

Performance of *Lentinus edodes* cultures obtained from various regions of sporophore

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ABSTRACT

Tissues from *Lentinula edodes* were collected from various regions of the sporocarp, specifically the stipe, pileus, and the junction of the pileus and stipe, and subsequently cultured on Potato Dextrose Agar (PDA) medium. The primary objective of this study was to evaluate key yield attributes that influence mushroom cultivation. We assessed the spawn run duration, time taken for primordial initiation, average weight of sporocarps, total number of sporocarps produced, overall yield, and biological efficiency of each culture. Our findings indicate significant variations in growth characteristics among the different tissue sources. Notably, cultures derived from the junction of the pileus and stipe demonstrated superior performance, exhibiting the shortest spawn run period and the highest yield and biological efficiency. These results suggest that the anatomical location of the tissue plays a crucial role in the growth and productivity of *Lentinula edodes*. The insights gained from this study contribute to a better understanding of the optimal tissue selection for enhanced mushroom cultivation under controlled conditions, thereby promoting efficient production practices in the industry. Future research should further explore the physiological mechanisms that underpin these differences in yield attributes.

Keywords: *Lentinus edodes*, sporophore, biological efficiency, pileus and stipe

Introduction

The 21st century has ushered in a significant shift in the exploration and application of natural resources, particularly within the food and medicinal industries. This growing interest stems from the unique properties of these resources, which exhibit low toxicity levels while providing high specificity in immune system activation [1]. Among these natural resources, mushrooms have garnered considerable attention due to their diverse bioactive compounds. Numerous studies have highlighted the multifaceted therapeutic potential of mushrooms, showcasing their antibacterial, antifungal, antioxidant, antiviral, antitumor, cytostatic, immunosuppressive, anti-allergic, antiatherogenic, hypoglycemic, anti-inflammatory, and hepatoprotective activities [2]. This increasing recognition of mushrooms as a source of valuable phytochemicals not only underscores their importance in traditional medicine but also paves the way for innovative applications in modern health care.

Materials and Methods

Fresh tissue samples from *Lentinula edodes* were collected from various regions, including the stipe, pileus, and the junction of the pileus and stipe, and were maintained on Potato Dextrose Agar (PDA) medium. Six replications were established for each treatment. Observations were made on yield attributes, including spawn run days, days taken for primordial initiation, average weight of sporocarps, number of sporocarps produced, overall yield, and biological efficiency. These parameters were carefully assessed and recorded.

Result and Discussion

The data on the performance of tissue culture isolates derived from various regions of the sporocarp, focusing on yield parameters and biological efficiency, are presented in Table 2. Among the cultures tested, the isolate developed from the

junction of the pileus and stipe outperformed those from other regions, demonstrating the shortest spawn run period of 35.2 days, the earliest pinhead formation at 85.3 days, the highest yield of 321.4 g per bed, and the greatest biological efficiency at 64.2%. This was followed by cultures obtained from the stipe, pileus, and spores, in decreasing order of merit. Notably, the culture derived from spores yielded the least compared to the other isolates. Previous studies have also highlighted the performance of tissue cultures sourced from different sporocarp regions. [3] reported significant yield differences among various tissue cultures and the parent culture of the same strain of *Agaricus bisporus*. Similarly, [4] indicated that cultures obtained from the junction of the pileus and stipe of *A. bisporus* consistently performed better across various parameters. [4] further concluded that pileus tissue cultures of *A. bisporus* exhibited superior overall performance compared to those raised from stem and gill tissues. The superior performance of the cultures derived from the junction of the pileus and stipe in this study can be attributed to the presence of more active, viable, and virulent cells in that region. [5] noted that more actively differentiating cells are observed at the junction of the pileus and stipe of a sporophore, which may explain the enhanced performance of these cultures.

Conclusion

The findings of this study underscore the significance of the tissue culture source on the yield and biological efficiency of *Lentinula edodes*. The superior performance of cultures derived from the junction of the pileus and stipe highlights the importance of selecting optimal tissue regions for cultivation. These cultures not only exhibited shorter spawn run periods and earlier pinhead formation but also yielded the highest overall production and biological efficiency. The results align with previous studies that emphasize the potential of specific sporocarp regions in enhancing mushroom cultivation outcomes.

Table: Performance of *L. edodes* cultures obtained from various regions of sporophore

Tr.no	Sources	Spawn run(days)	Pin head formation(days)	Sporophore weight(g)	Sporophore number / bed	Yield (g /bed)	Bio-efficiency (%)
1	Spores	37.1 _b	88.2 _b	21.3 _a	13.9 _d	295.6 _d	59.1 _d
2	Pileus	38.2 _c	91.5 _c	19.9 _b	15.6 _{ab}	310.5 _c	62.1 _c
3	Stipe	40.3 _d	94.2 _d	19.4 _{bc}	16.2 _a	315.3 _b	63.0 _b
4	Junction of pileus and stipe	35.2 _a	85.3 _a	20.9 _a	15.4 _{ab}	321.4 _a	64.2 _a

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