Sustainable Oyster Mushroom Cultivation Using Brewers' Spent By-Products

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The study aims to identify environmentally sustainable temperature conditions for mushroom cultivation, focusing on the mycelial growth of *Pleurotus ostreatus* 2A. Mushroom cultivation, a promising eco-friendly option, offers a nutritious food source and protein alternative. The research investigates the effects of four distinct temperature treatments on mushroom development, with the ultimate goal of maximizing the potential of mushroom cultivation on brewers' spent byproducts (grains, trub, yeast). We performed the isolation and inoculation of a commercial strain from local supermarket on sterile glass petri dishes, containing 15 g of BSB. The mycelial growth of *P. ostreatus* 2A was assessed under four different temperature treatments: T1 (15°C), T2 (25°C), T3 (30°C), and T4 (45°C). Over 45 days, we monitored mycelial growth and collected data. We used regression analysis to understand the relationship between temperature and mycelial growth, and ANOVA was used to compare average mycelial diameters among four temperature treatments to identify significant differences. Our findings revealed that *P. ostreatus* 2A exhibited its most robust mycelial growth at a temperature of 30°C (R^2 = 0.9537, y = 1.2077x + 4.8817), closely followed by 25°C (R^2 = 0.9126, y = 1.6x + 8.0667). Notably, mycelial growth at 15°C (R^2 = 0.7908, y = 1.2109x + 13.531) was notably inferior to that observed at 25°C and 30°C. Conversely, the highest temperature treatment of 45°C (T4) resulted in significantly diminished mycelial growth (18.885 ± 1.779), although it did exert a positive influence on fungal lineage growth (R^2 = 0.5998, y = 0.275x + 7.1831). Notably, a significant cause-and-effect relationship was established between temperature and mycelial growth (R^2 = 0.106, y = -0.7262x + 53.4623). Furthermore, the comparative analysis of mycelial diameter revealed significant differences among all treatments, except between T2 (25°C) and T3 (30°C) on the 30th day ($F = 9.199$, $p < 0.05$), reinforcing the cause-and-effect relationship between mycelial diameter and temperature. There was a substantial difference between T2 (25°C), T3 (30°C), and T4 (45°C), and on the 45th day as T2 (80.267 ± 7.707) exhibited the widest mycelial diameter on average. In summary, this study underscores the substantial influence of temperature on the mycelial growth of *P. ostreatus* 2A. The study found that a temperature of 25-30°C is optimal for cultivating oyster mushroom strains, promoting eco-friendly practices. This knowledge aids in optimizing cultivation conditions, reducing resource consumption, and aligning with sustainable food production, making understanding the temperature requirements crucial for sustainable agriculture.

Key words: bioremediation; oyster mushroom; temperature; mycelium

Cultivo sustentável de cogumelo ostra usando subprodutos gastos de fabricantes de cerveja

O estudo investigou as condições ideais de temperatura para o cultivo sustentável do cogumelo-ostra Pleurotus ostreatus 2A, focando no crescimento micelial. Quatro temperaturas (15°C, 25°C, 30°C e 45°C) foram testadas em 45 dias. Os resultados indicaram que 25°C foi a temperatura mais favorável para o crescimento micelial robusto, seguida de 30°C, enquanto 15°C e 45°C resultaram em menor crescimento. A temperatura teve um impacto significativo no crescimento, estabelecendo uma relação de causa e efeito. Essas descobertas apoiam práticas de cultivo ecológico, promovendo a sustentabilidade e a eficiência na produção de micélio, destacando a importância da temperatura na agricultura sustentável.

Palavras-chave: biorremediação; cogumelo ostra; temperatura; micélio

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