CSU POLICY BRIEF
Volume 2, No. 1 (2026) | DOI: 10.5281/zenodo.20589113
ISSN: 3155-6434
e-ISSN: 3155-6442

Transforming Local Wastes Into Liming Materials: Enhancing its Influence on the Growth and Production of Brown Oyster Mushrooms

S&T in Natural Resources

Yvette D. Medrano, Gerald M. Duza, Gerald L. Seridon, Nonito B. Pattugalan and Macluven T. Gonzales

College of Agriculture, Cagayan State University, Piat Campus, Piat, Philippines

Corresponding Author: medranoyvette48@gmail.com

Key Findings and Policy Implications

- **Mycelia Growth:** Filter cake (T2) showed the fastest growth after 4 weeks.
- **Yield:** Agricultural lime (T4) had the highest yield, but filter cake (T2) came very close.
- **Stem count:** No major difference across treatments
- **Cap size:** Agricultural lime (T4) produced the biggest caps, but the alternatives also performed well
- Local waste products like filter cake and rice hull ash can be used to grow mushrooms aside to agricultural lime.
- These materials are cheap, readily available and may reduce farm costs.
- This helps more people especially in rural areas and may establish mushroom production though commercial agricultural is unlikely to acquire.

Background

Many farmers want to grow oyster mushrooms but they struggle to find agricultural lime, which is one of the most pertinent component of growing material in mushroom farming. Lime adjusts the acidity of the substrate. In this study, researchers explored on other

materials like filter cake (waste from sugar processing), rice hull ash, and wood ash. These are local waste materials that could be used aside to agricultural lime. By using these alternative materials, oyster mushroom production in various areas may not be compromised.

Research Objectives

- Find alternatives to agricultural lime for oyster mushroom farming.
- Test how filter cake, rice hull ash and wood ash affect the oyster mushroom growth and yield.
- Help farmers who don't have access to lime grow oyster mushrooms successfully.

Methodology

The researchers set up 5 different treatments using sawdust mixed with:

T1 - no liming material (control)
T2 - filter cake
T3 - rice hull ash
T4 - agricultural lime (standard)
T5 - wood ash

The researchers measured the oyster mushroom's mycelia growth, yield, number of stems (stipes), and cap (pileus) diameter.

Key Findings

The study revealed that while agricultural lime (T1) continues to be the most effective material for maximizing yield and cap size, the alternatives showed promising results that justify their use in its absence.

Table 1. Parameters obtained by tiger grass after six (6) months.

Treatment	Yield (grams)	Cap Diameter (mm)	Stipe Count
T1 - Agricultural Lime	1845.32	79.28	3.06
T2 - Control (No Lime)	1291.35	55.56	2.77
T3 - Filter Cake	1307.17	67.19	3.36
T4 - Rice Hull Ash	1037.10	60.70	3.55
T5 - Wood Ash	770.04	57.70	3.28

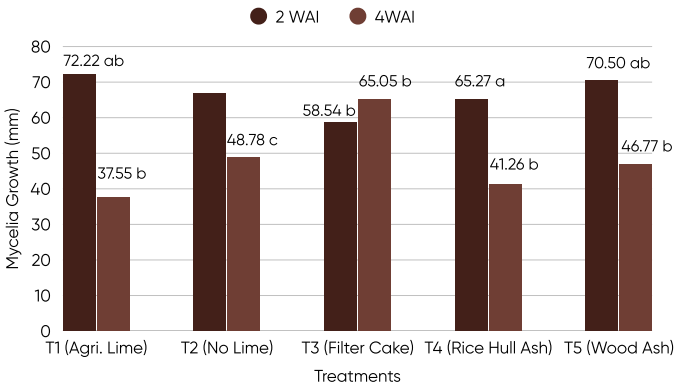

Figure 1. Mean mycelia growth (mm) at 2 and 4 weeks after inoculation of brown oyster mushroom using different liming materials.

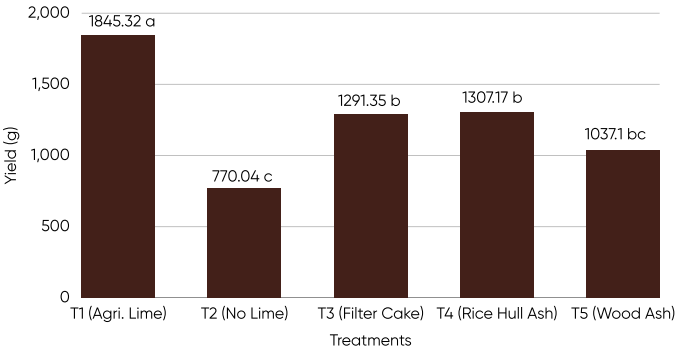

Figure 2. Brown oyster mushroom mean yield (grams) using different liming materials.

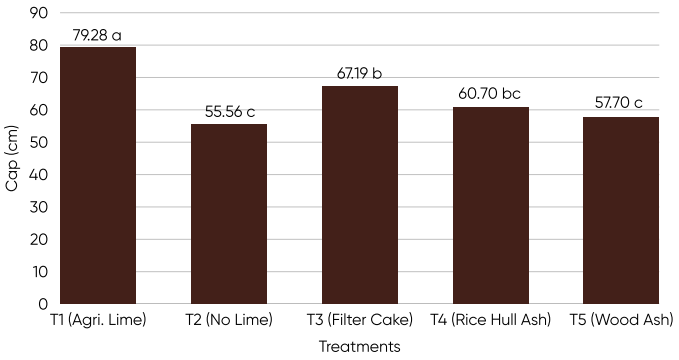

Figure 3. Mean pileus (cap) diameter (mm) of brown oyster mushroom *(Pleurotus cystidiosus)* using different liming materials.

