

Oyster Mushroom Cultivation

Part II. Oyster Mushrooms

Chapter 8

Pest and Disease Management

ABNORMALITIES IN FRUITING BODY

The formation and growth of fruiting bodies are sensitive to environmental conditions, such as temperature, humidity, carbon dioxide concentration, and moisture content in the mushroom substrate. Improper balance of these factors can induce fruiting body deformations.

Temperature and Relative Humidity

Temperature and humidity affect the fruiting bodies' shape. Optimal cultivation conditions vary with strains. The changes in the fruiting body shapes of an oyster mushroom strain at different conditions are described below. Optimal temperature and humidity for fruiting body formation of this mushroom is known as 13-16°C and > 80%. High and low temperature indicates > 16°C and < 12°C, respectively and high and low humidity indicates > 80% and < 60%.

Under high temperature and high humidity

- Cap/stipe ratio smaller (small cap/long stipe)
- Cap color becomes lighter (grey-brownish grey)
- Depression in the center

Under high temperature and low humidity

- Cap margin gets thinner and brittle
- Cap turns into umbrella shape
- Cap color become very light (light grey-white)
- Stipe becomes very thick

Under low temperature and low humidity

- Cap color becomes dark (dark brown)
- Stipe becomes thick or middle of stipe is swollen or barrel-shaped
- Fruiting bodies grows very slowly and produces low yields

Under low temperature and high humidity

- Relatively strong color and strong fruiting bodies formed
- Fruiting bodies grow slowly and the number of fruiting bodies reduced



Figure 1. Fruiting bodies at 60% (R.H.)



Figure 2. Fruiting bodies at 90% (R.H.)

CO₂ Concentration

High carbon dioxide (CO₂) concentration inside mushroom houses is one of the major causes of abnormality in fruiting bodies. Proper ventilation is needed in order to reduce CO₂ concentration. However, too much air movement caused by excessive ventilation also induces abnormalities in fruiting body shapes. An increase of carbon dioxide concentration can decrease cap sizes and increase length of stipes. However, even stipes are short at CO₂ concentrations of more than 0.5%.

Table 1. Fruiting body shape at different CO₂ concentration

CO ₂ conc. (%)	Diameter of cap (mm)	Length of stipe (mm)
0.03	6.5	4.6
0.1	3.4	6.8
0.3	2.4	6.7
0.5	0.6	2.5

A. CO₂ concentration 0.03%B. CO₂ concentration 0.1%

C. CO₂ concentration 0.3%D. CO₂ concentration 0.5%

Figure 3. Effect of CO₂ concentration on mushroom morphology of *P. ostreatus*
 (Photo courtesy of Kap-Yeol Jang)

Watering (Substrate Moisture Content)

Watering after primodium formation to maintain optimal moisture content in substrate is very important for the production of high yields of high quality oyster mushrooms. Disease usually increases with too much watering on cultivation beds (excessive moisture content). Too little watering reduces yields and induces abnormal shapes in fruiting bodies. Substrate blocks shrink and fruiting bodies become brown on dry cultivation beds, and new mycelia grow and many small new fruiting bodies are formed on old mushroom fruiting bodies.



A. Substrate was separated with box by shrinking



B. Browning of fruiting body



C. Baby fruiting bodies formed on an old fruiting body body



D. Baby fruiting bodies formed on an old fruiting

Figure 4. Oyster mushroom fruiting bodies with low substrate moisture content
(Photo courtesy of Kap-Yeol Jang)