## Effects of Different Nutrient Media on Mycelial Growth Quality During Pure Culture and Spawn Production Stages of White Oyster Mushroom (Pleurotus ostreatus var. Florida)

John Mark R. Francisco<sup>1,\*</sup> and Catherine C. Arradaza<sup>2</sup>

<sup>1</sup> Department of Horticulture, Faculty of Agriculture and Food Science, Visayas State University, Visca, Baybay City, Leyte, Philippines 6521-A

<sup>2</sup> Tissue Culture Laboratory, Department of Horticulture, Faculty of Agriculture and Food Science, Visayas State University, Visca, Baybay City, Leyte, Philippines 6521-A \*Correspondence: johnmark.francisco@vsu.edu.ph

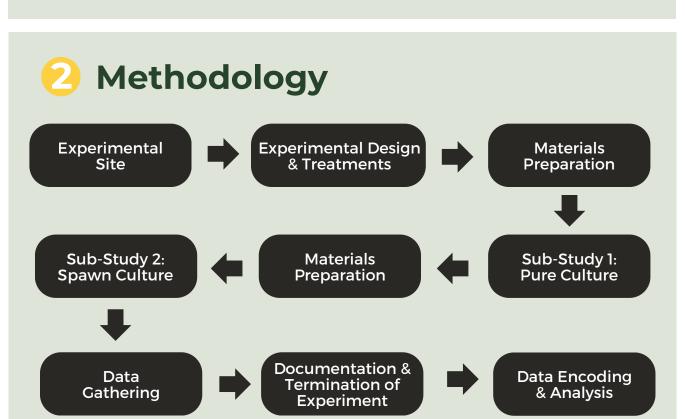


### **Introduction & Aim**

Potato Dextrose Agar (PDA) is widely recognized in mycological research for its effectiveness in cultivating a broad spectrum of fungi, including edible mushrooms like *Pleurotus ostreatus*. Its nutrient-rich composition, derived from potato infusion and dextrose, supports mycelial growth and sporulation, making it a staple in fungal cultivation studies Dey et al., 2007;

However, reliance solely on PDA may not always be optimal, especially considering factors like cost, availability, and specific fungal growth requirements. Exploring alternative media can offer benefits such as costeffectiveness and tailored nutrient profiles. While PDA is considered as the standard medium used in fungal culture for its nutrient richness and wide applicability (Aneja, 2003), the high cost of commercial agar limits its accessibility for local mushroom growers (Gowthami et al., 2016).

This study explores alternative nutrient media to the commonly used Potato Dextrose Agar (PDA), including low-cost formulations such as Rice Water Agar (RWA) and Potato Peel Sucrose Agar (PPSA), as well as laboratory-grade options like Malt Extract Agar (MDA) and Murashige and Skoog (MS) medium. These media were evaluated to determine their effectiveness in supporting the mycelial growth and quality of *Pleurotus* ostreatus in two sub-stages of mushroom production the pure and spawn culture.





**Figure 2.** Actual preparation for pure culture and spawn production.

Figure 1. Schematic representation of activities conducted

#### **Experimental Treatments**

• Treatment 0 - Potato Dextrose Agar (Control)

• Treatment 1 - Malt Extract Agar

- Treatment 2 Murashige and
- Skoog (MS)
- Treatment 3 Potato Sucrose Agar (PSA)
- Treatment 4 Rice Water Agar (RWA)

#### **Experimental Layout** • The experiment was laid out in

Completely Randomized Design (CRD) with 5 treatments and 3 replications.

#### **Data Gathered**

 Mycelial Growth Quality in pure and spawn culture and incidence and timing of contamination

# **Findings**

#### **Pure Culture Stage**



Figure 3. Mycelial growth of P. ostreatus on five different nutrient media at 3 days after inoculation (DAI). Mycelial density - very thin (+), thin (++), thick (+++), very thick (++++) - Kalaw et al., 2013



Figure 4. Mycelial growth of P. ostreatus on five different nutrient media at 9 days after inoculation (DAI). Mycelial density - very thin (+), thin (++), thick (+++), very thick (++++) - Kalaw et al., 2013

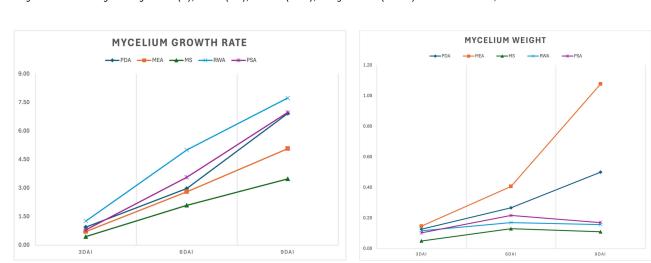


Figure 5. From left to right is the response comparison of mycelium growth rate and mycelium weight

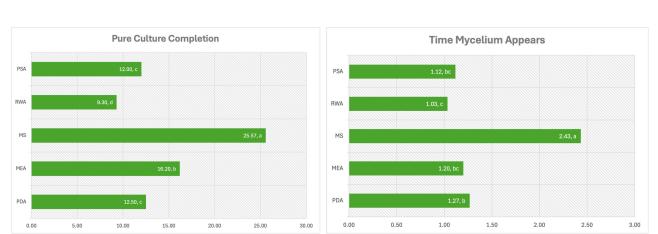


Figure 6. From left to right is the time required for pure culture completion and initial mycelial appearance significantly varied across the five-nutrient media.

