THE EFFECTS OF HONEY ON PLASMA GLUCOSE AND INSULIN CONCENTRATIONS IN OBESE PREPUBERTAL GIRLS

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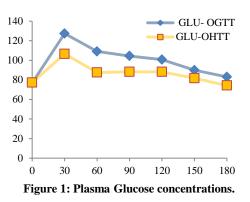
Background: Honey is known for centuries for its medicinal and health promoting properties. It contains phytochemicals with high phenolic and flavonoid content, which contribute to its high antioxidant activity. Recent studies performed in adult healthy subjects suggest that honey has a beneficial effect on plasma glucose and serum insulin concentrations compared with monosacharides and disacharides.

Aim: To compare the effects of honey (OHTT) and Oral Glucose Tolerance Test (OGTT) solution on plasma glucose and serum insulin concentrations in obese prepubertal girls.

Methods: Thirty healthy obese prepubertal girls aged 11,59 ($\pm$ SE: 0.4) years with a body mass index (BMI) above the 90th centile for age (27.60 ± 1.38 kg/m^2) underwent initially a standard OGTT and an OHTT two weeks later. Both solutions contained 75gr of glucose. Plasma glucose and serum insulin concentrations were determined before the administration of the solution and at 30 min intervals thereafter for a total of 3 hours. Subsequently, subjects were randomized to either receive 15gr of honey or 15gr of marmelade daily, while both groups complied with dietary instructions. Six months later all subjects were re-evaluated with an OGTT and a OHTT.
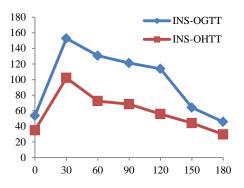
Results: Upon initial evaluation, plasma glucose concentrations at 120 min were significantly lower at the OHTT than the OGTT (91.00 ± 2.58 *vs.* 104.44 ± 2.99 mg/dL, *P*=0.001) [Figure 1]. At the end of the study, all subjects demonstrated a significant reduction in BMI (26.59 ± 1.38 *vs.* 27.60 ± 1.39 kg/m^2, *P*<0,001). Serum insulin concentrations at 0 min (21.48 ± 4.57 *vs.* 41.23 ± 7.47 μIU/mL, *P*=0.01) and at 120 min (45.47 ± 6.35 *vs.* 71.79 ± 11.99 μIU/mL, *P*=0.007) were significantly lower at OHTT than the OGTT [Figure 2].

Conclusions: Honey had a beneficial effect on stimulated plasma glucose and serum insulin concentrations compared with the standard OGTT solution. These data indicate that honey might delay or prevent the development of insulin resistance, impaired glucose tolerance and diabetes in obese children.

Figure 1: Plasma Glucose concentrations.

Area Under the Clucose Concentration Curve

AUC – OGTT (mg*min/dL): mean=13382.72, SD= 1791.7, 95% CI: 12701.2-14064.2
AUC-OHTT (mg*min/dL): mean=11488.6, SD=1204.3, 95% CI: 11030.5-11946.7
***P* < 0.001**

Figure 2: Serum Insulin Concentrations

Area Under the Insulin Concentrations Curve

AUC-OGTT (μIU*min/mL): mean=13972.16, SD=6981.0, 95% CI: 11316.7-16627.6
AUC-OHTT (μIU*min/mL): mean=8858.3, SD=4246.4, 95% ci: 7243.0-10473.5
***P* < 0.001**