The Medicinal Mushroom *Ganoderma neo-japonicum* (Agaricomycetes) from Malaysia: Nutritional Composition and Potentiation of Insulin-Like Activity in 3T3-L1 Cells

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**ABSTRACT:** *Ganoderma neo-japonicum* is an annual polypore mushroom that is consumed by Malaysian indigenous tribes to treat various ailments including diabetes. The present study aimed to investigate the nutritive composition and in vitro antihyperglycemic effects of *G. neo-japonicum* extracts on 3T3-L1 preadipocytes. Nutritional analysis of *G. neo-japonicum* basidiocarps indicated a predominant presence of carbohydrates, proteins, dietary fiber, and microelements. Hot aqueous extract (AE) and its isolated (1,3)(1,6)-β-D-glucan polysaccharide (GNJP) from basidiocarps of *G. neo-japonicum* were evaluated for their ability to stimulate insulin independent adipogenesis, glucose uptake, adiponectin secretion, and regulate gene expression in 3T3-L1 adipocytes. GNJP showed a dose dependent stimulation of glucose uptake and adiponectin secretion but attenuated lipid accumulation in 3T3-L1 adipocytes. It upregulated the expressions of adiponectin, Akt1 (protein kinase B), PPARγ (peroxisome proliferator activated receptor gamma), PRKAG2 (protein kinase, AMP activated), and Slc2a4 (glucose transporter) genes to stimulate glucose uptake in 3T3-L1 cells, which may have contributed to the insulin-mimicking activities observed in this study. In summary, the nutritive compositions and significant glucose uptake stimulatory activities of GNJP indicated that it may have potential use in the formulation of functional food for the management of hyperglycemia, insulin resistance, and related complications.

**KEY WORDS:** *Ganoderma neo-japonicum*, nutritional analysis, polysaccharides, adipocyte, insulin, glucose uptake, medicinal mushrooms