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CoQ10 and Ubiquinol Supplements Review

Find the Best CoQ10 and Ubiquinol Supplements and Learn How They Differ

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Summary

- **What does CoQ10 do?** People often take CoQ10 to offset a decline in natural levels of CoQ10 that occurs with the use of statin (cholesterol-lowering) medication (although it remains uncertain if CoQ10 reduces side effects of statins). It may also benefit people with congestive heart failure. CoQ10 may modestly lower elevated cholesterol levels, reduce migraine, and improve energy levels, although the evidence for these uses remains preliminary or mixed (see What It Does). There is little evidence that CoQ10 lowers homocysteine levels.

  Most of the CoQ10 in supplements is naturally produced by fermentation. After being absorbed into the body, more than 90% of CoQ10 is converted to its active form, known as ubiquinol (CoQH2-10), which is also available as a supplement (such as *QH* from Kaneka) and appears to have greater bioavailability (i.e., it raises blood levels more) (see What It Is). "Nano" formulations of CoQ10 claim to have better absorption are also available, though the evidence for this is not strong.

- **How to take CoQ10?** CoQ10 and ubiquinol are typically taken at a dose of 50 to 300 mg per day, although higher doses have been used (see Dosage). Generally, CoQ10 and ubiquinol are best absorbed when taken with or shortly after a fatty meal, although water-soluble forms can be taken without fats (see Absorption and Bioavailability Enhancers). It's best to divide doses of 100 mg or more into several smaller doses, taken throughout the day.

- **What did CL's tests of CoQ10 show?** In laboratory testing, all of the products ConsumerLab purchased for this Review were found to provide their listed amounts of CoQ10 or ubiquinol. Cost comparisons, based on a 100 mg dose, showed you could spend as little as 5 cents to as much as 70 cents for an equivalent amount of CoQ10, and from 25 cents to $1.29 for ubiquinol (see What CL Found and How Products Were Evaluated).

- **Best CoQ10 supplement?** Among 20 CL Approved products, CL selected ***Top Picks*** for regular CoQ10 and ubiquinol, as well as for bioavailability-enhanced CoQ10 and ubiquinol, with each providing high quality CoQ10 or ubiquinol at exceptional value.

- **CoQ10 safety and side effects:** At typical doses, CoQ10 and ubiquinol appear to be generally safe, even when taken daily for several years. Gastrointestinal side effects may occur, but can be minimized by breaking up the dose throughout the day, although it may interfere with sleep if taken before bed. CoQ10 may interact with certain drugs, including blood thinners and diabetes medications (see Concerns and Cautions).

Products tested in 2024

What It Is:

Coenzyme Q10 (CoQ10), also known as ubiquinone or ubidecarenone, is a naturally occurring antioxidant compound used for energy production within cells. It's manufactured in the heart, liver, kidney and pancreas. The body normally produces sufficient CoQ10, although some medications such as statins may interfere with this process and CoQ10 levels in the body may decline with age and heart disease. Only small amounts of CoQ10 are available from food, mainly beef and chicken. Consequently, dietary supplements are the most common way to increase the body's CoQ10 levels. After being absorbed into the body (see Absorption and Bioavailability Enhancers), more than 90% of CoQ10 is converted to its active form, known as (CoQH2-10) or ubiquinol. Ubiquinol has strong antioxidant properties. Conditions that cause oxidative stress on the body, such as liver disease, decrease the ratio of ubiquinol to CoQ10. In the body, *blood levels* of CoQ10 steadily rise from young adulthood through middle-age, peaking at around age 60, when levels then decrease — although they do not fall below levels of early adulthood. However, levels of CoQ10 *in tissue* of the brain, heart and pancreas do decrease with age. Perhaps of greater significance though, is that, after age 60, the body seems to convert less CoQ10 into its active form (ubiquinol), resulting in a decreased ratio of ubiquinol to CoQ10 and indicating a higher level of oxidative stress (Niklowitz, J Clin Biochem Nutr 2016; Claessens, Ann Clin Biochem 2016).

