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INFLUENCE OF SUBSTRATE AND ITS PASTEURIZATION ON YELLOW OYSTER MUSHROOM (*PLEUROTUS CORNUCOPIAE* (PERS.) ROLLAND) YIELD

WPLYW PODŁOŻA I PASTERYZACJI NA PLONOWANIE BOCZNIAKA
CZAPECZKOWATEGO (*PLEUROTUS CORNUCOPIAE* (PERS.) ROLLAND)

Summary. The yield of *Pleurotus cornucopiae* grown on substrates of wheat and rye straw was investigated. The highest yields were obtained on the rye straw pasteurized for 72 h and on wheat straw pasteurized for 48-72 h. The optimal pasteurization period at 60°C for wheat straw was 48 h, and for rye straw – 72 h.

Key words: *Pleurotus cornucopiae*, yellow oyster mushroom, substrate, pasteurization

Introduction

Pleurotus cornucopiae is known as P50 cultivar of Hauser and Claron of Somycel 3040 (KALBERER 1992). This species produces light-yellow fruit bodies with an edible stem centrally located in relation to the pileus. The fruit bodies of this mushroom are distinguished by their high taste values. In spite of the exquisite taste, it is the least popular cultivated species. The growth of its mycelium is slower than that of other species, therefore, the substrate is more susceptible to the danger of infection. For fruiting, it requires the temperature of 18-20°C (DELMAS and MAMUON 1982, TAN et AL. 2005). High thermal requirements permit yielding of this mushroom in summer. The usability of different organic materials for the growing of *Pleurotus cornucopiae* was confirmed in many research works. As reported by the majority of authors, good results in the growing of *Pleurotus* are obtained with the use of substrates composed of cereal straw (LELLEY 1991, ZIOMBRA 1996).

The aim of this study was a comparison of *Pleurotus cornucopiae* yield affected by the straw substrates pasteurization time.

Materials and methods

Studies on the effect of substrate and its pasteurization on the yield of *Pleurotus cornucopiae* were carried out in 1997-1998 in the Department of Vegetable Crops, Poznań University of Life Sciences. A comparison was made of substrates prepared of wheat straw and rye straw pasteurized at 60°C for 24, 48, 72 and 96 h. The experiment was established in a random block design in six replications. Each bag with substrate was a replication.

In order to prepare the cultivation substrate for *Pleurotus*, the straw was cut into 3-5 cm long chaff and watered for 24 h up to the moisture of 70%. The moisture content was determined by the gravimetric method. Then, the straw was pasteurized at 58-60°C for 24, 48, 72 and 96 h. After pasteurization, the substrate was cooled to about 25°C, was inoculated with grain mycelium of *Pleurotus* in the amount of 2% of the substrate mass, and it was placed into perforated foil bags. The perforation openings of 0.8 cm diameter were distributed at 6 × 6 cm intervals. One foil bag contained 3 dm³ of substrate.

The incubation was carried out in the dark at 25°C for 20 days. After complete overgrowing of the substrate by the mycelium of *Pleurotus*, illumination of about 600 lx was provided by glow-discharge tubes. Growing compartment was kept at 18-20°C and 85-90% relative air humidity.

The harvest of fruit bodies was carried out successively as the particular groups of fruit bodies developed. The whole groups of fruit bodies were picked up in the moment when majority of them had straightened rands of their pileuses. The yielding period lasted four weeks.

Results and discussion

The time length from the inoculation of the substrate with mycelium to the development of the first fruit bodies was differentiated depending on the substrate and the pasteurization period oscillating between 26 and 44 days (Table 1). In the substrate of wheat straw, the mycelium of *Pleurotus cornucopiae* started its fruiting period significantly quicker than in the rye straw substrate. There was also an influence of the length of the straw pasteurization time at 60°C on an earlier yielding. *Pleurotus cornucopiae* yielded the quickest when the wheat straw was pasteurized for 48 to 96 h, and when the rye straw was pasteurized for 72 to 96 h. OVERSTIJNS (1990) and ZIOMBRA (1993) showed that the pasteurization process insuring substrate selectivity influenced the growth rate of *Pleurotus* mycelium.

