humidity, following the standard conditions for oyster mushroom production (Parjimo & Andoko 2007). Water spraying was applied when necessary to maintain suitable humidity and temperature conditions, following the procedure described by Cahyana et al. (1999). Routine maintenance was conducted throughout the fruiting period to ensure that the baglogs remained under favorable environmental conditions for pinhead initiation and fruiting-body development.

Observed Variables

The observed variables were mycelial colonization time, pinhead formation time, harvesting time, fresh weight of fruiting bodies, and number of fruiting bodies. Mycelial colonization time was recorded as the number of days after inoculation required for the mycelia to cover the substrate in each baglog fully. Pinhead formation time was recorded as the number of days after inoculation until the first pinhead appeared. Harvesting time was measured as the number of days after inoculation until the first harvest of fruiting bodies. Fresh weight was determined by weighing the fruiting bodies from the first harvest of each baglog on a digital balance and expressed in grams. The number of fruiting bodies was recorded by counting the fruiting bodies produced in the first harvest of each baglog

Experimental Design and Data Analysis

The experiment was arranged in a Completely Randomized Design (CRD) with six treatments and four replications. Prior to ANOVA, the data were checked for normality and homogeneity of variance. Data were then analyzed using analysis of variance (ANOVA), and significant differences among treatments were further tested using Tukey's test.

C. RESULTS AND DISCUSSION

Mycelial Colonization

The duration of mycelial colonization is presented in Figure 1. Treatment P1, which consisted of 800 g corn cob, showed the fastest mycelial colonization, requiring 19 days to fully cover the baglog. In contrast, P5, composed of 200 g corn cob and 600 g bagasse, showed the slowest colonization, requiring 24 days. The remaining treatments, namely P0, P2, P3, and P4, required approximately 21.00, 22.25, 21.50, and 22.00 days, respectively. Analysis of variance indicated that substrate composition had a highly significant effect on mycelial colonization time ($F = 11.73$; $p < 0.01$), and the follow-up test showed that P1 and P5 differed significantly from the other treatments.

The rapid mycelial colonization observed in P1 suggests that corn cob may have provided a more favorable lignocellulosic substrate for early mycelial establishment than bagasse-dominated media. This interpretation is biologically plausible because corn cob has been reported to contain relatively high hemicellulose and comparatively lower lignin, which may facilitate substrate degradation and improve nutrient availability during colonization (Olajuyigbe *et al.* 2019). Similar tendencies have also been observed in maize-derived lignocellulosic residues, where faster hyphal growth and higher cellulase activity were reported, although the response may vary depending on fungal species and substrate formulation (Mou *et al.* 2023; Duan *et al.* 2025). In the present study, mycelial colonization occurred within 19–24 days, which was faster than that reported for some other alternative substrates, such as bamboo- and *Morus alba*-based media (Amelia *et al.* 2020; Taskirawati *et al.* 2020).

This finding is also consistent with previous studies showing that substrate composition strongly affects oyster mushroom growth and productivity. Agricultural-residue formulations have been reported to influence mycelial growth rate, fruiting initiation, and yield, although the optimal ratio depends on the type and proportion of materials used (Fufa *et al.* 2021; Saidan *et al.* 2023; Zakil *et al.* 2022). Furthermore, studies on mixed lignocellulosic substrates have shown that some combinations can improve production performance, whereas others remain inferior to single sawdust-based substrates, indicating that substrate optimization depends more on the balance of lignocellulosic components than on whether the substrate is single or mixed (Elfandari *et al.* 2021; Hariadi *et al.* 2013). Therefore, the rapid colonization recorded in P1 supports the view that corn cob can function effectively as a substrate component for *P. ostreatus*, although faster colonization does not necessarily guarantee the highest yield.

From a production perspective, rapid mycelial colonization is important because it can shorten the cultivation cycle and reduce the risk of contamination. However, the present results also indicate that rapid colonization alone did not automatically result in the highest fresh yield, suggesting that substrate suitability should be evaluated across both vegetative and reproductive growth stages.