Like CoQ10, ubiquinol is available as a dietary supplement. (For more information about forms sold, see ConsumerTips™.)

What It Does:

Cardiovascular health

Long-term supplementation with CoQ10 may be beneficial in people with congestive heart failure, while evidence that it's helpful for diastolic heart failure is mixed. Preliminary studies suggest CoQ10 may modestly lower cholesterol levels in people not on statin medication, lower homocysteine levels, and protect the heart during aortic heart valve replacement. CoQ10 does not appear to further lower cholesterol in people taking statins.

Taken orally, coenzyme Q10 may help treat **congestive heart failure**, a disease in which the heart doesn't adequately maintain circulation. CoQ10's role in cell energy production may be the mechanism by which it assists the heart. An analysis of 13 clinical studies found that taking coenzyme Q10 (usually 100 mg daily) significantly improves how well the heart pumps blood (i.e., ejection fraction) by about 3.7% compared to placebo in people with mild-to-moderate heart failure (Fotino, Am J Clin Nutr 2013). The largest and longest clinical study to date found that taking 100 mg three times daily of coenzyme Q10 for 2 years significantly reduced the chance of an adverse cardiovascular event (e.g., hospitalization, worsening heart failure, or death) by almost 50% compared to placebo in people with moderate-to-severe heart failure and significantly improved measures of quality of life such as activity levels, fatigue, and shortness of breath. It's important to note that *these benefits from CoQ10 may require long-term supplementation (2 years)*; when researchers checked after just 3 months of supplementation, no significant improvements were found (Mortensen, JACC Heart Failure 2014). In all of these studies, coenzyme Q10 was used in addition to prescription heart failure treatment, not in place of it.

Research evaluating ubiquinol for **diastolic heart failure** (also known as heart failure with preserved ejection fraction) has shown mixed evidence. A study in Israel among 32 men and women (average age 75) with mild to severe diastolic heart failure found that 100 mg of stabilized ubiquinol (by Kaneka Corporation, which funded the study) taken three times daily for four months in addition to standard

treatment did *not* improve diastolic function or decrease levels of a blood marker typically elevated in people with heart failure (NT-proBNP) compared to standard treatment plus placebo. In addition, there was no significant improvement in ejection faction (which was, on average, low but within normal range among participants) with ubiquinol compared to placebo (Samuel, Drugs R D 2021).

However, a study in the U.S. among 139 people (average age 69) diagnosed with diastolic heart failure within the last 12 months found that supplementing with a much higher dose of ubiquinol — 600 mg — daily for 12 weeks increased ejection fraction by 7.08%, improved self-reported symptoms by 22.41 points (on a scale of 1 to 100), decreased levels of a blood marker usually elevated in people with heart failure (BNP), and increased levels of adenosine triphosphate (which is required for normal systolic and diastolic function) compared to placebo. However, there was no significant improvement in left ventricular diastolic function or total distance walked during a 6-minute walk test compared to placebo. Interestingly, taking 15 grams of D-ribose (a simple sugar that is used by mitochondria in cells to produce ATP) daily *without* ubiquinol had similar benefits compared to placebo, but there was no evidence of added benefit when ubiquinol was taken *in combination with* D-ribose (Pierce, Am J Cardiol 2022).

Ubiquinol may help protect the heart around the time of **aortic valve replacement**, as demonstrated in a study of 50 elderly people (average age 78) who took 200 mg of ubiquinol (*QH Absorb*, Jarrow Formulas Inc.) or placebo twice daily for 7 days before and 5 days after aortic valve replacement surgery. People taking ubiquinol showed lower blood levels of troponin I and CK-MB (markers of heart muscle damage) at 1 and 5 days after surgery, respectively, compared to placebo. Taking ubiquinol also curbed the decline in how well the heart pumps after surgery (i.e., ejection fraction) by about 5% at 6-months follow-up compared to placebo. However, ubiquinol did not improve heart function as measured by NYHA classification or reduce the rate of major adverse events after surgery -- although rates of most of these events was low (Orlando, Aging 2020).

