

Common Diseases of Oyster Mushroom and Its Management

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SUMMARY

The oyster mushroom is an economically important crop that is grown in many regions of the world. Several species of *Pleurotus* mushroom are grown in many countries with different shades of colour such as pink, cream, yellow, white, grey, light brown depending upon the species. It is a rich source of proteins and vitamins C and B. Green mould, ink caps, cobweb, dry bubble, yellow blotch and soft rot are some common diseases infecting *Pleurotus*. The conditions and environment in which mushroom cultivation takes place such as humidity, warm temperature predisposes the mushroom to pathogens.

INTRODUCTION

Oyster mushroom is an important edible mushrooms sharing all the fundamental characters of cultivated mushrooms and distributed almost all over the world (Lee, 1993). It is the second most important mushroom accounting for 25% of total cultivated mushroom production in the world. Oyster mushroom is a fruiting body of an edible white rot fungus belonging to the genus *Pleurotus*, family Pleurotaceae, order Agaricales and phylum Basidiomycota. There are eight different species of *Pleurotus* viz., *Pleurotus sajor-caju*, *P. flabellatus*, *P. cornucopiae*, *P. ostreatus*, *P. pulmonarius*, *P. citrinopileatus*, *P. cystidiosus* and *P. tuberregium*. In nature they can thrive in many places as a cluster on most of all hardwoods, dead trees, paper, pulp sludge, sawdust, cereal straw, corn and corn cobs, banana fronds etc. Due to warm temperature, high humidity favoured by mushroom cultivation, limited use of chemicals pesticides, carbon dioxide level and growing inside a house has led to many diseases caused by fungi, virus and bacteria in oyster mushroom (Bellettini et al. 2017). Such diseases have caused around 70% yield loss in *Pleurotus* mushroom every year causing serious problems in its production and cultivation. Depending upon environmental conditions, stage of infection and compost quality some diseases can cause complete failure of mushroom crop. The control of such diseases and pests is crucial for mushroom crop production. Good hygiene and careful farm management maybe some of the important strategies to prevent some major pathogen attack. In order to get healthy and increased production of *Pleurotus* mushroom, growing high quality mushroom coupled with low input and effective disease management is desired. It is necessary to detect the diseases at the early stage so that effective control measures can be implemented to reduce the loss.

Green mould

Causal organism: *Trichoderma hazianum*, *T. pleurotum*, *T. virens*, *T. atroviride*, *T. asperellum*, *T. citrinoviride*, *T. longibrachiatum* and *T. pleuroticola*

Symptoms:

At early stage of infestation the hyphal growth of the pathogen and *Pleurotus* mushroom are both white colour so it is difficult to distinguish them. At later stage the conidiopores produced by the pathogens in oyster mushroom are green colour (Park et al. 2005). The typical symptoms consist of appearance of green patches at the spawning stage on the substrate of the mushroom 10-15 days after cultivation. *Pleurotus* mushroom hyphae development is halted on such green patches of the pathogen and which is then covered by green mould and causes lesions on the stems. In severe case, all the mushrooms are destroyed with no yield.

Management

- Proper hygiene and sanitation during mushroom production
- Avoiding the use of contaminated spawn with green mould.
- Before using the supplements, sterilise them and properly mix them, ideally after spawning.
- Spraying the affected mushroom with carbendazim or Chlorothalonil @0.1% can help to control the disease
- Mixing Chlorothalonil @254ml/100m² with casing material

Ink caps

Causal organism: *Coprinus* sp.

Symptoms:

Ink cap appears both before and after opening of bags including during fruiting period or spawn run. The corpinus fruit body resembles a small mushroom (Tsarev 2003). They have thin cap that looks like a cap on a thin slender white stalk. These caps are cream coloured when young and later on turn into black mass when fully matured. This black mass helps in the development of large number of spores with spreads into healthy mushroom and compost. The mycelium of the ink cap fungus is grey in appearance and difficult to differentiate from mushroom mycelium.

Management:

- Manual removal of the ink cap soon as it starts to appear to avoid further spread
- Over watering of the mushroom should be avoided
- Compost should be prepared using fresh straw which are properly sterilized
- Chemical control is not recommended for Coprinus
- At spawning, the ammonia level in the compost should be less than 10 ppm

Cobweb

Causal organism: *Cladobotryum dendroide*, *C. varium*, *C. multiseptatum*, *C. mycophilum*, and *C. verticillatum*

Symptoms:

The symptoms appear as small white patches of cobweb like growth on the mushroom surface later spreading on nearby healthy mushrooms. These cobwebs are mycelium of the fungus which is fine grey white in colour. At later stage the mycelium becomes pink to pale brown or yellow and covers the entire mushroom with soft mildewy growth. The fruiting body eventually becomes soft, dark brown and starts to rot producing offensive odour.

