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Xanthones From *Garcinia Malaccencis* Improve *Glut4* as Well as Decreased *PPARγ* Activation on Adipocytes

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In this study, we used α-mangostin, the major xanthone compounds and β-mangostin from *Garcinia malaccensis* Hk.f (locally known as "manggis burung") and evaluate its *in vitro* activities on adipocyte differentiation, glucose uptake and related gene expression (*pparγ* and *glut4*) mechanism. Firstly, we elucidated the inhibitory effect of the compounds on lipid accumulation of 3T3-L1 preadipocytes by using Oil red O staining. Cell treated with α-mangostin and β-mangostin dose-dependently was found to inhibit the cytoplasmic lipid accumulation as well as adipogenic differentiation of preadipocyte. All compounds showed high lipid inhibition activity at 50 μg/mL concentration ($P < 0.05$) compared to MDI treated cells. Besides, glucose uptake activity was investigated in differentiated adipocytes using a radioactive-labelled glucose by Liquid Scintillation Counter. The insulin-induced 2-deoxy-D-[^{3}H] glucose uptake activities were significantly improved with increasing the concentration of the test compounds. Further evaluation with the quantitative real time polymerase chain reaction (qRT-PCR) shows that α-mangostin and β-mangostin reduced the expression of *pparγ* genes during adipocyte differentiation. At the same time, induction of glucose uptake by α-mangostin and β-mangostin was accompanied by the increased mRNA expression of *glut4* genes. Since downregulation of *pparγ* has been reported to be activated during inhibition of adipogenesis and enhance expression of *glut4* has been shown to be increased during glucose uptake we demonstrated that both compounds follow the antiobesity pathways. Taken together, these results indicate that xanthones derived from *Garcinia malaccencis* may be a candidate for preventing metabolic disorders such as obesity.

Keywords: Antiobesity, mangostin compounds, adipogenesis, glucose uptake, gene expression.