CoQ10 SAP

Science-based fermented coenzyme Q_{10} for cardiovascular health

Coenzyme Q_{10} is produced by the human body and is necessary for the basic functioning of healthy living cells. CoQ_{10} is also the vital catalyst in the creation of energy that cells need for life. Without CoQ_{10}, the chain of cellular energy is broken and without energy, cellular life ceases. CoQ_{10} levels decrease with age, and are even lower in patients with chronic diseases. Prescription drugs, including statins, may also lower CoQ_{10} levels, yet they can be increased by supplementing with CoQ_{10}.

ACTIVE INGREDIENTS

CoQ10 SAP (capsule)

Each vegetable capsule contains:

Coenzyme Q_{10} (ubiquinone-10) (bacterial fermentation)..... 100 mg

Other ingredients: Vegetable magnesium stearate and microcrystalline cellulose in a capsule composed of vegetable carbohydrate gum and purified water.

This product is non-GMO and vegan friendly.

CoQ10 SAP (softgel)

Each softgel contains:

Coenzyme Q_{10} (ubiquinone-10) (bacterial fermentation)..... 100 mg

Nonmedicinal ingredients: Medium chain triglycerides (MCT), sunflower lecithin, and beeswax in a softgel made of annatto extract, bovine gelatin, glycerin, and purified water.

This product is non-GMO.

Contains no: Gluten, soy, wheat, eggs, dairy, citrus, preservatives, artificial flavour or colour, starch, or sugar.

CoQ10 SAP contains **60 capsules** or **60 softgels** per bottle.

DIRECTIONS FOR USE

Adults: Take 1 capsule or 1 softgel, one to two times daily or as directed by your healthcare practitioner.

INDICATIONS

CoQ10 SAP can help:

- Support cardiovascular health by mitigating oxidative stress and improving inflammation.
- Support glycemic control.
- Improve fertility.
- Maintain optimal CoQ10 levels in the body by preventing deficiency from statins or drugs.
- Manage migraine.

NATURAL FERMENTATION

NFH's **CoQ10 SAP** is made via fermentation, in which a microorganism naturally produces CoQ_{10}. The CoQ_{10} is then extracted from the organism and concentrated. It is termed natural and not synthetic, since it is normally and naturally produced by the bacterium from which it was obtained.

PURITY AND STABILITY

All ingredients listed for each **CoQ10 SAP** lot number have been tested by an ISO 17025–accredited third-party laboratory for identity, potency, and purity.

Scientific Advisory Panel (SAP): adding nutraceutical research to achieve optimum health

NFH®

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WHAT IS COENZYME Q_{10}?

Coenzyme Q_{10} (CoQ_{10}) is a quinone compound synthesized in the human body and has properties similar to those of vitamins.[1, 2] Coenzyme Q_{10} occurs widely in living organisms and, because of its ubiquitous distribution in nature, it is also known as ubiquinone.

Structurally, CoQ_{10} ($C_{59}H_{90}O_4$) is a benzoquinone ring compound, has 10 isoprenoid units in its tail, and occurs naturally in the *trans* configuration. CoQ_{10} is present in all human tissues, highly concentrated in the mitochondria as an endogenous cofactor in the mitochondrial energy production.[2, 3] Another important function of CoQ_{10} is as an antioxidant.[1]

Many chronic diseases are associated with dysfunctional energy metabolism, and CoQ_{10} supplementation has been widely tested and used in the treatment of cardiac, neurologic, oncologic, as well as other disorders.[3] Used in most countries, CoQ_{10} supplementation targets improving cellular bioenergies, counteracting oxidative stress and slowing down some age-related pathologies.[2, 4]

ENERGY PRODUCTION AND ANTIOXIDANT PROPERTIES

Present in all human tissues, ~50% of CoQ_{10} is localized in the mitochondrial membrane.[5] CoQ_{10}, a cofactor in the mitochondrial electron transport chain (ETC), is essential for ATP production and therefore plays a fundamental role in cellular bioenergies. CoQ_{10} mainly functions in the ETC as a mobile redox agent shuttling electrons and protons; however, the redox functions of CoQ_{10} exist outside of the mitochondria.

CoQ_{10} in its reduced form, ubiquinol, is a powerful antioxidant. As an antioxidant, CoQ_{10} prevents lipid peroxidation[3] and can recycle and regenerate other antioxidants such as tocopherol and ascorbate.[5]

ABSORPTION AND TRANSPORT

CoQ_{10} is a lipophilic substance (or fat-soluble nutrient) and is therefore absorbed in the gastrointestinal tract by the same method as lipids, such as vitamin E.[2] Being hydrophobic and of large molecular weight, the absorption of dietary CoQ_{10} is enhanced in the presence of lipids or fatty meals. However, absorption of pure supplemental CoQ_{10} products is not reliant on gastric digestion. Rather, secretions from the pancreas and bile acid facilitate emulsification and micelle formation that is necessary for the absorption of CoQ_{10} in the small intestine.

Following absorption, CoQ_{10} is packaged into chylomicrons and transported via the lymphatics to the circulation. Being mostly carried by VLDL/LDL particles, plasma CoQ_{10} concentrations are highly dependent on plasma lipoproteins.