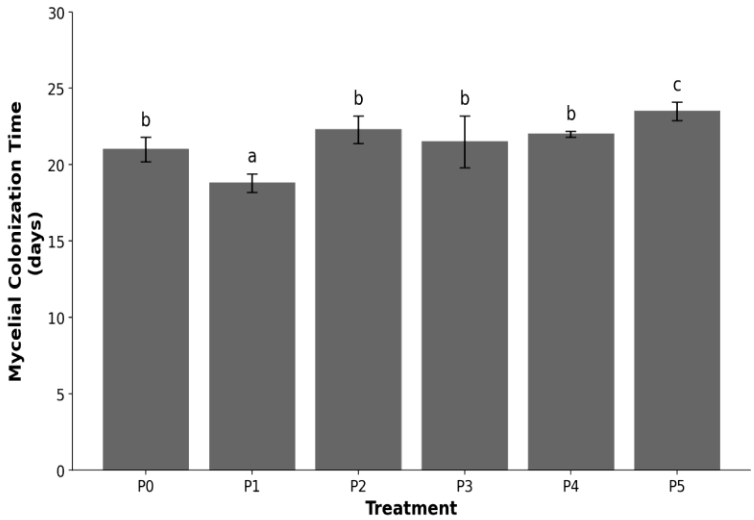

Figure 1. Mycelial colonization time of *Pleurotus ostreatus* grown on different substrate compositions (days after inoculation)

Pinhead Formation

The time required for pinhead formation is presented in Figure 2. Treatment P2, which used 800 g bagasse, showed the fastest pinhead initiation at 34 days after inoculation. Treatments P1, P3, and P5 formed pinheads at 35 days, whereas P0 and P4 required 36 days. Statistical analysis showed that these differences were not significant ($F = 0.02$; $p > 0.05$), indicating that substrate composition did not significantly affect pinhead formation time.

Although the differences were not statistically significant, the narrow range of 34–36 days indicates that all tested substrates were capable of supporting primordia formation within a relatively similar period. This suggests that once mycelial colonization had been established, both single-residue and mixed-residue substrates were generally adequate for the transition from vegetative growth to early fruiting. Previous studies have shown that pinhead formation may vary substantially depending on substrate composition and cultivation conditions. For example, pinhead formation has been reported at 21–22 days on sawdust-based media and 27–31 days on paddy straw, whereas longer timelines have also been observed on other lignocellulosic wastes under different conditions and in different fungal species (Sathiyaseelan *et al.* 2024; Patel *et al.* 2022; Thiribhuvanamala & Krishnamoorthy 2021). Therefore, the pinhead formation time observed in this study indicates that corn cob- and bagasse-based substrates were able to sustain normal reproductive initiation in *P. ostreatus*.

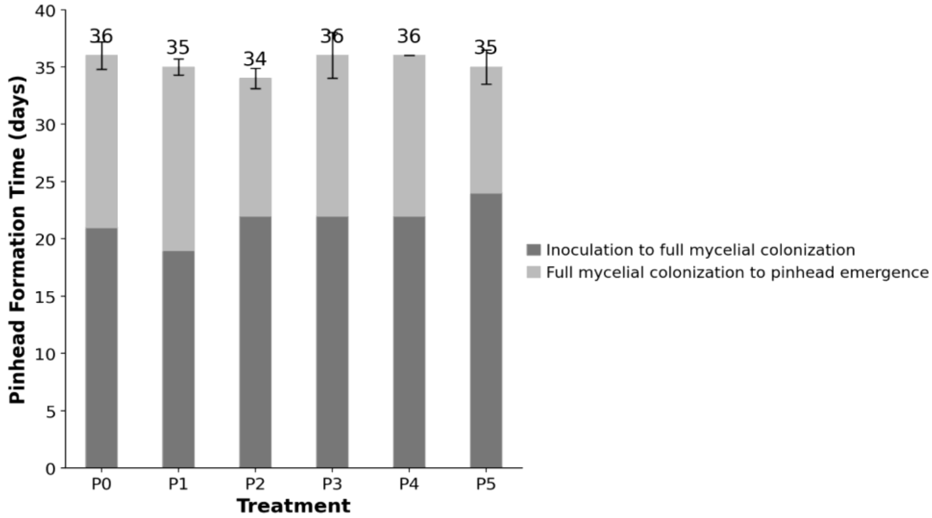

Figure 2. Pinhead formation time of *Pleurotus ostreatus* grown on different substrate compositions (days after inoculation)

