

### Effects of vitamin C and iron co-supplementation on plasma lipid peroxidation

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Vitamin C is marketed as a dietary supplement, partly because of its antioxidant properties. However recent evidence suggests that supplementary vitamin C increases free radical production resulting in oxidative damage and potentially causing degenerative disease (1). In addition it has been shown that vitamin C, in the presence of transition metals such as iron, increases the production of free radicals (2). A small number of studies have investigated the effects of co-supplementation of vitamin C and iron on oxidative damage however the results are equivocal (2,3). Therefore the purpose of this study was to investigate the effects of co-supplementation with iron and vitamin C on plasma lipid peroxidation in females.

A double blind, placebo controlled, randomised crossover design was used with 15 females aged between 16-26 yr recruited for the study. Exclusion criteria included smoking, high alcohol intake, oral contraceptives, pregnancy, consumption of dietary supplements or illicit drugs. Subjects were required to consume either the supplement (SUPP) (1500 mg vitamin C and 700 mg ferrous iron per day) or placebo (PLACEBO) in a random order over 2 4-week periods separated by a 6-week wash-out phase. Blood samples were taken prior to and at the completion of both treatment phases and analysed for plasma ascorbate and ferritin. Plasma lipid peroxidation was assessed using two measures: 1) thiobarbituric acid reactive substances (TBARS) assay and 2) high performance liquid chromatography for cholesterol ester hydroperoxides and hydroxides (CE-O(O)H).

Supplementation resulted in significant increases ( $P < 0.05$ ) with plasma ascorbate and ferritin, however there were no significant differences ( $P > 0.30$ ) in plasma TBARS or CE-O(O)H.

	PLACEBO		SUPP	
	Pre	Post	Pre	Post
Ascorbate (mg/ 100mL)	0.84 ± 0.03	1.00 ± 0.17	1.08 ± 0.11	1.36 ± 0.4*
Ferritin (µg/L)	41.7 ± 7.7	40.5 ± 7.4	36.6 ± 7.5	60.0 ± 10.2*
TBARS (nM)	0.29 ± 0.03	0.27 ± 0.03	0.25 ± 0.03	0.29 ± 0.03
CE-O(O)H (µM)	23.4 ± 14.9	35.3 ± 17.4	31.9 ± 15.9	29.8 ± 5.9

All data mean ± SEM

\* Significantly greater than SUPP pre ( $p < 0.05$ )

These findings support the notion that co-supplementation with vitamin C and iron does not affect markers of plasma lipid peroxidation in females.

1. Podmore ID et al. Vitamin C exhibits pro-oxidant properties. *Nature* 1998;392(6676):559.
2. Rehman A et al. The effects of iron and vitamin C co-supplementation on oxidative damage to DNA in healthy volunteers. *Biochemical And Biophysical Research Communications* 1998;246(1):293-8.
3. Collis CS et al. The effects of ascorbic acid and iron co-supplementation on the proliferation of 3T3 fibroblasts. *Free Radical Research* 1996;25(1):87-93.