Regulation of Adipogenesis and Lipolysis by the Rhizomes of *Alpinia galanga* in 3T3-L1 Preadipocytes and High Fat Diet-Induced Obese BALB/c Mice

Chih-Hung Liang¹, You-Shan Lin² and Shen-Shih Chiang²*

¹Department of Food Science, Tunghai University, Taichung, Taiwan, R.O.C.
²Department of Food Science and Biotechnology, National Chung-Hsing University, Taichung, Taiwan, R.O.C.

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Obesity is a worldwide healthy problem that has attracted considerable attention. One of the aims of this study was to investigate the effects of pure compound (1’-acetoxychavicol acetate, ACA), essential oil (AGO) and ethanol extract (AGE) from *Alpinia galanga* (AG) rhizomes on 3T3-L1 preadipocytes differentiation and lipolysis in cell model. The results indicated that 15-125 μg/mL AGO could significantly inhibit the lipid accumulation determined by oil red O staining. The mRNA expressions of adipogenesis-related genes, including PPARγ, SREBP-1c, C/EBPα, GLUT4, LPL, CD36, aP2, ACC1 and FAS were significantly down-regulated by 31-125 μg/mL AGO during the 3T3-L1 preadipocyte differentiation. Moreover, we also investigated the prevention effect of fat accumulation from *Alpinia galanga* freeze-dried powders (FA) in high fat diet (HFD)-induced obese BALB/c mice. The obese mice were oral administrated by 2, 4 and 10% FA (LFA, MFA and HFA respectively) powder for 10 weeks. The results showed that the decreases of body weight and body fat ratio of LFA (8.7 and 2.3%) MFA (9.1 and 1.6%) and HFA (15.0 and 1.4%) groups were raised (*p < 0.05). Moreover, administrations of FA could reduce the serum triglyceride, total cholesterol, aspartate aminotransferase, alanine aminotransferase levels. The fatty liver in FA groups were ameliorated and the expressions of lipid β-oxidation-related genes PPARα and CPT-1 were up-regulated by MFA and HFA in the liver (*p < 0.05). These results provide the evidences that *Alpinia galanga* rhizomes can inhibit the 3T3-L1 preadipocyte adipogenesis and lower the risk of obesity in obese BALB/c mice.

Key words: *Alpinia galanga* (L.) Willd, 1’-Acetoxychavicol acetate, 3T3-L1 Preadipocyte, Adipogenesis, Lipolysis.