RESEARCH ON THE INFLUENCE OF HYBRID, CULTURE SUBSTRATE AND METHOD OF DISINFECTION ON OYSTER MUSHROOMS - *PLEUROTUS* SPP.

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Abstract

The cultivation of *Pleurotus* mushrooms has a number of advantages from the point of view of the growing technology, and from the economic point of view. Compared with other species of cultivated mushrooms, oyster mushroom are obtained more easily, have greater resistance to diseases, pests and greater variations in temperature, requires no expensive works of cultivation and maintenance. Nutrient substrate used is exploited potential crop cycle because after about 2.5-3 months can be reused in agriculture, as animal feed or soil conditioner.
It is important to note that rapid movement of funds invested is given relatively short cycle of this culture. The profit earned relative to the amount invested in production costs, are between 50-100%.
Analysing the results of production, the most effective method of disinfection is pasteurization, because by this method does not completely destroy the bacterial flora of the substrate, flora which helps develop the mycelium *Pleurotus* spp.

Key words: mushrooms, *Pleurotus*, culture substrate, disinfection

Common names: the oyster mushroom, oyster shelf, tree oyster, straw mushroom, hiratake, tamogitake.

Taxonomic synonyms and considerations: First described in 1774 from Austria by Jacquin, and in 1871 by Kummer, no type specimens survived. *Pleurotus ostreatus* represents a huge complex of subspecies, varieties and strains.

Of all the cultivated mushrooms in the world, *P. ostreatus* is the easiest to grow. This species adapts to a very large spectrum of substrates. This aggressive mushroom will make its home on most any woody or pulpy substrate containing cellulose.

MATERIAL AND METHOD

Oyster HK 35 (*figure 1*) is a high quality hybrid, created in Hungary, which was imposed in Romania. HK 35 has light cream hat and has the advantage that both performs very well at low temperatures 10-12 °C and at higher temperatures 22-24 °C is not demanding in this regard.

Oyster P80 (*figure 2*), is a hybrid created in Italy, dark gray-brown, with large and very consistent carpophores. It is adapted for the autumn and winter, tolerant and easy to grow, early and aggressively with a very good productivity. The recommended temperature during production is 14-16˚C in the air and relative humidity 85-90%.

Figure 1 **Oyster HK 35**

Figure 2 **Oyster P 80**

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It was organized a trifactorial experience with the following experimental factors:
- biological material - two strains of *Pleurotus*,
- two culture substrates, prepared according to two different recipes,
- three methods of disinfection for the substrates.

The combination of factors resulted in 12 experimental variants shown in *table 1*, each embodiment having four repetitions with 3 bags/variant.

Table 1

Experimental variants

Experimental variants	Hybrids	Substrate	Disinfection method
V1	HK 35	I	Sterilization (100ºC – 1hour)
V2	HK 35	I	Pasteurization (65ºC – 1 hour)
V3	HK 35	I	Chemical (Tposin 0.1% - thyophanate methyl)
V4	HK 35	II	Sterilization (100ºC – 1hour)
V5	HK 35	II	Pasteurization (65ºC – 1 hour)
V6	HK 35	II	Chemical (Tposin 0.1% - thyophanate methyl)
V7	P80	I	Sterilization (100ºC – 1hour)
V8	P80	I	Pasteurization (65ºC – 1 hour)
V9	P80	I	Chemical (Tposin 0.1% - thyophanate methyl)
V10	P80	II	Sterilization (100ºC – 1hour)
V11	P80	II	Pasteurization (65ºC – 1 hour)
V12	P80	II	Chemical (Tposin 0.1% - thyophanate methyl)

I - 88% corn cobs, grains of barley 8%, 4% $CaCO_3$
II - wheat straw 75%, 10% corn cobs, wheat bran 10%, 5% $CaCO_3$

The harvesting of mushrooms was conducted by peeling the whole bunch by hand, when hats were flat or slightly concave edge. The amounts collected for each experimental variant for each culture wave are shown in *table* 2. The brute results are expressed in kg for 3 bags of compost, and for 1 kg of compost.

