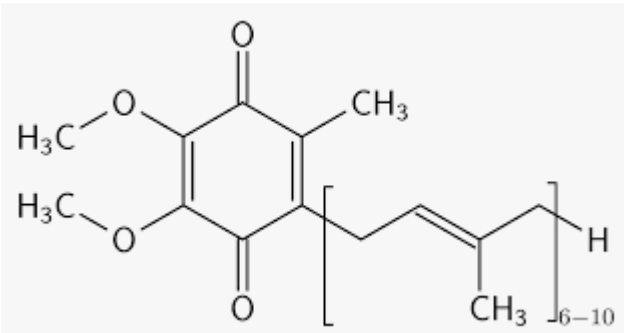


## Liquid CoQ<sub>10</sub>

### TECHNICAL SUMMARY

Coenzyme Q<sub>10</sub> (CoQ<sub>10</sub>) is a vitamin-like compound present in almost all cells, where it is necessary for cellular energy production.\* CoQ<sub>10</sub> concentrations are highest in the heart, where chemical energy availability is critical. CoQ<sub>10</sub> also functions as a powerful fat-soluble free radical scavenger within cell membranes and vascular structures.\* This product also provides coenzyme B vitamins for their complementary roles in cellular energy production and maintenance of cardiovascular health.\*

#### Structure formula:



**Chemical name:** 2,3-dimethoxy-5-methyl-6-decaprenylbenzoquinone also known as ubiquinol.

**Allergen and Additive Disclosure:** Not manufactured with wheat, gluten, milk, egg, fish, shellfish or sesame ingredients. Produced in a GMP facility that processes other ingredients containing these allergens.

**Delivery Form:** Liquid

### ROLE AS NUTRIENT/FUNCTION

CoQ<sub>10</sub> has multiple biological functions, primarily based on its ability to undergo redox cycling.\* CoQ<sub>10</sub> is involved in adenosine triphosphate (ATP) synthesis (as part of the electron transport chain of the inner membrane of the mitochondrion) and has the ability to act as a free radical scavenger in response to oxidative stress.\* CoQ<sub>10</sub> in its reduced form (ubiquinol) is a potent lipophilic free radical quencher capable of recycling and regenerating other antioxidants such as vitamins C and E. Other important functions of CoQ<sub>10</sub> such as cell signaling and gene expression have also been described.\* CoQ<sub>10</sub> is especially important for heart muscle function where its concentration is higher than in any other tissue in the body.\*

B vitamins are required as co-enzymes for numerous complex reactions that are essential to cellular function and energy production, notably at the mitochondrial level.\*

Ribose is a pentose sugar found in all living cells and is a structural component of nucleotides such as DNA, RNA, and ATP.\* ATP is the ultimate source of energy for all cells, and is necessary for muscle movement.\* Ribose has been clinically researched for its role in the support of ATP production within skeletal muscle and for the maintenance of healthy cardiac energy metabolism.\* These studies indicate that ribose can help to sustain ATP production in these vital tissues.\*

## Supplement Facts

Serving Size 1 Teaspoon (5 mL)

Servings Per Container about 24

	Amount Per Serving	% Daily Value
Calories	20	
Total Fat	2 g	3%**
Total Carbohydrate	1 g	<1%**
Total Sugars	0 g	†
Niacin (from NAD)***	0.9 mg	6%
Vitamin B-6 (from P-5-P Monohydrate)***	7 mg	412%
Vitamin B-12 (as Cyanocobalamin)	100 mcg	4167%
Pantothenic Acid (as Pantethine)***	5 mg	100%
Coenzyme Q10 (CoQ10)	100 mg	†
Stevia Extract (Leaf)	20 mg	†
D-Ribose	10 mg	†
NAD (Nicotinamide Adenine Dinucleotide)	5 mg	†

\*\* Percent Daily Values are based on a 2,000 calorie diet.

† Daily Value not established.

