

## Vitamin E in the mitigation of carbon tetrachloride induced oxidative stress in rats

LK MacDonald-Wicks, ML Garg

Discipline of Nutrition & Dietetics, Faculty of Medicine & Health Sciences, University of Newcastle, NSW, 2308, Australia

Oxidative stress is implicated in the pathophysiology of a number of chronic diseases including atherosclerosis, diabetes, cataracts and aging (1). The aim of this study was to elucidate the protective role of vitamin E supplementation in conjunction with a monounsaturated fat diet (Sunola Oil) when oxidative stress is induced by  $CCl_4$  administration, using rat as the model. Plasma levels of 8-iso-PGF $_{2\alpha}$ , antioxidant micronutrients and enzymes were measured to examine changes in oxidative stress levels subsequent to the supplementation of vitamin E in the diet.

Samples were collected from control rats fed a Sunola diet (n=9), rats fed Sunola and challenged with  $CCl_4$  (n=9), rats fed a vitamin E supplemented Sunola diet (n=9), and rats fed a vitamin E supplemented Sunola diet and challenged with  $CCl_4$  (n=9). The rats were fed the appropriate diet for four weeks then  $CCl_4$  was administered and the rats euthanised after four hours.

The plasma and RBC fatty acid profiles reflected the dietary fat, and were high in the monounsaturated fat C18:1n-9. Plasma  $\alpha$ -tocopherol concentrations were higher for both the diet groups supplemented with vitamin E, however the supplemented diet group that was subsequently challenged with the  $CCl_4$  had significantly lower ( $P=0.001$ ) vitamin E levels than the vitamin E diet group that was not challenged. Total plasma 8-iso-PGF $_{2\alpha}$  levels were elevated in diet groups challenged with  $CCl_4$  however those were significantly lower ( $P=0.001$ ) when the diet was supplemented with  $\alpha$ -tocopherol. The antioxidant enzymes were not influenced by either dietary vitamin E manipulation or by the inducement of oxidative stress with  $CCl_4$ .

	Sunola	Sunola + $CCl_4$	Sunola + Vit.E	Sunola + Vit.E + $CCl_4$
Vitamin E ( $\mu\text{mol/mL}$ ) <sup>1</sup>	44.1 $\pm$ 3.7 <sup>a</sup>	31.6 $\pm$ 1.5 <sup>b</sup>	64.5 $\pm$ 5.2 <sup>c</sup>	44.9 $\pm$ 2.3 <sup>a</sup>
8-ep-PGF $_{2\alpha}$ (pg/mL) <sup>1</sup>	359 $\pm$ 65 <sup>a</sup>	1450 $\pm$ 225 <sup>c</sup>	410 $\pm$ 72 <sup>a</sup>	776 $\pm$ 111 <sup>b</sup>

<sup>1</sup> mean  $\pm$  SEM

values without a common superscript are significantly different ( $P < 0.05$ )

The results of this study indicate that the Vitamin E was a protective peroxidation when oxidative stress is induced by the pro-oxidant challenge such as  $CCl_4$ .

1. Sodergren E, Jonas C, Basu S, Vessby, B J Nutr. 2000; 130:10-14

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