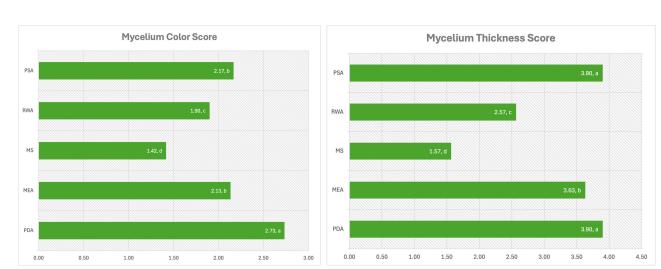


Figure 7. From the left: The mycelium color score rate is the measure of the intensity of the mycelium based on the system scoring of Rahayu and Martono (2019) with slight changes on the rating. A score of 1 thin white, 2 - thick white; and 3 - yellowish white. From the right: The mycelium thickness score evaluate the density or compactness of the mycelium visually based on the visual scoring system of Rahayu and Martono (2018). The score has the following interpretation: 4 - very thick, thick mycelium evenly distributed; 3 - thick, thick mycelium is uneven; 2 - thin - thin mycelium; and 1 - very thin, the mycelium is almost invisble.

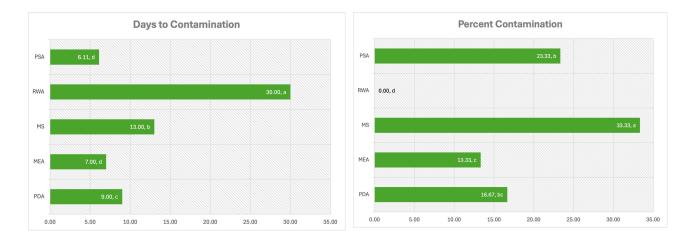


Figure 8. From left to right is the days to contamination and percent contamination. Non-contaminated replicates were assigned a value of [30] days, representing no contamination within the observation period. The MS media pure culture completion period, which lasted 29 days, was used as the maximum observation period. An additional day (+1), making it 30 days, was assigned to indicate that no contamination was observed.

#### **Spawn Production Stage**



Figure 9. Mycelial growth of P. ostreatus on five different nutrient media at 6 days after inoculation (DAI). Mycelial density - very thin (+), thin (++), thick (+++), very thick (++++) - Kalaw et al., 2013.



Figure 10. Mycelial growth of P. ostreatus on five different nutrient media at 12 days after inoculation (DAI). Mycelial density - very thin (+), thin (++), thick (+++), very thick (++++) - Kalaw et al., 2013.

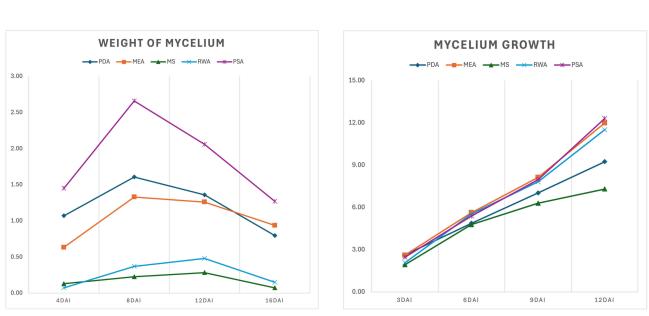


Figure 11. From left to right is the response comparison of mycelium growth rate and mycelium weight from different nutrient media at 3 days interval.



From left to right is the time required for spawn culture completion and initial mycelial appearance significantly varied across the five-nutrient media.



Figure 13. From the left to right. The mycelium color score rate and the mycelium thickness score for spawn. Refer to Figure 7 for legend.

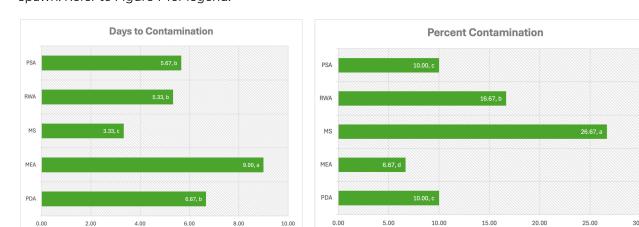


Figure 14. From left to right is the days to contamination and percent contamination.

#### **Conclusions**

- While PDA remains the standard medium, alternatives like MEA, RWA, and PSA showed equal or better mycelial growth, with MEA being a good PDA substitute. MS medium performed poorest due to its high salt content.
- MS medium had the highest and fastest contamination, while RWA, PSA, MEA, and PDA showed better resistance.
- RWA and PSA, made from local agricultural by-products, provide cost-effective options for small-scale mushroom growers without reducing spawn quality.

#### Recommendations

- Rice Water Agar (RWA) and Potato Sucrose Agar (PSA) are recommended as affordable alternatives to PDA, ideal for community or small-scale mushroom labs.
- Due to poor performance, high cost, and high contamination, MS medium is not advisable for P. ostreatus culture or spawn production.
- Future studies should focus on improving RWA and PSA by enriching them with local ingredients (e.g., molasses, banana peels) and exploring other locally sourced agar formulations for oyster mushroom cultivation.

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