

A Study on the Effect of Coconut Lipids on Glucose Metabolism in Rats and Cell Culture Models

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High prevalence of diabetes mellitus demands novel measures to alleviate this condition. Therefore, this study was aimed to elucidate the effect of virgin coconut oil (VCO) or soya oil (SO) on glucose tolerance in diabetic (D) and non-diabetic (ND) rats. Three groups of Sprague Dawley male rats (6 each) were in the ND state and another three in the D state, induced using alloxan. The animals received, either water, VCO or SO, orally at 7.5ml/1000g each. Oral glucose tolerance test (OGTT) results on Day 45 and 90 of treatment were analyzed by one-way-ANOVA. In D group, test treatments did not show significant difference in the results. However, in ND animals there was a statistically significant difference in the glucose tolerance, between the animals fed with water and the animals fed with VCO, and with the animals fed with SO, with a very high significance level ($p < 0.001$). These results clearly show that VCO and SO were capable of improving the glucose tolerance when insulin was available, but not in its absence as seen with the alloxan treated diabetic animals. Red cell fragility of the above groups of animals was tested by suspending the red cells in saline solutions of varying NaCl concentrations (0 - 0.9 g/dL), and the released hemoglobin measured by spectrophotometry. In both ND and D groups, VCO fed animals showed a lesser red cell fragility than the other groups – indicating that VCO has a cell membrane stabilizing effect. Glucose uptake by the MCF-7 cells in the presence of varying concentrations of VCO hydrolysate and SO hydrolysate, with and without insulin was analyzed, using α MEM and ‘Glucose uptake colorimetric assay kit’. Increasing the concentration of the hydrolysates of both oils to an extent (0.3 μ l / 100 μ l medium), increased the glucose uptake in a dose dependent manner.

Keywords: Diabetes, Glucose tolerance, Virgin coconut oil, Soya oil

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