

UNIVERSITI TEKNOLOGI MARA

**PHYSICOCHEMICAL PROFILE OF
SELECTED MALAYSIAN HONEY
AND THE EFFECT OF PINEAPPLE
HONEY ON OBESITY IN VITRO
AND IN VIVO MODELS**

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ABSTRACT

Obesity has become a worldwide problem that can lead to various chronic diseases due to unhealthy diet and lifestyle. Honey has been identified as a food that has a positive effect in combating obesity. In this study, the effect of pineapple honey in combating obesity was investigated using *in vivo* and *in vitro* models. The study started with a preliminary screening of selected honeys, namely gelam, acacia and pineapple honeys and two adulterated honeys available in the market. Physicochemical analysis revealed that gelam honey had the highest content of phenolic compounds and flavonoids, followed by pineapple honey. Meanwhile, parameters such as sugar profiles, HMF, and glucose oxidase activity tested for adulterated honey A and B did not fulfil standard quality factors set by the IHC Honey Board. The effect of honey in *in vitro* studies showed that Gelam, Acacia and pineapple honey at 25% v/v and above significantly ($p < 0.05$) inhibited adipogenesis in 3T3-L1 adipocytes by reducing lipid accumulation, *Feret* diameter and intracellular triglyceride content. In addition, Gelam, Acacia and pineapple honey significantly reduced the concentrations of leptin and resistin. The results suggest that honey may be involved in the control of adipocytokines in the process of adipogenesis. *In vivo* studies showed no abnormal changes in acute and subacute studies after administration of Acacia, Gelam and pineapple honey. In addition, obese rats fed pineapple honey (HFDPH) and orlistat (HFDO) had an obesity index ~4% lower than the HFD group. In addition, the HFDPH group had significantly lower triglyceride, glucose, plasma leptin and resistin levels compared to the HFD group. Histological examination of the HFDPH group showed a slight improvement in the liver and kidneys after obesity induction compared to the HFD group. However, the changes were not significantly different from those of the NC group. In conclusion, administration of pineapple honey can reduce obesity-related parameters in cell cultures and animal models while regulating the release of adipocytokines to suppress the effects of a high-fat diet on obesity. Pineapple honey is thought to regulate lipid metabolism by lowering plasma leptin and resistin levels in obese rats. Consequently, it may indirectly stimulate lipolysis by inhibiting the physical barrier protection of lipid droplets, thus preventing lipid accumulation of lipids in cells. Further studies are needed to explore the active components of honey and subsequently determine the likely mechanisms of action of honey in lowering plasma lipids and maintaining weight.

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