From an applied perspective, this finding is important because it shows that replacing sawdust with corn cob and bagasse did not delay the onset of reproductive development. Similar patterns have been reported in studies using agricultural wastes and their combinations, in which alternative substrates maintained acceptable growth and fruiting performance without causing major delays in crop development (Fufa *et al.* 2021; Saidan *et al.* 2023). Therefore, the non-significant differences observed in this study should not be interpreted as a lack of biological relevance; rather, they suggest that the tested agricultural residues were capable of sustaining normal pinhead initiation in *P. ostreatus*.

Harvesting Time

The harvesting time of *P. ostreatus* is presented in Figure 3. The earliest harvest was recorded in P2 at 37 days after inoculation. Treatments P1, P3, and P5 reached harvest at 38 days, whereas P0 and P4 required 39 days. Despite this numerical variation, analysis of variance showed that substrate composition had no significant effect on harvesting time ($F = 1.49$; $p > 0.05$).

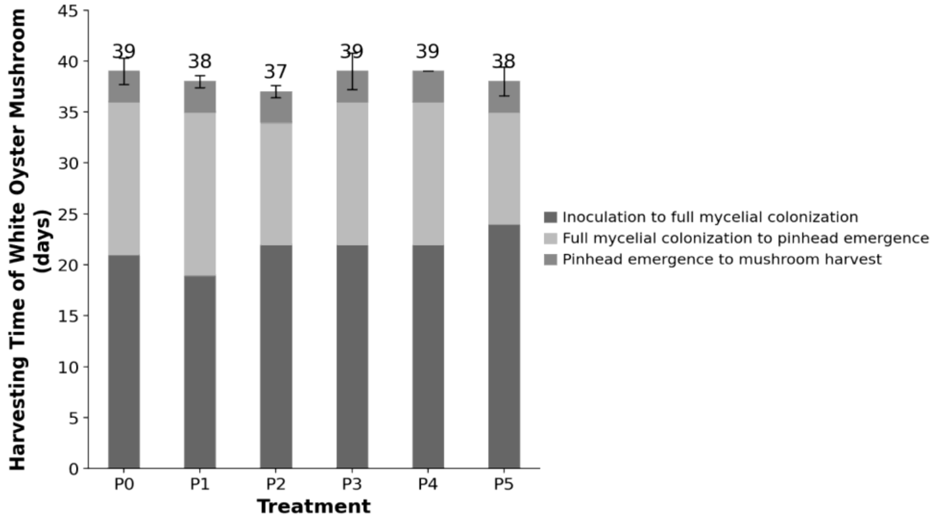

Figure 3. Harvesting time of *Pleurotus ostreatus* grown on different substrate compositions (days after inoculation).

The narrow harvest range of 37–39 days indicates that all tested substrates were able to support a comparable production cycle. This result is important because it suggests that replacing sawdust with corn cob and bagasse did not substantially delay crop maturity. The harvesting stage generally occurred about three days after pinhead formation, indicating that once primordia had emerged, fruiting body development proceeded normally across treatments. This pattern suggests that the strongest substrate effect in the present study occurred during the mycelial colonization stage rather than during the final fruiting stage.

From an applied perspective, this finding is favorable because alternative substrates can be used without major changes in cultivation scheduling. Similar patterns have been reported in previous studies, where different lignocellulosic substrates affected yield and biomass accumulation but still maintained comparable crop-cycle performance when their physical and nutritional properties remained suitable for mushroom development (Zakil *et al.* 2022; Fufa *et al.* 2021). Therefore, the present result strengthens the practical relevance of corn cob and bagasse as substitutes for conventional sawdust-based media in oyster mushroom cultivation.

