Construction of a model system to analyze the decomposition process of bamboo culm adopting mushrooms in Agaricomycotina

Takehiro Ochi¹, Tatsuya Fukuda¹,², Akira Suzuki²
¹Graduate School of Environment and Information Studies, Tokyo City University, Japan
²Faculty of Knowledge Engineering, Tokyo City University, Japan

Purpose: We focused on construction of a model system to analyze the decomposition process of bamboo culm adopting mushrooms in Agaricomycotina.

Methods: We used five white-rot fungi and two litter-inhabiting fungi, and selected a brown-rot fungus as a control. The growth rate of the fungi on PDA medium and lignin decomposition ability by Bavendamm reaction and Remazol Brilliant Blue R test were examined. Among them, Pleurotus djamor var. roseus was selected based on the evaluation of the above criteria. The bamboo powder of Phyllostachys reticulata culm powder was moistened at 71%, and 400 to 405 g of the powder was filled in a PP bag followed by sterilization at 120°C for 1 hour. Five mycelial blocks punched out from a mycelium grown on PDA medium were inoculated onto the bamboo powder. They were incubated at 25°C and analyzed its decomposition.

Results and Conclusions: The mycelium covered the whole surface of the medium in about 2 to 3 weeks in all cultures. Fruiting bodies were formed within 1 month of incubation. It indicates that Pl. djamor var. roseus has a high decomposition ability of the culm. Weight loss of the bamboo powder culture was 14% after 3 months of incubation. Dry weight of α-cellulose, hemicellulose, and lignin decreased 25.1%, 11.8%, and 0.8%, respectively, suggesting that lignin decomposition initiated within 3 months. Our results suggest that the bamboo culture by Pl. djamor var. roseus would be a suitable model system to analyze the decomposition process of bamboo culm.