CoQ10, itself, may modestly **lower elevated cholesterol** levels. A study among middle aged people in China with high cholesterol levels who were *not* taking statins or other cholesterol-lowering drugs found that 60 mg of CoQ10 taken twice daily after meals (120 mg per day) for 5 ½ months decreased **LDL cholesterol and triglyceride levels**, although not total cholesterol levels, compared to placebo. Among those who took CoQ10, average LDL cholesterol decreased by 6.5% and average triglyceride levels decreased by nearly 20%. In addition, average **fasting blood sugar and insulin levels** decreased by 6% and 21%, respectively, and average systolic and diastolic blood pressure decreased by 4% and 5%, respectively, compared to placebo (Zhang, J Clin Lipidol 2017). (However, as noted in Concerns and Cautions, a review of clinical studies concluded that CoQ10 does not have a clinically significant effect on lowering blood pressure). Further analysis of data from this study showed that CoQ10 did *not* significantly affect high-density lipoprotein (HDL) cholesterol levels compared to placebo. However, it very slightly (by 1%) increased the ability of HDL to transfer cholesterol from macrophages within atherosclerotic plaques to the liver, a process associated with reduced risk of atherosclerotic cardiovascular disease, although this effect was only significant among women, those who were older than 60, and those who were generally normal weight, but not among men, those who were 60 or younger, or those who were overweight or obese (Zou, Nutr 2022).

CoQ10 does *not*, however, appear to further **lower cholesterol levels in people taking a statin drug**. This was shown in a study in Denmark among 55 men and women who were already taking the statin drug simvastatin (40 mg/day); adding 400 mg of ubiquinol (the active form of CoQ10) daily for two months did not lower LDL, total cholesterol or triglyceride levels compared to simvastatin with placebo (Hansen, Cytokine 2018).

Although some studies have found CoQ10 to **lower elevated blood pressure**, a critical review of these studies concluded that CoQ10 does not have a clinically significant effect in lowering blood pressure (Ho, Cochrane Database Syst Rev 2016). Interestingly, one physician found that CoQ10 helped maintain blood pressure in seven older people with **orthostatic hypotension** (low blood pressure upon standing) who were also using traditional treatments (clonidine, salt tablets, compression stockings etc.). The patients were given 257 mg of CoQ10 daily for approximately eight months. This apparently reduced the drop in systolic blood pressure upon standing from 30 mmHg to just 7 mmHg, although the study lacked controls and can only be considered preliminary. Three of the individuals had signs of multiple system atrophy, an neurodegenerative disease that can affect the autonomic nervous system (and therefore, blood pressure) and is associated with mutations in an enzyme involved in CoQ10 synthesis (Rembold, Am J Med 2017).

A clinical study in India suggested that taking 100 mg of CoQ10 daily for two months could significantly lower elevated **homocysteine levels**. However, the study had no placebo control, so the results area inconclusive (Ritu, J Clin Trials Cardiol 2014). In a placebo-controlled study in China, neither a low (60 mg) nor higher (150 mg) dose of CoQ10 taken daily for three months had a significant effect on homocysteine levels (Lee, Nutrition 2012). Furthermore, a study among healthy older men and women in Japan (average age 59) whose homocysteine levels were not elevated found that supplementation with 100 mg to 120 mg of ubiquinol for six to twelve months had no effect on homocysteine levels in men and slightly increased levels in women — although this study did not include a control group, making the results inconclusive (Kinoshita, Funct Foods Health Dis 2016). In short, there is no solid evidence that CoQ10 or ubiquinol lowers homocysteine levels. Also, keep in mind that although elevated homocysteine is associated with a higher risk of heart disease, lowering homocysteine levels has not been shown to be beneficial.

