

Physiological and Genetic Characteristics of Cultivated Mushroom, *Hypsizygus marmoreus*

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A edible mushroom, *Hypsizygus marmoreus* is commercially cultivated in Northeast Asia. Japan's annual production is 110,000ton or more. Since 2002, cultivation is expanded in Korea. To investigate the morphological, cultural and microscopic characteristics of *Hypsizygus marmoreus*, 109 isolates were collected from Korea and other countries. Clamp connection, chlamydospore and arthrospore were present in all tested isolates of *H. marmoreus* except HYM-002 and HYM-004. Also pilealtrama, gilltrama, basidia, basidiospore and cystidia of fruiting body were no difference among the isolates in the present investigation. Morphological characteristics of fruiting body was that color of pileus was brown and white, irregular as marble, the average size 12~22mm and stipes was 46~91×6~10mm. Isolates HYM-031, HYM-047 and HYM-109 formed grayish-brown pileus with a faint pattern. Molecular analysis with RAPD and ITS rDNA sequence analysis were also performed to check the genetic relationships among *H. marmoreus* isolates. Based on the RAPD analysis using the URP-PCR, all isolates of *H. marmoreus* were clustered into large 3 groups but more than 90% showed high similarity. In addition, morphological and geographical differences have been classified as an independent cluster. The brown and white strains enclosed in same cluster. So genetically no significance difference was observed between these two strains. ITS gene sequences of 16 selected isolates which were 640 bp long, were aligned and compared. The similarity in ITS sequence was 94.8 to 99.1% among tested isolates and the *H. marmoreus* isolates in GeneBank. In conclusion the tested isolates were *H. marmoreus*. Morphological and molecular observations proved that all tested isolates were belonging to *H. marmoreus*. For the stable artificial cultivation, composition of optimum media, mature period and light condition were established. Optimal formula of artificial cultivation medium was Douglas sawdust: corn cob: soybean meal: wheat bran = 40:30:15:15. In addition, 7% rice bran and 3% yellow sucrose was the most effective composition for spawn's liquid medium. For the maturation of the isolates was favorable for growing for 20 to 30 days at 25°C and the LED lights in mixture of white and blue was good for growth period. For effective growth, the temperature, humidity and aeration control in every step was important.

Keywords : Cultivation, Genetic characteristics, *Hypsizygus marmoreus*, Physiological characteristics