In the human circulatory system, about 95% of CoQ_{10} in circulation exists in its reduced form as ubiquinol. CoQ_{10} is most concentrated in tissues with high energy requirements such as the heart, brain, liver, muscles, and kidneys. Studies show that with chronic dosing, there appears to be a dose-dependent relationship between supplementation and CoQ_{10} tissue levels for oil-based, powder-based and solubilized formulations of CoQ_{10}.

Regarding dietary supplementation of CoQ_{10}, solubilized formulations show enhanced bioavailability relative to powder-based and oil-based formulations, which have similar bioavailability. Indicating it is slowly absorbed, the T_{max} of CoQ_{10} is about 6 h for all products, and healthy adult plasma CoQ_{10} values range from 0.4–1.91 µmol/L.[2]

SAFETY AND CONTRAINDICATIONS

CoQ_{10} has an excellent safety record. The observed safe level risk assessment method reveals strong evidence of safety at intakes up to 1200 mg/d.[1] Adverse effects with CoQ_{10} supplementation are rare, with <1% of the patient population reporting GI discomfort.[3]

There may be potential interactions with warfarin (Coumadin), and due to CoQ_{10}'s potential hypoglycemic and hypotensive effects, it may be prudent to discuss adjunctive use of CoQ_{10} with other medications with a healthcare practitioner.[3] There is not enough scientific evidence to support the safe use of CoQ_{10} during pregnancy or breast-feeding.[3]

Statins, which are potent inhibitors of cholesterol biosynthesis, also inhibit CoQ_{10} synthesis and thus lower its endogenous levels in the body.[6] Even brief exposure to statin therapy causes a marked decrease in blood CoQ_{10} concentration leading to exercise intolerance, myalgia (heart pain), and myoglobinuria. However, these conditions are reversed with CoQ_{10} supplementation.[6]

CARDIOVASCULAR INDICATIONS

Numerous clinical trials supplementing with 100–300 mg/d of CoQ_{10} have found improvements in several clinical parameters related to chronic heart failure (CHF), including frequency of hospitalization, dyspnea, fatigue, and edema.[3, 4, 7] A clinical trial of 23 patients with CHF supplementing oral CoQ_{10} (100 mg t.i.d.) resulted in improved functional capacity, endothelial function, and left ventricular contractility without any side effects.[8] Similarly, CoQ_{10} supplementation may offer myocardial protection during cardiac surgery and improve postoperative cardiac function as well as reduce myocardial structural damage.[9]

A review of clinical trials using CoQ_{10} at various doses for hypertension, typically as adjuvant therapy, found a mean decrease in systolic and diastolic blood pressure of 16 and 10 mmHg, respectively.[10] Additionally, preliminary human studies of patients given CoQ_{10} orally within three days after a heart attack reported reductions in deaths, abnormal heart rhythms, and second heart attacks.[7] CoQ_{10} supplementation may also benefit cardiomyopathy (dilated, hypertrophic), angina from clogged heart arteries, and atherosclerosis.[7]

NEUROLOGIC AND METABOLIC INDICATIONS

In Parkinson's disease, CoQ_{10} may be used for slowing of functional decline. A clinical trial of 80 patients supplementing 1200 mg/d of CoQ_{10} showed that subjects experienced 44% less functional decline.[11] Furthermore, CoQ_{10} also has demonstrated positive trends in improving metabolism and physical endurance, and in reducing symptoms associated with selected mitochondrial diseases.[3, 7]

In early Alzheimer's disease, evidence from human research suggests that CoQ_{10} supplementation may slow down, but not cure, dementia in patients.[7]

In migraine studies, patients taking 150–300 mg/d of CoQ_{10} experienced a significant decrease in frequency (≥ 50%) of migraine attacks.[3]

Preliminary studies also show potential benefits of CoQ_{10} supplementation with Friedreich's ataxia as well as with Huntington's disease.[3, 7]

BREAST CANCER

Several studies of women with breast cancer have observed decreased CoQ_{10} levels in blood and diseased breast tissue; however, it is not clear if treatment with CoQ_{10} is effective.[7] On the other hand, anthracycline chemotherapy drug use, commonly used to treat various cancers including breast cancer, leads to heart damage, and CoQ_{10} supplementation has been suggested to protect against this damage.[7]

Furthermore, in adjuvant therapy, CoQ_{10} as a scavenging antioxidant may protect against free radicals in the pathogenesis of cancer, thereby preventing cancer-cell proliferation.[12]

OTHER DISORDERS

Due to CoQ_{10}'s hypoglycemic and hypotensive effects, CoQ_{10} supplementation has been studied in patients with type 2 diabetes.[13] A study supplementing 200 mg/d of CoQ_{10} for 12 weeks observed improved blood pressure and glycemic control in type 2 diabetes patients. However, these results were not associated with a reduction in oxidative stress.

Since CoQ_{10} is vital in energy production, the effects of CoQ_{10} supplementation on exercise performance in athletes and normal healthy adults have been studied; however, results are variable.[7]

Preliminary studies in periodontitis (gum disease) have also observed improvements in bleeding, swelling and pain with oral or topical application of CoQ_{10}.[7] Currently, several phase-II research trials are underway to clarify the potential contribution of CoQ_{10} in the treatment of conditions such as muscular dystrophy, idiopathic spermatozoa, kidney failure, as well as HIV/AIDS.[7]

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