Fresh Weight of Fruiting Bodies

The fresh weight of fruiting bodies is presented in Figure 4. Based on the graph, treatment P0 produced the highest fresh weight at 121.69 g, followed by P5 at 113.16 g, P4 at 108.29 g, P3 at 103.99 g, P1 at 103.98 g, and P2 at 101.13 g (Figure 4). Statistical analysis showed that the differences among treatments were not significant ($F = 1.04$; $p > 0.05$).

This result should be interpreted carefully. Although P0 yielded the highest fresh weight overall, P5 was the most promising alternative substrate treatment because it produced the highest fresh weight among the sawdust-free substrates. This finding indicates that the combination of corn cob and bagasse in P5 has potential as a substitute for sawdust-based media in white oyster mushroom cultivation.

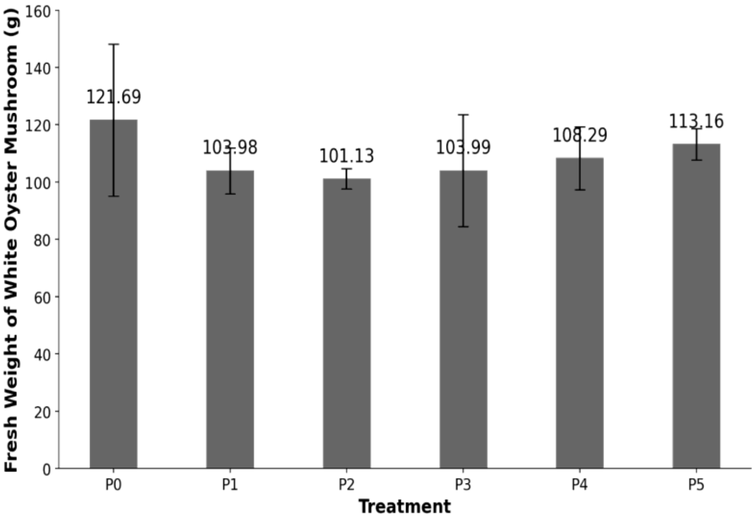

Figure 4. Fresh weight of *Pleurotus ostreatus* fruiting bodies grown on different substrate compositions (g)

A possible explanation is that the substrate composition in P5 provided a more favorable balance of physical structure and nutrient availability during fruiting body development than the other alternative treatments. This result also suggests that rapid mycelial colonization did not necessarily lead to the highest fresh yield, since P1 showed the fastest mycelial growth, whereas P5 performed better in terms of fresh weight production.

This pattern is consistent with previous studies showing that the substrate with the fastest mycelial colonization does not always produce the highest fresh biomass. Studies on lignocellulosic substrates have reported that mixed substrates can maintain or improve yield relative to single substrates under certain conditions, whereas in other cases a single sawdust-based substrate still performs better, depending on the balance between nutrient availability, degradability, and structural support for fruiting body development (Elfandari *et al.* 2021; Hariadi *et al.* 2013; Zakil *et al.* 2022; Zhou *et al.* 2023). Therefore, the superior performance of P5 among the alternative substrates supports its potential as a practical substitute for sawdust-based media, even though it did not show the fastest colonization time.

Number of Fruiting Bodies

The number of fruiting bodies produced under each treatment is presented in Figure 5. Treatment P4 produced the highest number of fruiting bodies, reaching 13 fruiting bodies, followed by P5 with 12, P0 and P2 with 11, and P1 and P3 with 10 fruiting bodies. However, analysis of variance showed that the differences among treatments were not significant ($F = 0.98$; $p > 0.05$).

Although statistically similar, the numerical trend suggests that mixed substrates may support a slightly higher number of fruiting bodies than single-material treatments. Nevertheless, the present study also shows that a larger number of fruiting bodies did not necessarily correspond to a greater total fresh weight. This indicates that fruiting body number was not directly proportional to harvested biomass.