Conclusion

Agricultural lime remains the gold standard for Brown Oyster Mushroom cultivation, providing the best environment for high yield and large cap diameters. Nevertheless, filter cake, rice hull ash, and wood ash are proven alternatives that can support mushroom production without compromising the fundamental morphological characteristics of the crop. These alternatives are particularly valuable for small-scale farmers in remote areas where commercial lime may be unavailable or costprohibitive.

Policy Recommendations

1. Train oyster mushroom growers to use filter cake, rice hull ash and wood ash.
2. Promote these materials through the LGUs agriculture offices.
3. Organize collection and sharing of these wastes in mushroom farming firms or entities.

Target Policy Actors and Beneficiaries

1. **State Universities and Colleges**
2. **Local Government Universities**

References

Chang, S., & Miles, P. G. (2004). Mushrooms: Cultivation, nutritional value, medicinal effect, and environmental impact (2nd ed.). CRC Press. https://doi.org/10.1201/9780203492086

Casas, L., Hernandez, Y., Mantell, C., Casdelo, N., & Martinez de la Ossa, E. (2015). Filter cake oil-wax as raw material for the production of biodiesel: Analysis of the extraction process and the transesterification reaction. Journal of Chemistry, 2015, Article 9.

Fusade, L., Viles, H., Wood, C., & Burns, C. (2019). The effect of wood ash on the properties and durability of lime mortar for repointing damp historic buildings. Construction and Building Materials, 216, 34–43. https://doi.org/10.1016/j.conbuildmat.2019.03.326

Manso, J., Obodai, M., Dzomeku, M., & Apertorgbor, M. M. (2011). Influence of rice husk on biological efficiency and nutrient content of *Pleurotus ostreatus* (Jacq. ex. Fr.) Kummer. International Food Research Journal, 18(1), 249–254.

Manuel, L. T., & Ramos, L. V. (2018). Filter cake as an alternative liming material for oyster mushroom (*Pleurotus florida*) production. Cagayan State University-Piat.

Mardiana, S. (2021). Combination of sawdust, "filter cake" and calcium carbonate as growth medium for the production of white oyster mushroom (*Pleurotus ostreatus*). Iraqi Journal of Agricultural Sciences, 52(3), 736–744.

Martinez, M. A. V., Pascual, A. F., Medrano, Y. D., Seridon, G. L., & Uy, M. M. (2019). Mycelia growth performance of grey oyster mushroom *(Pleurotus sajor-caju)* using different liming materials. In International Conference on Food and Economic Security and Environmental Sustainability.

Mullins, G. L., Alley, M. M., Wysor, W. G., & Phillips, S. B. (2014). Sources of lime for acid soils in Virginia (Virginia Cooperative Extension Publication 452-510). Virginia Cooperative Extension.

Editor's Note

This policy brief is based on results of the CSU-funded project "Yield Performance of Brown Oyster Mushroom *(Pleurotus cystidiosus)* Using Different Liming Materials" This project was implemented by the Cagayan State University - Piat Campus. The CSU - Piat Campus project team is composed of Yvette D. Medrano, Gerald M. Duza, Gerald L. Seridon, Nonito B. Pattugalan and Macluven T. Gonzales

About CSU Policy Brief

Our policy brief offers an in-depth analysis of contemporary challenges and opportunities within higher education, with a special focus on the unique context of Cagayan State University. Through rigorous research and stakeholder engagement, we examine key areas such as academic innovation, research advancement, community engagement, and administrative excellence. Each recommendation is carefully developed to foster an environment of growth, equity, and sustainability. **This policy brief is published bi-annually.**

Our approach is built on transparency and inclusiveness. By integrating comprehensive data analysis with practical insights from experts and the broader university community, we ensure that our policy recommendations are not only academically robust but also practically implementable. This process underscores our commitment to creating a positive and lasting impact on the university's future.

The policy brief also serves as a platform for translating research outputs into practical policy insights across six strategic thematic areas including Science and Technology in Agriculture, Natural Resources, Education, Food Science and Chemistry, Public Health and Medicine, and Behavioral and Social Sciences. These areas reflect the university's research priorities and address emerging concerns related to agriculture and livestock, environmental management, teaching and learning, food innovation, clinical diagnostics, and community resilience.

While these publications provide science-based interventions for regional and national development, the analyses and recommendations are those of the authors and do not necessarily represent the official positions of Cagayan State University. Any reproduction, distribution, or citation of this work must acknowledge the author and the CSU Policy Brief.

SUSTAINABLE DEVELOPMENT GOALS

Get in touch with us via:

facebook.com/csuktmpo

csu_ktmoffice@csu.edu.ph

csu.org.ph/policybrief

Cagayan State University
Knowledge & Technology Management and Publication Office
RDE Bldg., CSU- Andrews Campus Caritan Sur, Tuguegarao City, Cagayan

POLICY BRIEF
Cagayan State University
Knowledge & Technology Management and Publication Office

csu.org.ph/policybrief

facebook.com/csuktmpo

csu_ktmoffice@csu.edu.ph