Other ingredients: De-ionized Water, Rice Bran Oil, Vegetable Glycerin, Xylitol, Soy Lecithin, Hydroxylated Soy Lecithin, Natural Vanilla Flavor, Natural Orange Flavor, Brown Rice Protein, Mixed Tocopherols, Rosemary Extract (Leaf), Citric Acid, Potassium Sorbate (as preservative) and Guar Gum.

\*\*\*Co-enzyme Form

- **Cardiovascular Support\***
- **With Co-enzyme B Vitamins**

**SUGGESTED USAGE:** Shake well. Take 1 teaspoon daily with a fat-containing meal, or as directed by your healthcare practitioner. REFRIGERATE AFTER OPENING.

Nicotinamide adenine dinucleotide, or NAD, is the biologically active coenzyme form of vitamin B<sub>3</sub> (niacinamide). NAD is the oxidized form of coenzyme B<sub>3</sub> that acts as a hydrogen (H) acceptor, while NAD(H) (known as NADH) is the reduced form that donates hydrogen as part of the Krebs' citric acid cycle and electron transport side chain.\* NADH is a complex molecule comprised of vitamin B<sub>3</sub>, ribose, a phosphate group and adenine nucleotide.

NAD and NADH can each be converted back and forth into the other form many times during the body's energy production cycles.\* They are both involved in transferring electron pairs during energy transfer reactions within the cell.\* ATP is produced in this cycle.\*

### NATUROKINETICS®

The bioavailability of CoQ<sub>10</sub> formulations depends on the individual and on the type of excipients used for solubilization of CoQ<sub>10</sub>.

**Liberation:** This product is in liquid form; therefore, disintegration is not applicable.

**Absorption:** CoQ<sub>10</sub> is a lipophilic substance that is absorbed in the intestines. Its uptake is similar to that of other lipid substances and is enhanced by the presence of other fats upon ingestion. Once absorbed, it is incorporated into chylomicrons and transported through the lymphatic system before reaching the bloodstream. CoQ<sub>10</sub> is reduced to ubiquinol either during or following absorption in the intestine.

**Distribution:** CoQ<sub>10</sub>'s distribution depends on the metabolic activity of tissues and organs. Typically, tissues with high-energy requirements of metabolic activity contain relatively high concentrations of CoQ<sub>10</sub>. It is primarily found in the heart, kidneys, liver and muscles with other smaller reserves present in the brain, intestines, lungs and blood cells (except red blood cells).

**Metabolism:** Within cells, CoQ<sub>10</sub> is a part of the Q cycle located in the inner membrane of mitochondria.\* As part of a redox reaction, it is recycled during energy production by donating its electrons.\* Data from animal models suggest that CoQ<sub>10</sub> is metabolized in all tissues; the metabolites are phosphorylated in the cells.

**Elimination:** Unabsorbed CoQ<sub>10</sub> is eliminated in feces and absorbed CoQ<sub>10</sub> is excreted in the GI tract via the bile where it can be partially reabsorbed into the body for reuse. CoQ<sub>10</sub> metabolites resulting from intracellular phosphorylation are excreted into urine. However, it should be noted that the urinary metabolites of CoQ<sub>10</sub> only account for a small fraction of the body pool of CoQ<sub>10</sub>, and that the major route of elimination of CoQ<sub>10</sub> is by way of biliary and fecal excretion.

### CLINICAL VALIDATION

**Free Radical Scavenger.\*** In a randomized, placebo-controlled study, 10 highly trained male athletes were administered 50 mg CoQ<sub>10</sub> or a placebo leading up to a 50 km mountain race. Administration occurred two days prior with dinner; one day prior with each meal; the day of, and one hour before the race. Several blood markers of oxidative stress and immune function were measured before and after the event.