Muscle pain and other statin-related side effects

*Cholesterol-lowering statin drugs have been linked with side effects such as **muscle pain (myalgia), weakness/fatigue, shortness of breath, memory loss** and **peripheral neuropathy.** It is uncertain if CoQ10 **reduces these side effects of statins**, as studies (and reviews of those studies) have yielded inconsistent results* (Skarlovnik, Medical Science Monitor 2014; Bookstaver, Am J Cardiol 2012; Young, Am J Cardiol 2007; Qu, J Am Heart Assoc 2018; Kennedy, Atherosclerosis 2020). Guidelines from a task force of the American College of Cardiology and American Heart Association state that available evidence does not support use of CoQ10 for statin-associated muscle symptoms (Grundy, Circulation 2019).

Additional evidence against CoQ10 for treating statin-associated muscle symptoms was provided in 2022 by an observational study in the U.S. and Canada among 511 people (average age 58) with a history of **statin-associated muscle symptoms** that found that supplementation with CoQ10 (dose not specified) was not associated with increased resolution of symptoms or willingness to continue statin therapy compared to not taking CoQ10 (Chen, Future Cardiol 2022). Furthermore, a small clinical study in Denmark among 35 men and women (average age 63) on statin therapy (simvastatin, 40 mg per day), about half of whom reported having **muscle pain**, showed that supplementation with 200 mg of CoQ10 taken with a meal twice daily for eight weeks did not reduce muscle pain intensity, nor increase CoQ10 levels *in muscle*, despite increasing *blood levels* of CoQ10, compared to placebo. When evaluated for each individual, increases and decreases in muscle CoQ10 levels measured during the study did not correlate with changes in muscle pain intensity. Supplementation did not increase CoQ10 levels in mitochondria or improve mitochondrial function in muscle cells (Dohlmann, Antioxidants 2022). It should be noted that this study was too small to reliably detect changes in clinical symptoms.

Nevertheless, one study suggested that CoQ10 *in combination* with a reduction in statin dose can **help people considered statin-intolerant** (due to muscle-related side effects) more than lowering the statin dose alone. In the study, conducted in Italy, participants reduced their statin dose by half for a month and then, for three months also took either 100 mg daily of CoQ10 or placebo. Among those who took the CoQ10, 46.6% reported having significantly less muscular pain than before starting the CoQ10 compared to just 6.6% of those who took the placebo. In addition, the CoQ10 prevented a worsening in lipid profiles that occurred in the placebo group (Derosa, Drug Des Devel Ther 2019). Another study in Italy among 60 adults (average age: 74) with **statin-associated asthenia (physical weakness/fatigue)** for at least three months showed that taking 300 mg of CoQ10 phytosome (Ubiqsome by Indena, SpA, which provided the supplement but did not fund the study), which contained 60 mg of CoQ10, daily for 8 weeks reduced self-reported asthenia by 3 points (on a scale of 0 to 10) compared to baseline. This improvement was significant compared to the placebo group, which (oddly) showed a 1-point *increase* in self-reported asthenia. The CoQ10 group also showed significant improvement in handgrip strength (+4.5 kg vs. -0.2 kg), lower limb strength based on the number of times the participant could sit and stand over a 1-minute period (+6.8 vs. +0.1 repetitions), and aerobic endurance based on the number of times the participant could step in place while lifting their knees over a 2-minute period (+11.2 vs. +1.3 steps) compared to placebo (Fogacci, J Clin Med 2024).

Blood sugar, insulin, and diabetes

CoQ10 supplementation may decrease blood sugar levels and improve insulin sensitivity in healthy people as well as those with type 1 or type 2 diabetes according to some studies. However, high dose CoQ10 (> 300 mg per day) may *worsen* some of these measures.