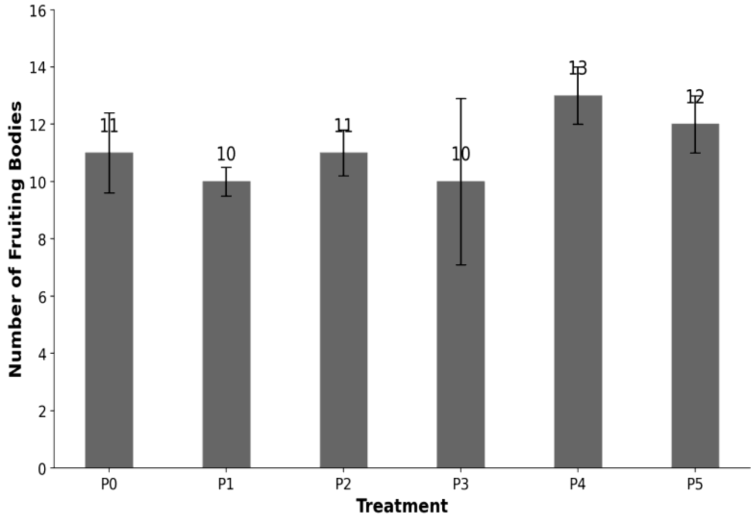

Figure 5. Number of fruiting bodies of *Pleurotus ostreatus* grown on different substrate compositions

Biologically, this pattern may reflect differences in assimilate distribution during fruiting body development. When more fruiting bodies are formed, the available nutrients and energy may be distributed among a larger number of mushrooms, resulting in a higher fruit count but not necessarily greater total biomass. A similar trend was reported by Amelia *et al*. (2020), whereas Taskirawati *et al.* (2021) found that fruiting body number was proportional to fresh weight. More broadly, previous studies have shown that mixed lignocellulosic substrates may improve certain production traits, such as fruiting body number or biological efficiency, without consistently maximizing fresh biomass in the same treatment (Hariadi *et al.* 2013; Saidan *et al.* 2023; Zakil *et al.* 2022). Therefore, productivity in *P. ostreatus* cultivation should not be evaluated using a single parameter only, because fruiting body number and fresh weight may respond differently to substrate composition.

Overall, the results demonstrate that corn cob and bagasse have practical potential as alternative substrates for white oyster mushroom cultivation, particularly when their lignocellulosic composition is appropriately balanced. The clearest treatment effect in this study was observed during mycelial colonization, where corn cob alone promoted the fastest vegetative growth. In contrast, pinhead formation time, harvesting time, fresh weight, and number of fruiting bodies were not significantly affected by substrate composition, indicating that the tested formulations were broadly comparable in supporting fruiting performance under the conditions of this study. One possible explanation is that all substrates provided sufficient basic lignocellulosic resources and nutrient supplementation through bran, lime, and gypsum, thereby reducing treatment contrasts during later growth stages. Under such conditions, substrate composition may influence early mycelial establishment more strongly than reproductive variables such as pinhead formation, harvesting time, fresh weight, and number of fruiting bodies. Among the sawdust-free treatments, P5 showed the most promising performance because it produced the highest fresh weight among the alternative substrates while maintaining a harvest time comparable to the control. This suggests that substrate evaluation in *P. ostreatus* should not focus solely on rapid mycelial colonization, but also on the ability of the substrate to support fruiting body formation and biomass accumulation during later growth stages. These findings are consistent with recent literature emphasizing that agricultural waste-based substrates can contribute to more sustainable mushroom cultivation by valorizing lignocellulosic residues and reducing dependence on conventional sawdust-based media (Doroški *et al.* 2022). Therefore, the combined use of corn cob and bagasse may be considered a feasible and sustainable alternative substrate for oyster mushroom production.

