

Effect of germinated brown rice extracts on pancreatic lipase, adipogenesis and lipolysis in 3T3-L1 adipocytes

ABSTRACT

Background: This study investigated anti-obesity effects of seven different solvent (n-hexane, toluene, dichloromethane, ethyl acetate, absolute methanol, 80% methanol and deionized water) extracts of germinated brown rice (GBR) on pancreatic lipase activity, adipogenesis and lipolysis in 3T3-L1 adipocytes. **Methods:** GBR were extracted separately by employing different solvents with ultrasound-assisted. Pancreatic lipase activity was determined spectrophotometrically by measuring the hydrolysis of p-nitrophenyl butyrate (p-NPB) to p-nitrophenol at 405 nm. Adipogenesis and lipolysis were assayed in fully differentiated 3T3-L1 adipocytes by using Oil Red O staining and glycerol release measurement. **Results:** GBR extract using hexane showed the highest inhibitory effect ($13.58 \pm 0.860\%$) at concentration of 200 $\mu\text{g/ml}$ followed by hexane extract at 100 $\mu\text{g/ml}$ ($9.98 \pm 1.048\%$) while ethyl acetate extract showed the lowest ($2.62 \pm 0.677\%$) at concentration of 200 $\mu\text{g/ml}$ on pancreatic lipase activity. Water extract at 300 $\mu\text{g/ml}$ showed $61.55 \pm 3.824\%$ of Oil Red O staining material (OROSM), a marker of adipogenesis. It significantly decrease ($p < 0.05$) lipid accumulation than control (OROSM = 100%), follow by ethyl acetate extract at 300 $\mu\text{g/ml}$ (OROSM = $65.17 \pm 3.131\%$). All the GBR extracts induced lipolysis with 1.22-1.83 fold of greater glycerol release than control. **Conclusions:** GBR extracts especially the least polar and intermediate polar solvent extracts exhibited inhibitory effect on pancreatic lipase, decrease fat accumulation by adipocyte differentiation inhibition, and stimulate lipolysis on adipocytes. Therefore, GBR could be furthered study and developed as a functional food in helping the treatment and/or prevention of obesity.

Keyword: Obesity; Germinated brown rice; Pancreatic lipase; 3T3-L1 adipocytes