

Enhanced Anti-Obesity Effect of Soybean by Fermentation with *Lactobacillus plantarum* P1201 in 3T3-L1 Adipocyte

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Abstract : Obesity has become a global health problem and a source of major metabolic diseases like type-2 diabetes, hypertension, heart disease, nonalcoholic fatty liver and cancer. Synthetic anti-obesity drugs are effective but very costly and with undesirable side effects, so natural products such as soybean are needed as an alternative for obesity treatment. *Lactobacillus Plantarum* P1201 is a probiotic bacterial strain reported to produce conjugated linoleic acid (CLA) and increase the ratio of aglycone-isoflavone of soybean, both of which have anti-obesity effect. In this study, the anti-obesity effect of the fermented soybean extract with P1201 (FSE) will be evaluated compared with that of the soybean extract (SE) by 3T3-L1 cells as an in vitro model of adipogenesis. 3T3-L1 cells were treated with SE and FSE during the nine days of the differentiation, lipid accumulation was evaluated by oil-red staining and triglyceride content and the mRNA expression level of adipogenic or lipogenic genes were analyzed by RT-PCR and qPCR. The results showed that formation of lipid droplets in differentiated 3T3-L1 cells was inhibited and triglyceride content was reduced by 23.1% after treated with 1000 µg/mL of FSE compared with control. For SE-treated groups, no delipidating effect was observed. The effect of FSE on adipogenesis inhibition can be attributed to the down-regulation of mRNA expression of CCAAT/enhancer binding protein (C/EBP-α), lipoprotein lipase (LPL), adiponectin, adipocyte fatty acid-binding protein (aP2), fatty acid synthesis (FAS) and CoA carboxylase (ACC). Our results demonstrated that the anti-obesity effect of soybean can be improved by fermentation with P1201, and P1201 can be used as a potential probiotic bacterial strain to produce natural anti-obesity food.

Keywords : fermentation, *Lactobacillus plantarum* P1201, obesity, soybean

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