As expected, intense exercise was associated with an increase in TNF- $\alpha$ , IL-6, 8-hydroxy-20-deoxyguanosine (8-OHdG), and isoprostane levels, which are biological signs of the generation of oxidative stress and of a healthy immune response to intense exercise. In the CoQ<sub>10</sub> group, modifications of biological markers of oxidative stress (membrane hydroperoxides, 8-OHdG and isoprostane generation, increased catalase, and total antioxidant status) were less pronounced than in the placebo group after exercise.\* Results also indicated that CoQ<sub>10</sub> supplementation led to less over-expression of TNF- $\alpha$  after exercise.\* Moreover, CoQ<sub>10</sub> supplementation reduced exercise induced creatinine production.\*

### SAFETY INFORMATION

**Tolerability:** CoQ<sub>10</sub> is generally well tolerated. Some adverse effects have been reported, mainly minor GI disturbances.

**Contraindications:** None known.

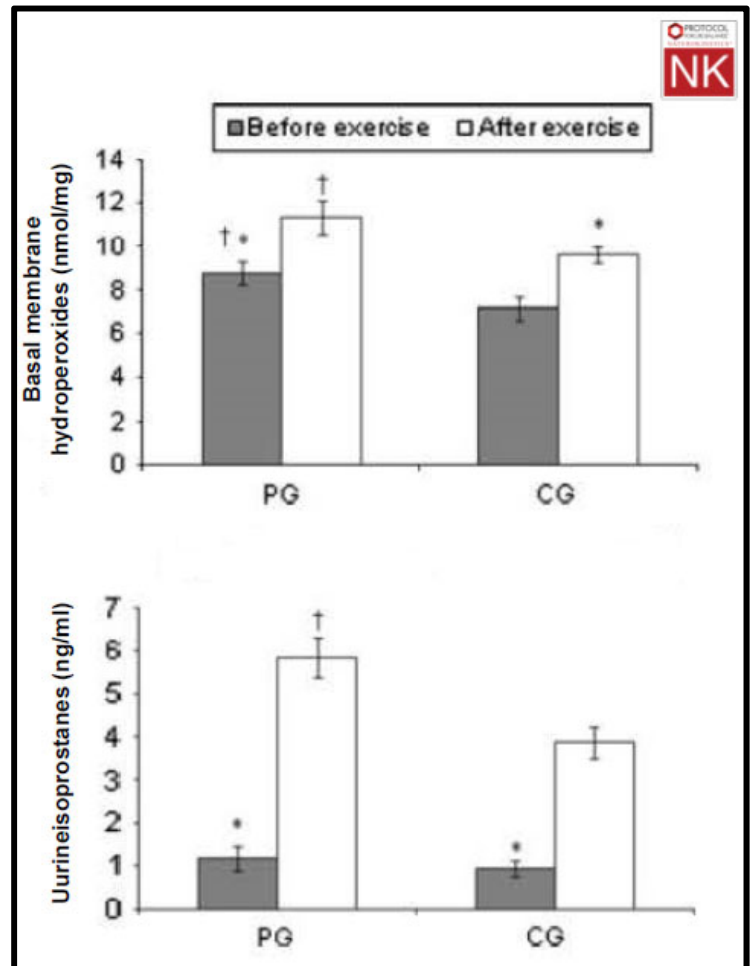


Fig. 1: Biomarkers for oxidative stress was measured from blood samples taken before and after strenuous exercise for both placebo and supplemental groups.

### INTERACTIONS

**Drug Interactions:** Concomitant use of CoQ<sub>10</sub> with warfarin may affect its anticoagulant effects.

**Supplement Interactions:** Acacia gum may increase the absorption of CoQ<sub>10</sub>. CoQ<sub>10</sub> may increase beta-carotene levels. CoQ<sub>10</sub> has vitamin K-like activity and may increase its effects. CoQ<sub>10</sub> can affect blood pressure and may have additive effects with other herbs and supplements that have hypotensive effects.

**Interaction with Lab Tests:** CoQ<sub>10</sub> may affect results of prostate-specific antigen (PSA) tests.

### STORAGE

Store in a cool, dry place.