Management:

- Proper hygiene by cleaning regularly and removal of already infected mushrooms.
- Lowering humidity and boosting air circulation are two control techniques.
- Disinfecting the mushroom house and its surrounding with 2% formalin every year.
- Cobweb infected areas should be covered with salt
- Sterilizing the substrate with methyl @40mg/ litre + formalin @500 mg/ litre
- Application of chlorothalonil and benzimidazole

Dry bubble

Causal organism: *Lecanicillium fungicola*

Symptoms:

Onion shaped mushrooms are produced at the initial stage of infection. Dry bubbles with amorphous sporophore mass are developed on the infected pin or button of the mushroom which later starts to turn brown and crack and curl with necrotic areas. Small pimple like out growth or grey spot are seen on fully infected top of fruit bodies. The mushrooms are unmarketable due to blemishes or discolouration.

Management:

- Proper sanitization to avoid primary infection
- Proper sterilization of the substrate such as rice straw.
- Use of volatile 1-octen-3-ol on infected Pleurotus
- Drenching of the substrate with 0.1% carbendazim

Yellow blotch

Causal organism: *Pseudomonas agarici* and *P. reactans*

Symptoms:

The diseases first appears as depressed yellow to orange spots on the caps. With increase in severity the fruit body becomes deformed by recurving near the base of the stipes with upright sporocarp with slimy body. Under high temperature and humidity the infected fruits gives out foul odour.

Management:

- Decreasing the relative humidity of air
- Antibiotics and disinfectants such as streptomycin @400ppm, Kasugamycin, Chloramine T, Bronopol and essential oils can be used to manage yellow blotch.

Soft rot

Causal organism: *Pantoea* sp.

Symptoms:

Symptoms of bacterial soft rot at the initial stage starts with small water soaked lesion with brown fuscous spots on the pileus and stipes of mushroom within a week of transfer to cultivation room. The lesion gradually expands and becomes viscous, discoloured within 7 or 14 days. Later on the infected part becomes mushy with soft rot and produces a foul odour.

Management:

- Proper hygiene, sterilization and care throughout the production process.
- Treatment with chlorine mixed in water with 175 to 300 ppm of active chlorine fairly reduces the infection without affecting the yield.
- Application of calcium hypochlorite solutions with 175 ppm active chlorine were also found effective in reducing the disease (Kim et al. 2015).

CONCLUSION

Mushroom farming can aid in the alleviation of food production and it is a major source of nutrients. The cultivation of mushroom can expose to various pathogens such as fungi, bacteria and virus causing significant loss in production. Its survival and multiplication depends on number of factors. A clean environment is very necessary for mushroom cultivation since unhygienic surroundings of mushroom farming create an ideal environment for a variety of diseases. Study on the major diseases of *Pleurotus* is needed so that we can better diagnose the diseases and apply effective management practices.

REFERENCES

- Bellettini, M. B., Bellettini, S., Fiorda, F. A., Pedro, A. C., Bach, F., Fabela-Morón, M. F., & Hoffmann-Ribani, R. (2018). Diseases and pests noxious to *Pleurotus* spp. mushroom crops. *Revista Argentina de microbiologia*, 50(2), 216-226.
- Kim, M. K., Lee, S. H., Lee, Y. H., Kim, H., Lee, J., & Rho, I. R. (2015). Characterization and chemical control of soft rot disease caused by *Pantoea* sp. strain PPE7 in *Pleurotus eryngii* mushroom crops. *European journal of plant pathology*, 141(2), 419-425.
- Lee, J (1993). Coloured Korean mushrooms 1 (In korean).
- Park, M. S., Seo, G. S., Bae, K. S., & Yu, S. H. (2005). Characterization of *Trichoderma* spp. associated with green mold of oyster mushroom by PCR-RFLP and sequence analysis of ITS regions of rDNA. *The Plant Pathology Journal*, 21(3), 229-236.
- Tsarev, A (2003). Mushroom industry. <https://en.agaricus.ru/cultivation/diseases/ink-cap-fungi>.