Bull. Mukogawa Women's Univ. Nat. Sci., **45**, 49－51(1997)
武庫川女子大紀要（自然科学）

Effect of Culture Broths from Various Microorganisms on Fruiting of *Pleurotus ostreatus*

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We report the effect of culture broths from various microorganisms on fruiting of *Pleurotus ostreatus*. *P. ostreatus* has been grown on sterile sawdust medium containing culture broths from various microorganisms with good yields in small scale experiments. The spawning to first yield obtained for a period of 10 days was 5.9% of the moistened medium on the sawdusts medium containing culture broth from *Bacillus cereus*.

Introduction

Species of *Pleurotus* are well-known edible mushroom. Commercial cultivation of *P. ostreatus* (Jacq. ex Fr.)Kummer has been practiced in Japan for a long time. Many countries have already started commercial cultivation of many kinds of mushrooms[1)-9)]. Therefore, we tried the artificial cultivation of *P. ostreatus* with culture broths from various microorganisms.

Materials and Methods

Organisms

P. ostreatus, kindly provided by Plant Research Center, Hyogo, Japan was used. Thirty-one strains of microorganisms belonging to bacteria, yeasts, actinomycetes and moulds were used.

Medium and cultivation condition

Bacteria, actinomycetes, moulds and yeasts were cultured in 300ml Erlenmyer flasks with 100ml of 2% malt extract medium at 25℃ for 3 to 7 days on a rotary shaker(80 rpm).

After growth, the culture broth was centrifuged to remove the cells. The supernatant obtained was tested for cultivation of *P. ostreatus*

Effect of culture broths on fruiting of mushroom

Cultivation of *P. ostreatus* was initially attempted in 300ml Erlenmyer flasks with 100ml of 2% malt extract medium. The sawdust medium with 70% moisture derived from the mixture of sawdust of beech : agricultural waste of wheat bran 3 : 1 ratio by weight was placed in bottled container.

Thirty five grams of the medium was placed in a plastic bottle which was covered with aluminium sheets to prevent contamination and to retain moisture. After which the bottle was sterilized in an autoclave for 30 minutes at 15 pounds pressure. The autoclaved bottles on cooling were inoculated with a master culture of *P. ostreatus* grown in 300ml Erlenmyer flasks and incubated at 25℃. When the mycelia of the

culture had already fully colonized the substrate, saturated water was added to each bottle and kept overnight. On the next day, excess water was drained off completely. And then, the supernatant obtained from various microorganisms was added to each bottle. The bottles were kept in a room maintained at 15℃ and 90% relative humidity. After about 7 days, the first flush of the fruit bodies appeared on the surface of the culture, and several days later they were large enough for harvesting. The bottom portion of the stipe of the fruit body was cut off, and the dried weight of the fruit bodies was recorded.

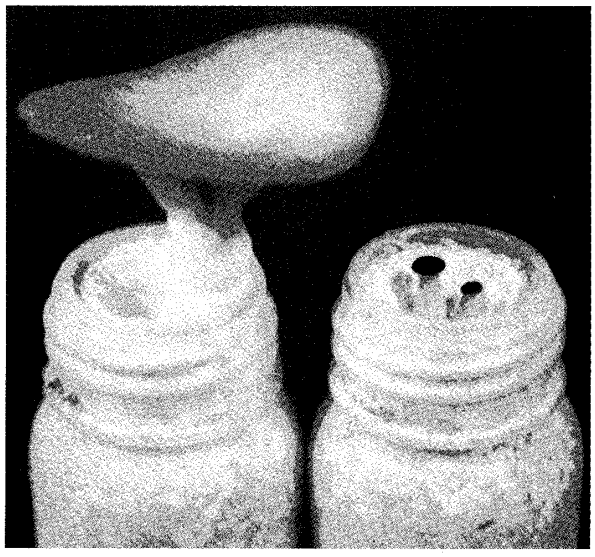

Fig. 1 Effect of culture broth from *B. natto* on fruiting of *P. ostreatus*.

Left, the sawdust medium was containing culture broth from *B. natto*; Right(control), the sawdust medium was containing malt extract medium.