A review of 40 randomized clinical trials conducted in various countries, including 25 trials among people with type 1 or type 2 diabetes, concluded that there is weak evidence that 100 mg to 200 mg per day of CoQ10 modestly decreases HbA1c (a measure of blood sugar levels over weeks to months) by about 0.12%, and *may* decrease fasting blood sugar (average decrease 5.22 mg/dL) and insulin levels (average decrease 1.32 µIU/mL), as well as improve insulin sensitivity (average decrease of 0.69 HOMA-IR). Most benefit was seen with supplementation lasting 12 weeks or more. Higher daily doses of CoQ10 (300 mg or more) did *not* provide greater benefit, and, in fact, resulted in less improvement or even worsening of some measures (Liang, eClinicalMedicine 2022).

Migraine

A study in Switzerland among 42 men and women with **migraine** (with or without aura) found that 100 mg of CoQ10 taken as liquid drops three times daily (total daily dose of 300 mg CoQ10) for three months modestly decreased the frequency of attacks by about one migraine per month and slightly decreased the number of days with nausea but did not decrease the duration of episodes, compared to placebo. The improvements were noticeable only after the first month of supplementation (Sandor, Neurology 2005). A study in Iran among 45 men and women (average age 32) with migraine found that those who took 200 mg of ubiquinol (*Ubiquinol Active CoQ10*, Natural Factors Inc. Canada) as capsules twice daily with meals (total daily dose of 400 mg) for three months had greater reductions in the frequency (- 6 vs. - 3 migraines per month), duration (- 7 vs. - 4 hours), and severity of episodes (-3.4 vs. -2.4 points on a scale of 1 to 10) compared to placebo. CoQ10 supplementation also reduced blood levels of lactate and nitric oxide, both of which may be elevated in people with migraine (Nattagh-Eshtivania, Eur J Integr Med 2018).

Gingivitis/gum disease

CoQ10, both topical and oral, is sometimes promoted to help treat **gum disease**, although the evidence is limited. One small study reported a benefit with the application of CoQ10 gel (PerioQ) in addition to non-surgical cleaning treatment, compared to treatment alone (Sale, J Indian Soc Periodontol 2014). Another small study in India, among 30 men and women with periodontitis who received traditional treatment (deep cleaning with scaling and root planing), found that those who took 120 mg of CoQ10 daily for three months after treatment had a modest decrease in gum inflammation compared to those who took a placebo after treatment, but there were no improvements in other measures of disease, such as plaque or pocket depth (gaps between teeth and gums that can deepen and allow for bacteria that cause gum disease to grow) (Manthena, J Clin Diagn Res 2015).

Sleep, mood and fatigue

Given its role in energy production in cells, CoQ10 supplementation has been proposed as a treatment for relieving fatigue caused by various conditions. Overall, little benefit has been found in clinical trials, although CoQ10 seemed to reduce fatigue and improve mood in people with Gulf War illness. It does not appear to help with sleep, and at higher doses may even worsen sleep (see Concerns and Cautions).

A small, placebo-controlled study of veterans in their forties and early fifties with **Gulf War illness** found that taking 100 mg of CoQ10 (in oil from a softgel) daily for 3 to 4 months appeared to improve **physical function** and symptoms of the illness (such as recalling words and names, impatience, irritability, headache, fatigue with exertion, low energy to do things, and muscle pain). There was no improvement with sleep problems — possibly due to an "activation" effect of CoQ10. Self-rated health status also improved among men, although not among women. These effects, however, were not found with a larger, 300 mg dose (Golomb, Neural Computation 2014).

A study in Japan among 62 healthy men and women (average age 42) experiencing **fatigue** in daily life showed little benefit with either 100 mg or 150 mg of ubiquinol taken daily after breakfast. Despite both dose amounts causing significant increases in blood levels of CoQ10, there was no significant improvement, relative to placebo, in nerve function, blood markers of oxidative stress, or on most tests of cognitive function and fatigue. Four weeks into the study there was improvement at both dosage levels in self-reported fatigue and sleepiness after cognitive testing, but the improvement was no longer significant relative to placebo at the end of the study. The study was funded by Kaneka, a manufacturer of ubiquinol supplements (Mizuno, Nutrients 2020).