The yield of *Pleurotus* depended on the type of straw used as substrate and the length of the pasteurization period (Fig. 1). The highest yields, independent of the pasteurization period amounting on the average to 650 g from 1 kg of substrate dry matter were obtained in the wheat straw substrate. Significantly lower yields (on the average 485 g) were obtained in the rye straw substrate. Many authors (VISSCHER 1989, LELLEY 1991, LABORDE and IRACABAL 1995) recommended wheat straw as the substrate for intensive growing of *Pleurotus*. In the present study, the substrate of wheat straw was

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Table 1. Number of days since substrate inoculation with mycelium to first harvest of yellow oyster mushroom

Tabela 1. Liczba dni od zaszcepienia podłoża grzybnią do pierwszego zbioru bocznika czapczkowatego

Time of pasteurization Czas pasteryzacji (h)	Substrate – Podłoże	
	rye straw słoma żytnia	wheat straw słoma pszenna
24	44 ±3	34 ±3
48	36 ±2	30 ±2
72	30 ±1	26 ±2
96	30 ±1	26 ±1

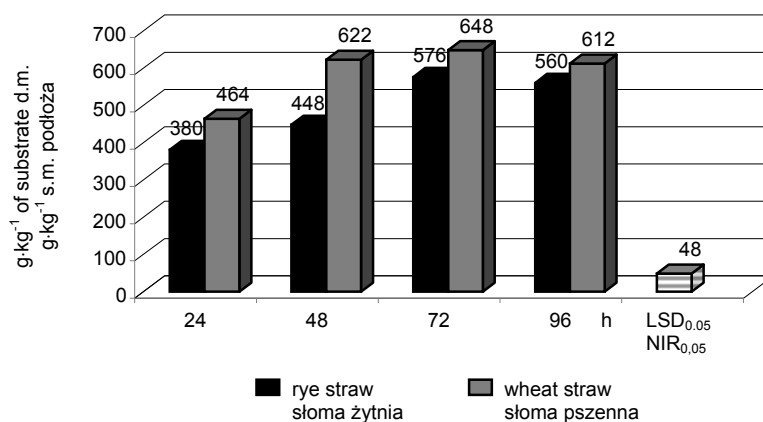


Fig. 1. Influence of substrate pasteurization on yellow oyster mushroom yield
Rys. 1. Wpływ pasteryzacji podłoża na plon bocznika czapczkowatego

more useful for *Pleurotus cornucopiae* growing than rye straw. The process of substrate preparation of wheat straw can be significantly shorter than that of rye straw due to the fact that microorganisms have a greater availability of carbon compounds contained in wheat straw and it facilitates pasteurization (BISKO and DUDKA 1987).

In the present studies, the highest yields not differing significantly from each other, were obtained in the substrate of wheat straw pasteurized for 48, 72 and 96 h. In the substrate of rye straw, the highest yields were obtained when the substrate was pasteurized for 72 and 96 h.

Conclusions

1. The yield of *Pleurotus cornucopiae* depended on the substrate and its pasteurization time.
2. The highest yields were obtained in the substrate of wheat straw.
3. The optimal pasteurization period at 60°C for wheat straw was 48 h, and for rye straw – 72 h.

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WPŁYW PODŁOŻA I PASTERYZACJI NA PLONOWANIE BOCZNIKA CZAPECKOWATEGO (*PLEUROTUS CORNUCOPIAE* (PERS.) ROLLAND)

Streszczenie. W doświadczeniach badano plonowanie *Pleurotus cornucopiae* na podłożach słomy żytniej i pszennej pasteryzowanych w temperaturze 60°C przez 24, 48, 72 i 96 h. Największe plony owocników stwierdzono na podłożu słomy pszennej pasteryzowanej 48 lub 72 h oraz na słomie żytniej pasteryzowanej 72 h. Optymalny okres pasteryzacji w temperaturze 60°C dla podłoża ze słomy pszennej wynosi 48 h, a dla podłoża ze słomy żytniej – 72 h.

Słowa kluczowe: *Pleurotus cornucopiae*, bocznik czapeczkowaty, podłoże, pasteryzacja

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