Table 2

Quantities harvested for each experimental variant

Experimental variants	The quantity of compost / 3 bags	The harvested quantity Flush 1 -kg-	The harvested quantity Flush 2 -kg-	The harvested quantity Flush 3 -kg-	Total harvest -kg-	Total quantity of mushrooms / kg of compost -kg-
V1	32.4	3.73	2.52	1.2	7.45	0.23
V2	32.4	4.3	3.2	1.25	8.75	0.27
V3	32.4	3.6	1.81	1.1	6.51	0.20
V4	19.44	2.4	1.27	0.7	4.37	0.22
V5	19.44	2.95	1.98	0.9	5.83	0.30
V6	19.44	2.35	1	0.75	4.1	0.21
V7	32.4	4.2	1.82	1.3	7.32	0.23
V8	32.4	4.36	3.24	1.31	8.91	0.28
V9	32.4	3.45	2.47	1.05	6.97	0.22
V10	19.44	2.35	1.39	0.75	4.49	0.23
V11	19.44	2.95	1.86	0.92	5.73	0.29
V12	19.44	2.4	0.88	0.69	3.97	0.20

RESULTS AND DISCUSSIONS

It was analyzed the influence of unilateral disinfection method used on obtained yield in kg mushroom/kg of compost. *Table 3* presents the obtained values. Analyzing the data in the table, it can be said that disinfection by pasteurization affects production, recorded significant positive differences compared to the experience average. At chemical disinfection were significant negative differences from the average.

Was analyzed the combined influence of the experimental factors hybrid and the disinfection method used, the obtained yield was expressed as kg mushrooms / kg of compost. *Table 4* presents the obtained values. Analyzing the data in the table, it can be said that disinfection by pasteurization affects production, recorded positive significant differences at both hybrids, compared to the experience average. At chemical disinfection were negative significant differences from the average at both hybrids.

Table 3

Unilateral influence of disinfection method on obtained yield

Disinfection method	Harvested mushrooms / kg of compost -kg-		Difference ±D	Signification of difference
	Obtained values	%		
	0.24	100.0	0.00	Mt.
Sterilization	0.23	95.2	-0.01	-
Pasteurization	0.29	119.0	0.05	***
Chemical	0.21	85.8	-0.03	00
DL (p 5%)			0.02	
DL (p 1%)			0.03	
DL (p 0.1%)			0.04	

Table 4

The combined influence of experimental factors hybrid and disinfection method used, on the obtained yield

Disinfection method	Mushroom hybrid	Harvested mushrooms / kg of compost -kg-		Difference ±D	Signification of difference
		Obtained values	%		
		0.24	100.0	0.00	Mt.
Sterilization	HK 35	0.23	94.2	-0.01	-
Pasteurization	HK 35	0.29	120.0	0.05	**
Chemical	HK 35	0.21	85.8	-0.03	0
		0.24	100.0	0.00	Mt.
Sterilization	P 80	0.23	96.1	-0.01	-
Pasteurization	P 80	0.29	118.1	0.04	**
Chemical	P 80	0.21	85.8	-0.03	0
DL (p 5%)				0.03	
DL (p 1%)				0.04	
DL (p 0.1%)				0.05	

Was analyzed the combined influence of the experimental factors disinfection method and the used substrate, the obtained yield was expressed in kg mushrooms/kg of compost. *Table 5* presents the obtained values. Analyzing the data in the table, it can be said that disinfection by pasteurization affects production, was recorded significantly positive distinct differences in substrate II, and significant positive difference in the substrate I, to experience media. At chemical disinfection were negative significant differences from the average in both recipes substrate.

Table 5

The combined influence of experimental factors, disinfection method and the substrate used, on the obtained yield

Disinfection method	The used substrate	Harvested mushrooms / kg of compost -kg-		Difference ±D	Signification of difference
		Obtained values	%		
		0.24	100.0	0.00	Mt.
Sterilization	I	0.23	96.5	-0.01	-
Pasteurization	I	0.28	116.8	0.04	**
Chemical	I	0.21	86.7	-0.03	0
		0.24	100.0	0.00	Mt.
Sterilization	II	0.23	93.8	-0.01	-
Pasteurization	II	0.30	121.2	0.05	***
Chemical	II	0.21	84.9	-0.04	00
DL (p 5%)				0.03	
DL (p 1%)				0.04	
DL (p 0.1%)				0.05	

CONCLUSIONS

Analysing the results of production, the most effective method of disinfection is pasteurization, because by this method does not completely destroy the bacterial flora of the substrate, flora which helps develop the mycelium *Pleurotus* ssp.

The disinfection by pasteurization affects production, registering significant positive differences on substrate II with hybrid HK 35, significantly positive differences on substrate I with hybrid HK 35 and P80, compared to the experience average.

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