Lycopene Reduces Lipid Peroxidation Induced by Hyperglycemia in Human Erythrocytes in vitro

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INTRODUCTION: The chronic hyperglycemia determines a series of biochemical phenomena, which are involved in the genesis of the oxidative stress in diabetes mellitus. Lycopene is a dietary carotenoid synthesized by plants and microorganisms. The antioxidant activity of lycopene has been extensively evaluated based on its ability to scavenge free radicals in cell culture and in animal models. The aim of this study was to evaluate the effects of the Lycopene on the oxidative damage induced by different fructose concentrations in human erythrocytes in vitro.

MATERIAL AND METHODS: Samples of human red blood cells, donated from the hospital of Itaqui (RS, Brazil) were used. The erythrocytes were incubated at 37°C for 24 hours with the following concentrations of fructose 5, 10, 20, 30 and 50 mM with or without lycopene. Lycopene (10% powder, Deg Chemical Products Importation LTDA, São Paulo, Brazil) was added into erythrocytes in increasing concentrations (0.01, 0.02 and 0.03 mM). After incubation, the lipid peroxidation was determined according to the method of Thiobarbituric Acid Reactive Substances (TBARS) formation as Ohkawa et al. (1979). Data were analyzed by ANOVA followed by Tukey's test.

RESULTS AND DISCUSSION: The TBARS assay showed that with increasing concentrations of fructose, the lipid peroxidation also increased, reaching a peak at 50 mM fructose. We observed that all concentrations of lycopene tested demonstrated a significant reduction of TBARS in any fructose concentration evaluated, so it didn’t was differences between concentrations of lycopene. Therefore, it was found that the lowest lycopene concentration has the same effect of the highest concentration tested being able to reduce until 60% of TBARS. CONCLUSIONS: The results showed a dose-dependent effect of the concentration of fructose and TBARS production, and that all concentrations of lycopene were able to significantly reduce lipid peroxidation caused by hyperglycemia in human erythrocyte like tested in vitro.

Keyword: Fructose; Lipid peroxidation; Oxidative stress; Carotenoid.
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