Influence of Temperature on Mycelial Growth of some *Pleurotus eryngii* and *Lentinula edodes* Strains *in vitro*

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Abstract

The mycelial growth rate of eight experimental strains - *Pleurotus eryngii* (4) and *Lentinula edodes* (4) - was studied on PDA medium at different incubation temperatures: 18°C, 24°C and 30°C. The aim of the investigation was to determine the optimal temperature for *in vitro* cultivation of each of the eight strains under study. All the experimental souses reached their optimum growth at 24-30°C. *P. eryngii* strains showed better growth rates compared to those of *L. edodes*. The fastest strains were Pery-G (4,83 mm day⁻¹/30°C), Pery-K (4,14 mm day⁻¹/30°C) for *P. eryngii* and Led-S (3,35 mm day⁻¹/30°C), LeM-51 (3,05 mm day⁻¹/30°C) for *L. edodes*, respectively. Statistical analyses show that experimental strains of both species obtained very significant positive results at 30°C.

Keywords: *Lentinula edodes*, mycelium, *Pleurotus eryngii*

Introduction

Pleurotus eryngii (King oyster) and *Lentinula edodes* (shiitake) are two of the most important and popular cultivated mushrooms worldwide. These *speciality* mushrooms are considered as a delicacy with high nutritional and functional value and are also accepted as nutraceutical foods. They are of considerable interest because of their organoleptic merit, medicinal properties and economic significance (Chang and Miles, 2008; Chen *et al.*, 2013). Successful cultivation of these mushrooms requires a spawn with high productive potential, able to quickly colonize the culture substrate. Factors such as composition and pH of the nutrient medium, temperature and CO₂ concentration play an essential role in growth of the mycelium and preparing of the next mushrooms production. (Philippoussis, 2009). This paper examines the influence of temperature on mycelial growth of some *P. eryngii* and *L. edodes* strains of different origins.

Aims and objectives

The aim of the investigation was to determine the optimal temperature for *in vitro* cultivation of each of the eight studied strains.

Materials and methods

Eight different strains, *P. eryngii* - 4 and *L. edodes* - 4, were used in experiments. *P. eryngii*: Pery-G, Pery-R and Pery-26 were obtained from the Center of Applied Biochemistry and Biotechnology - BIOTEHNOL Bucharest and Pery-K from the Research Institute for Vegetable and Flower Growing - RIVFG Vidra. *L. edodes* strains Led-S, Led-C were obtained from BIOTEHNOL Bucharest and LeM-51, LeM-52 from RIVFG Vidra. The isolates were inoculated and grown on PDA media in tubes/Petri dishes. Mycelium extension rates were evaluated at 18°C, 24°C and 30°C. The experiments were arranged in a randomized complete design with

Tab. 1. Influence of temperature on mycelial growth of four *P. eryngii* strains

Temperature	Mycelium growth rate (mm day ⁻¹) - PDA, pH 6.5 -			
	Pery-G	Pery-K	Pery-R	Pery-26
18°C	2.15	1.85	1.30	1.73
24°C	3.35 ^c	2.95 ^c	1.75 ^d	2.40 ^d
30°C	4.83 ^a	4.14 ^a	3.53 ^a	4.08 ^a

Tab. 2. Influence of temperature on mycelial growth of four *L. edodes* strains

Temperature	Mycelium growth rate (mm day ⁻¹) - PDA, pH 6.0 -			
	LeM-51	LeM-52	Led-S	Led-C
18°C	1,40	1.10	1,38	1,40
24°C	2,00 ^c	1,80 ^c	2,05 ^b	1,93 ^c
30°C	3,05 ^a	2,28 ^a	3,35 ^a	2,70 ^a

Note: Letters are the statistical interpretation with Fisher test in which a- very significant, b- distinct significant, c- significant, d- nonsignificant

four replications per treatment. The results were statistically processed and interpreted with Fisher test.

Results and discussion

The mycelial growth rates of both species increased progressively along with the rise of incubation temperature. All the experimental strains reached their optimum growth at 24-30°C. *P. eryngii* strains showed better growth rates compared to those of *L. edodes*. The fastest strains were Pery-G (4,83 mm day⁻¹/30°C), Pery-K (4,14 mm day⁻¹/30°C) for *P. eryngii* and Led-S (3,35 mm day⁻¹/30°C), LeM-51 (3,05 mm day⁻¹/30°C) for *L. edodes*, respectively. Statistical interpretation (Fisher test) shows that our experimental strains of both species obtained very significant positive results at 30°C. One strain, Led-S, gave a significant distinct positive result (2,05 mm day⁻¹) at 24°C, while the other ones revealed only significant results (tab.1. and tab.2.).

Conclusion

Growth speed of *L. edodes* and *P. eryngii* strains cultivated *in vitro* is determined by genotype and is strongly influenced by temperature. The growth

rate increased progressively along with the rise of incubation temperature from 18°C to 30°C. All the experimental strains reached their optimum growth at 24-30°C. Statistical interpretation shows that our experimental strains of both species obtained very significant positive results at 30°C. *P. eryngii* strains showed better growth rates compared to those of *L. edodes*.

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