Fermentation of Mulberry Leaves with Cordyceps militaris Enhanced Anti-adipogenesis Activity in the 3T3-L1 Cell Line Through Down-Regulation of PPAR-γ Pathway Signaling

Duurimaa Otgonbayar1, Li Guo1, Zhengwei Cui1, Jum Soon Kang1, Young Hoon Park1, Beong Il Je1, Dae Youn Hwang2, and Young Whan Choi1*

1Department of Horticultural Bioscience, Pusan National University, Miryang 50463, Korea, 2Department of Biomaterials Science, Pusan National University, Miryang, Korea

Obesity has become one of the most common diseases in the world for the last few decades. Cordyceps militaris is a well-known and precious tonic mushroom used in the food and traditional medicine. Previous studies have shown that some materials enhanced bioactivity through fermentation with Cordyceps militaris. Although scientists have reported that mulberry leaves inhibited pre-adipocytes differentiation to adipocytes in vitro, the effective concentrations are very high. In this study, we investigated whether a fermentation of mulberry leaves (FML) mixed with 50% silkworm pupa (FMLP50) and silkworm pupa (FP) fermented with Cordyceps militaris to non-fermented mulberry leaves (ML) enhanced anti-adipogenesis activity in vitro. High-Performance Liquid Chromatography (HPLC) analysis assay showed that the contents of five bioactive compounds changed after fermentation. Furthermore, the addition of ML, FML, FMLP50, and FP to the medium during differentiation of the 3T3-L1 cell line revealed that FMLP50 had a better efficacy of anti-adipogenesis than ML, FML, and FP. Further studies showed that FMLP50 inhibited triglycerides accumulation and glucose uptake. Furthermore, mechanism studies illustrated that FMLP50 inhibited the expression of PPAR-γ and its target protein. These results indicate that fermentation with Cordyceps militaris enhanced anti-adipogenesis efficacy of mulberry leaves.

T. 055-350-5522, ywchoi@pusan.ac.kr