

Effect of gelam honey on the oxidative stress induced signaling pathways in pancreatic hamster cells

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Background: The hallmark of type 2 diabetes is the dysfunction of pancreatic β cells and insulin resistance. Beta cell dysfunction plays a significant role in the pathogenesis, during the development of type 2 diabetes due to oxidative stress. Therefore the aim of our work is to determine the antioxidant property of Gelam honey, on the stress induced insulin signalling pathways in the β cells, of the pancreatic hamster cells (HIT-T15) cultured in vitro.

Methods: Phenolic extracts from a local Malaysian species of Gelam honey (*Melaluca* spp.), was prepared using the standard extraction methods. HIT-T15 cells were cultured in 5% CO₂ and then pre-incubated with Gelam honey extracts (20, 40, 60 and 80 μ g/ml) as well as quercetin (20, 40, 60 and 80 μ M), prior to stimulation by 20 and 50mM of glucose. The cell lysate were collected to determine the effect of honey extracts and quercetin on the stress activated MAPK phosphorylation, NF-kB phosphorylation, and IRS-1 serine phosphorylation causing insulin resistance and the Akt phosphorylation, causing increase in insulin content by using western blot method.

Results: HIT-T15 cells cultured under hyperglycemic conditions demonstrated insulin resistance with a significant increase in the levels of MAPK, NF-kB, IRS-1 serine phosphorylation (ser307) and a significant decrease in insulin content by reducing the expression of Akt (ser473). Pretreatment with quercetin and Gelam honey extract improved insulin resistance and insulin content by reducing the expression of phosphorylated MAPK, NF-kB, and IRS-1 (ser307) and increasing the expression of phosphorylated Akt significantly.

Conclusion: Our data provide evidence that Gelam honey has protective effects against hyperglycemia induced oxidative stress activated signaling pathways by improving insulin content and insulin resistance.

Biography

Rajes Qvist obtained her Ph.D. from University of Strasbourg, France Besides her Ph.D. She has several other degrees which gives her a broad training in several areas of biological sciences:- Bsc University of Melbourne, Australia; Bsc Hons Biochemistry, University of Singapore; Bsc Hons Virology, University of Western Australia, Msc Clinical Biochemistry University of Singapore; Post Graduate Diploma in Immunology; Monash University, Australia. Post doctoral work in Denmark, Japan and Australia where she specialised in several areas with the main focus on Diabetic research.

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