Table 1. Effect of culture broths from various microorganisms on fruiting of *P. ostreatus*

Microorganisms	Yield*
Mucor rouxianus IFO 5773	1.67
Rhizopus javanicus IFO 5441	1.05
Aspergillus oryzae	0.95
Aspergillus niger	0.95
Lactobacillus derbueckii IFO 3202	0.99
Lactobacillus paracasei IFO 3953	0.92
Lactobacillus cremoris IFO 3427	1.06
Streptococcus thermophilus IFO 13957	0.95
Bifidobacterium breve IFO I-53-8	0.90
Escherichia coli AKU 0001	1.64
Escherichia coli IFO 3208	1.78
Escherichia coli IFO 3301	1.32
Escherichia intermedia AKU 0010	1.49
Bacillus subtilis AKU 0236	1.46
Bacillus subtilis IFO 3007	1.52
Bacillus subtilis IFO 3037	1.58
Bacillus cereus IFO 3001	2.05
Bacillus megaterium NI 8100	1.21
Bacillus natto AKU 0206	1.82
Corynebacterium glutamicum ATCC 13032	0.81
Streptomyces antibioticus	0.96
Streptomyces fradiae IFO 12773	1.28
Saccharomyces cerevisiae AKU 4100	0.88
Saccharomyces cerevisiae AKU 4110	0.85
Saccharomyces cerevisiae AKU 4005	1.15
Saccharomyces cerevisiae AKU 4036	1.21
Saccharomyces cerevisiae AKU 4037	0.96
Saccharomyces calsbergensis IFO 0641	1.31
Saccharomyces rouxii IFO 0487	0.80
Candida utilis IFO 0619	0.78
Candida tropicalis IFO 0006	1.21
Control**	

*, Dried weight(g)/35g sawdust medium.
**, 2% malt extract medium.

Results and Discussion

Growth and fruiting

When the mycelium of *P. ostreatus* had fully colonized sawdust medium, the aluminium sheets were removed and water was sprayed as necessary to keep the material moist but not wet. Usually, the cover was removed 3 days later. The primordia of fruit bodies began to appear as tiny coralline heads on the surface of the media. The first crop was picked 7 days after the appearance of the primordia.

Figure 1 shows the effect of culture broth from *Bacillus natto* on fruiting of *P. ostreatus*. Table 1 shows the effect of culture broths from various microorganisms on fruiting of *P. ostreatus*. *P. ostreatus* has been grown on sawdust medium containing culture broths from various microorganisms with good yields in small scale experiments. The yield were recorded as follows; 2.05g on the sawdust medium containing culture broth from *Bacillus cereus*, 1.82g on that containing culture broth from *B. natto*, 1.78g on that containing culture broth from *Escherichia coli* IFO 3208, and 1.64g on that containing culture broth from *Escherichia coli* AKU 0001 as spawning to first yield for a period of 10 days. Therefore, the dried yield obtained was 5.9% of the moistened medium on the sawdust medium containing culture broth from *B. cereus* as spawning to first yield.

References

1) Bech, K., *Mushroom Journal*, 513, 17−18 (1992).
2) Eicker, A., *Mushroom Journal*, 513, 19−21(1992).
3) Elliot, T., *Mushroom Journal*, 513, 14−16(1992).
4) Flegg, P., *Mushroom Journal*, 513, 16−17(1992).
5) Jandaik, C. L. and Kapoor, J. N., *Mushroom Science*, IX, 667−672(1974).
6) Jong, S. C. and Peng, J. T., *Mycologia*, 67, 1235−1238(1975).
7) Kaul, T. N. and Janardhanan, K. K., *Indian Phytopathology*, 23, 578−580(1970).
8) Purakaystha, R. P., *Indian Mushroom Science*, I, 351−371(1978).
9) Okamura, T., Noda, H., Hoshino, Y., Sohgawa, E., Uesugi, S., Mohri, A. and Ohsugi, M., *Nippon Shokuhin Kagaku Kogaku Kaishi*, 43, 333−335(1996).