D. CONCLUSION

Corn cob and bagasse can be used as alternative substrates for the cultivation of white oyster mushroom (*Pleurotus ostreatus*). Substrate composition significantly affected mycelial colonization time, with corn cob resulting in the fastest colonization, whereas pinhead formation time, harvesting time, fresh weight, and number of fruiting bodies were not significantly affected. Among the sawdust-free treatments, the combination of 200 g corn cob and 600 g bagasse (P5) produced the highest fresh weight, although its production performance was generally comparable to that of the other treatments. These findings indicate that corn cob and bagasse have potential as sustainable substitutes for sawdust-based media in oyster mushroom cultivation.

AUTHOR'S DECLARATION

The authors declare no conflicts of interest related to this manuscript. All authors have made significant contributions to the research, data analysis, and manuscript preparation. All authors have read, reviewed, and approved the final version of the manuscript for submission.

The authors hereby confirm that all figures and tables presented in this manuscript are original and belong to the authors. Any figures or images not originally produced by the authors, if any, have been included with the necessary permission for republication.

No animal studies are present in this manuscript. No human studies are present in this manuscript. No potentially identifiable images or data are included in this manuscript.

REFERENCES

Amelia, Taskirawati, I., & Baharuddin. (2020). Waste of *Morus alba* as the main ingredients in making the cultivation media of oyster mushroom (*Pleurotus ostreatus*). *IOP Conference Series: Earth and Environmental Science*, *575*(1), 012138. https://doi.org/10.1088/1755-1315/575/1/012138.

Biswas, P. R., Boro, H., Doley, S. N., Dutta, A. K., & Tayung, K. (2023). Evaluation of different lignocellulosic-wastes and their combinations on growth and yield of oyster mushroom (*Pleurotus ostreatus*). *Studies in Fungi*, *8*, 7. https://doi.org/10.48130/SIF-2023-0007.

Cahyana, Y., Muchrodji, & Bakrun, M. (1999). Jamur tiram: Pembibitan, pembudidayaan, analisis usaha. Penebar Swadaya.

Doroški, A., Klaus, A., Režek Jambrak, A., & Djekic, I. (2022). Food waste originated material as an alternative substrate used for the cultivation of oyster mushroom (*Pleurotus ostreatus*)*: A review. Sustainability*, *14*(19), 12509. https://doi.org/10.3390/su141912509.

Duan, Y., Liu, L., Huang, C., Shu, W., Qi, Y., Dai, Y., Li, C., & Li, Y. (2025). Deciphering the yield limitation mechanisms in *Pleurotus eryngii* cultivation: A comparative study on red vs white corncob substrates. *LWT,* 118379. https://doi.org/10.1016/j.lwt.2025.118379.

Effiong, M. E., Umeokwochi, C. P., Afolabi, I. S., & Chinedu, S. N. (2024). Assessing the nutritional quality of *Pleurotus ostreatus* (oyster mushroom). *Frontiers in Nutrition*, *10*, 1279208. https://doi.org/10.3389/fnut.2023.1279208.

Elfandari, H., Yusanto, & Septiana. (2021). Pertumbuhan dan produktivitas jamur tiram putih (*Pleurotus ostreatus*) pada komposisi media tanam sengon dan jerami. *Jurnal Agrotek Tropika*, *9*(2), 301–305. https://doi.org/10.23960/jat.v9i2.4915.

Fufa, B. K., Tadesse, B. A., & Tulu, M. M. (2021). Cultivation of *Pleurotus ostreatus* on agricultural wastes and their combination. *International Journal of Agronomy*, 1465597. https://doi.org/10.1155/2021/1465597.

Hariadi, N., Setyobudi, L., & Nihayati, E. (2013). Studi pertumbuhan dan hasil produksi jamur tiram putih (*Pleurotus ostreatus*) pada media tumbuh jerami padi dan serbuk gergaji. *Jurnal Produksi Tanaman*, 1(1), 47-53. [A3.1][A3.2] https://doi.org/10.21176/protan.v1i1.6.

