

Comparative transcriptome analysis identified candidate genes involved in mycelium browning in *Lentinula edodes*

Hwa-Yong Lee, Suyun Moon, Hojin Ryu

Department of Biology, Chungbuk National University, Korea

Purpose: To understand the molecular mechanisms underlying this critical developmental process in *Lentinula edodes*, we characterized the morphological phenotypic changes in a strain, Chamaram (strain # 07-84), associated with abnormal brown film formation.

Methods: To investigate the brown film formation characteristics in the mycelial tissue, the strain Chamaram, was cultured on oak sawdust medium. The sawdust media inoculated with Chamaram spawn were cultured under three conditions: (1) continuous darkness for 100 days to form the white mycelial film, (2) continuous darkness for 40 days and followed by under 16 h light/8 h dark cycle for 60 days to form the normal brown mycelial film, and (3) 16 h light/8 h dark cycle for 100 days to induce the partial brown mycelial film. These mycelial films were observed by FE-SEM and RNA-sequencing was performed.

Results and conclusions: Compared to white mycelial film, the hyphae in normal brown film was elastic and the hyphae in partial brown film was slender and observed sawdust powder. The formation of brown film in sawdust medium for *L. edodes* assumed to be associated with light sensing via photoreceptors such as FMN- and FAD-bindings, signal transduction by kinases and GPCRs, melanogenesis via activation of tyrosinases, and cell wall degradation by glucanases, chitinases, and laccases. This study analysed the expression patterns of light-induced browning-related genes in sawdust medium for *L. edodes*. The result of this study will provide information for further investigations of browning formation mechanisms in sawdust cultivation for *L. edodes*.