

Enhanced Blood Levels of Coenzyme Q10 From An Emulsified Oral Form

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ABSTRACT

Coenzyme Q10 (ubiquinone) occupies a pivotal role in mitochondrial energy production. In the last twenty years, coenzyme Q10 (CoQ) has been used clinically and found to possess merit for cardiovascular disease patients, among other applications. Currently, CoQ is available in the United States as a nutritional supplement in dry form. Since CoQ is lipophilic, emulsified products should theoretically yield greater uptake than dry forms. This hypothesis was tested in 25 patients randomly allocated to three groups: placebo (n=7); dry CoQ (n=8) and emulsified CoQ (n=10). Supplements were administered in a double-blind manner and both CoQ groups ingested 30 mg of CoQ in three divided doses daily for 4 weeks. Venous blood was collected at 0 and 4 weeks, and serum frozen for assay. Serum CoQ levels were assayed by HPLC quantization after cleanup of heptane extracts of serum by TLC, based on published reports. Normal ranges for our assay were 0.51 ± 0.05 $\mu\text{g CoQ/ml}$ (SEM), n=41. Placebo subjects went from 0.47 ± 0.11 to 0.39 ± 0.08 $\mu\text{g/ml}$, an significant change ($P > 0.20$ by paired t-test). Dry CoQ subjects changed from 0.55 ± 0.12 to 0.53 ± 0.12 $\mu\text{g/ml}$, an insignificant difference ($P > 0.05$). Conversely, emulsified CoQ subjects increased serum levels from 0.46 ± 0.09 to 0.96 ± 0.39 $\mu\text{g/ml}$ ($P > 0.10$). Significance was reached if one

outlying value (a large increase) was removed ($P < 0.02$). Mean percent changes in serum levels were -1.3% for placebo, +11% for dry CoQ and +80% for emulsified CoQ. Thus, while 30 mg of emulsified CoQ supplements doubled serum levels of CoQ with 80% responders, 30 mg of a commercial dry product caused no changes, with only 38% responders. Compared to other doses and uptake reported in the literature, 30 mg of emulsified CoQ is as effective as 90-1000 mg of dry CoQ for elevating serum levels, making emulsified CoQ three times as effective as dry forms.

Keywords: Coenzyme Q10, ubiquinone, emulsification, human absorption, double-blind study.