Maliana, T., Taskirawati, I., & Baharuddin. (2022). Oil palm empty bunches as a growing media for white oyster mushroom (*Pleurotus ostreatus*). *IOP Conference Series: Earth and Environmental Science*, *959*(1), 012065. https://doi.org/10.1088/1755-1315/959/1/012065.

Mou, C., Gong, Y., Chen, L., Martin, F., Kang, H., & Bian, Y. (2023). Comparative analysis of simulated in-situ colonization and degradation by Lentinula edodes on oak wafer and corn stalk. *Frontiers in Microbiology*, *14*, 1286064. https://doi.org/10.3389/fmicb.2023.1286064.

Olajuyigbe, F. M., Fatokun, C. O., & Oni, O. I. (2019). Effective substrate loading for saccharification of corn cob and concurrent production of lignocellulolytic enzymes by *Fusarium oxysporum* and *Sporothrix carnis*. *Current Biotechnology*, *8*(2), 109-115. https://doi.org/10.2174/2211550108666191008154658.

Parjimo, H., & Andoko, A. (2007). Budidaya jamur: Jamur kuping, jamur tiram, dan jamur merang. Agromedia Pustaka.

Saidan, N. H., Hamil, M. S. R., Pahirul Zaman, K. A. K., Zakaria, N. N. A., Fadzil, N. S., & Abdul Rahman, K. A. M. (2023). The effect of different lignocellulose biomass-based substrates on the enhancement of growth, yield, and nutritional composition of grey oyster mushrooms. *Pertanika Journal of Tropical Agricultural Science*, *46*(3), 783–797. https://doi.org/10.47836/pjtas.46.3.04.

Sathiyaseelan, M., Kannadhasan, V., Tamilpriyan, S., Balaji, K., & Saranya, V. (2024). Cultivation potential of oyster mushroom (*Pleurotus ostreatus*) using agricultural wastes as substrates. *Indian J. Hortic*, *81*(2), 196-199. https://doi.org/10.58993/ijh/2024.81.2.12.

Patel, R., Suthar, H., Modi, K., & Khunt, M. (2022). Growth parameters of *Pleurotus ostreatus* (Jacq. Fr.) Kumm cultivation using paddy straw as a substrate. *Plantae Scientia*, 5(1), 12–16. https://doi.org/10.32439/ps.v5i1.12-16.

Taskirawati, I., Askar, A., & Baharuddin. (2021). Pine fruit as a media for planting white oyster mushroom (*Pleurotus ostreatus*). *IOP Conference Series: Earth and Environmental Science*, *891*(1), 012025. https://doi.org/10.1088/1755-1315/891/1/012025.

Taskirawati, I., Baharuddin, & Pratiwi, F. A. (2020). The bamboo sawdust and addition of EM4 as an alternative material for the cultivation of oyster mushroom (*Pleurotus ostreatus*). *IOP Conference Series: Earth and Environmental Science*, *575*(1), 012140. https://doi.org/10.1088/1755-1315/575/1/012140.

Thiribhuvanamala, G., & Krishnamoorthy, A. S. (2021). Evaluation of different lignocellulosic substrates for cultivation of medicinal mushroom *Ganoderma lucidum*. *Journal of Environmental Biology*, *42*(5), 1314-1319. http://doi.org/10.22438/jeb/42/5/MRN-1686.

Zakil, F. A., Xuan, L. H., Zaman, N., Alan, N. I., Salahutheen, N. A. A., Sueb, M. S. M., & Isha, R. (2022). Growth performance and mineral analysis of *Pleurotus ostreatus* from various agricultural wastes mixed with rubber tree sawdust in Malaysia. Bioresource Technology Reports, *17*, 100873. https://doi.org/10.1016/j.biteb.2021.100873.

Zhou, T., Hu, W., Yang, Z., Li, J., & Zeng, X. (2023). Study on nutrients, non-volatile compounds, volatile compounds and antioxidant capacity of oyster mushroom cultivated with corn distillers' grains. LWT, *183*, 114967. https://doi.org/10.1016/j.lwt.2023.114967.