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Could Lycopene and Vitamin C Modify the Biomarkers of Inflammation and Oxidative stress?

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OBJECTIVE Inflammation processes and oxidative stress are thought to be major factors involved in CHD and cancer. High plasma levels of antioxidants as carotenoids and vitamins are associated inversely to the development of these diseases. The aim of this study was to determine the effect of lycopene and vitamin C from tomato juice on several proinflammatorial mediators and oxidative stress biomarkers.
MATERIAL AND METHODS A 4 week human intervention study with 24 participants divided in two groups was carried out. Participants were non-smokers and followed a diet low in lycopene and with smart vitamin C restriction throughout the whole time. After two week depletion one group (group A) consumed additionally 250 mL tomato juice (juice A, 41.8 mg lycopene/L, 90 mg vitamin C/L) twice daily. The group B received the same tomato juice, fortificated with ascorbic acid to give a final content of 870 mg vitamin C/L. Fasting blood and 24-hour urine samples were taken prior to the depletion and after two weeks each (T-2, T0, T+2). Plasma was analysed for lycopene, vitamin C, TBARS and carbonylated proteins, C-reactive protein (CRP) and interleukin-1b (IL). Antioxidative status of plasma was also determined by TEAC and FRAP.
RESULTS AND DISCUSSION Total lycopene concentration in plasma decreased significantly during depletion to levels below 0.5 mmol/L and increased significantly during intervention to 1.05 mmol/L (A) and 0.91 mmol/L (B), overtopping inicial levels in both groups, 46% and 28% respectively. Vitamin C plasma levels did not change during depletion and intervention in group A, but increased significantly in group B due to consumption of enriched juice. CRP concentration in plasma decreased significantly in both groups from initial levels of 336.2 ng/mL (A) and 349.5 ng/mL (B) to 262.3 ng/mL and 247.1 ng/mL, respectively. Plasma levels of IL and antioxidant status did not differ in both groups during the whole study time. Concentration of TBARS in urine decreased significantly about 17.4% (group A) and 16.7% (group B), during the intervention period. Same results were observed in plasma. However, no clear tendence was observed in carbonylated protein. As there were no differences between the behaviour of both groups, effect of decreasing CRP and TBARS might be due to lycopene accumulation in plasma more than due to vitamin C.
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