Impact effect of lycopene and tomato-based products network on cardio-protective biomarkers in vivo

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ABSTRACT:

Background: Dietary intake plays an important role as nutritional supplements are known to provide potential health benefits in cardiovascular disease. Recent studies suggest that the dietary intake of tomatoes and tomato products containing lycopene are associated with a decreased risk of cardiovascular disease. In order to substantiate these facts, the present study was undertaken to investigate the effectiveness of lycopene from tomato products on the potential effects of oxidative stress and atherosclerosis in vivo, focusing on early atherosclerotic events.

Methods: Thirty male albino rats were assigned randomly into 5 groups; group C was the negative control group fed a basal diet, group H was the positive control fed a high-fat diet (HFD), group TS (HFD) was fed a 8% lyophilized tomato paste, group TW (HFD) was fed a 24% lyophilized raw tomato, and group L (HFD) was fed 0.1% mg pure lycopene. The level of serum; total cholesterol (TC), total triglyceride (TG), high-density lipoprotein cholesterol (HDL-c), and low-density lipoprotein cholesterol (LDL-c) was measured after 8 weeks of experimental treatment. Malondialdehyde (MDH) plasma levels were measured in heart tissue homogenate. Furthermore, pathologic changes of the heart and aorta were also assessed.

Results: We found that TC, TG, LDL-c and MDH, levels were significantly increased in group H (P < 0.05) compared to the negative control group. Administration of TS, TW and L demonstrated significant changes in these parameters (P < 0.05). The TW group (fed 24% of lyophilized raw tomato components) had more positive effects than the TS & L groups. Furthermore, morphologic changes of heart and aorta revealed that TW and TS had a similar preventive effect against the development of atherosclerosis.
Conclusion: Our study indicated that raw tomatoes have a higher potential effect when compared to tomato paste or lycopene alone. This potential effect includes the ability to attenuate and/or reverse oxidative stress and other atherosclerosis related parameters induced by the consumption of a high-fat diet.

Key words: Cardioprotective, Lipid profile, Lycopene, Oxidative stress, Tomatoes products