

Abstract

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Assessment of citrus peel extract on lipid metabolism and acyl coenzyme A oxidase enzyme mRNA level in rats under high fat diet induced obesity.

ABSTRACT Background: Citrus fruits have proved to contain a variety of effects and wide spread of biological activities, which have many positive health effects in the prevention of lifestyle-related diseases. Aim: The aim of this study was to investigate the effect of supplementation with LPE on high fat diet-induced obesity in rats. To achieve this aim, the regulatory effect of LPE administration on lipid profile, glucose, insulin, leptin, adiponectin and some lipid metabolism regulatory enzymes has been explored. In addition, LPE effect on the mRNA expression of the acyl coenzyme A oxidase (ACO) gene was evaluated. Fifty adult rats were divided into five groups: Gr.1 normal control fed on standard diet for 12 weeks, Gr.2 negative control supplemented with 0.5 g% LPE for 12 weeks, Gr.3 positive control fed on high fat diet for 12 weeks, Gr.4 protective group fed on high fat diet and supplemented with LPE 0.5 g% for 12 weeks and Gr.5 curative group fed on high fat diet for 12 weeks then fed a high fat diet supplemented with LPE 0.5 g% for 45 days. Results: Body weight gain, feed efficiency ratio, food intake, serum lipid profile except HDL-C, serum glucose, serum insulin, serum leptin levels and erythrocytes glucose-6-phosphate dehydrogenase activity were significantly suppressed by LPE in treated groups compared to the positive control group. Also, LPE up-regulated acyl coenzyme A oxidase (ACO) and medium chain acyl coenzyme A dehydrogenase (MCAD) activities in serum of treated groups compared to the positive control group. Additionally mRNA expression of ACO in the liver was up-regulated in LPE-treated groups as compared to the positive control group. Furthermore, oral supplementation of LPE resulted in improved serum HDL-C level, total antioxidant capacity and serum adiponectin. Conclusion: LPE prevents body weight gain and fat accumulation through improvement of lipid metabolism by up-regulating the activities of medium chain acyl coenzyme A dehydrogenase, acyl coenzyme A oxidase and its mRNA level in the liver while down regulated the activity of glucose 6 phosphate dehydrogenase. In this context, the protective effect of LPE was more pronounced than the curative effect. Keywords Lemon peel extract, ACO, G6PD, MACD, leptin, adiponectin.