A study in Denmark among 119 men and women with **COVID** symptoms persisting 12 weeks or more after infection (i.e., "long COVID") found that 500 mg of CoQ10 taken daily (as five 100-mg doses throughout the day to maximize absorption) for six weeks did *not* reduce the severity or duration of symptoms including physical fatigue, mental fatigue, and concentration difficulties, headache, and muscle weakness compared to placebo (Hansen, Lancet 2022 -- preprint).

Cognition

A study in Spain among 69 men and women (average age 72) with **mild cognitive impairment (MCI)** found that 200 mg of ubiquinol (Kaneka Corp) taken as a capsule once daily with breakfast for one year improved cerebral vasoreactivity (the ability of blood vessels to expand and contract to allow proper blood flow in the brain) and reduced a blood marker of inflammation (lipopolysaccharide) in men, but not in women, compared to placebo. However, there were *no improvements in cognition* or measures of neurological function compared to placebo (Garcia-Carpintero, Antioxidants 2021).

Muscle and nerve pain

A small, preliminary study in Spain among middle- aged adults with **fibromyalgia** (chronic, wide-spread muscular pain and fatigue) found that 100 mg of CoQ10 taken three times daily for 40 days significantly improved measures of interpersonal sensitivity, depression, anxiety, hostility, and symptoms of somatization and obsessive-compulsion compared to placebo (Alcocer-Gomez, CNS Neurosci Ther 2017). A reduction in inflammation and clinical symptoms, including sleep quality and tender points, was also noted by the researchers, but, unfortunately, data was not provided for these findings. Another small study, among middle-aged men and women in Thailand with fibromyalgia, found that taking 300 mg of CoQ10 in addition to 150 mg of the common fibromyalgia medication pregabalin (Lyrica) daily for 40 days significantly reduced pain, anxiety, and certain measures of inflammation compared to the decreases in these measures with pregabalin plus placebo. The study also found that those who took CoQ10 had greater decreases in brain activity in regions of the brain associated with pain perception and modulation (including emotional, cognitive and motor control responses to pain) compared to pregabalin taken with placebo (Sawaddiruk, Free Radic Res 2019).

CoQ10 may help people with **trigeminal neuralgia** (nerve pain in the face and jaw). A small study in Thailand among men and women being treated with standard medication (carbamazepine e.g. *Tegretol*, *Carbatrol*) for trigeminal neuralgia found that 100 mg of CoQ10 taken three times daily for two months significantly reduced self-reported nerve pain and certain measures of oxidative stress compared to placebo (Khuankaew, Free Radic Res 2018).

Parkinson disease

Although preliminary research had suggested CoQ10 might delay the progression of **Parkinson disease**, a large, placebo-controlled clinical study found no benefit from high-doses of CoQ10 (1,200 mg or 2,400 mg daily) in people with early Parkinson disease (Parkinson Study Group, JAMA Neurol 2014). In fact, over the course of the 16+ month study, symptoms worsened more among those given CoQ10, particularly at the higher dose, than in the placebo group, although these differences were not statistically significant. All patients in the study also received high-dose (1,200 mg daily) vitamin E. An earlier, smaller study had suggested benefit with a daily dose of 1,200 mg of CoQ10 (also with 1,200 mg of vitamin E), although not at lower doses (300 mg and 600 mg) (Shults, Arch Neurol 2002).

Skin/Wrinkles

A preliminary study among 33 healthy, middle-aged women found that 150 mg of water-soluble CoQ10 (Q10Vital® from Valens Intl.) taken daily for three months significantly reduced visible **wrinkles** around the eyes, nose and lips compared to placebo. However, there were no improvements in wrinkles on the forehead or frown lines between eyebrows, nor were there improvements in skin thickness or hydration, and there was no evidence of increased protection from UV damage. A lower dose (50 mg) had more limited effectiveness (Zmitek, Biofactors 2016).

Tinnitus

CoQ10 has been proposed to reduce symptoms of **tinnitus** (ringing in the ear), but but results of studies have been mixed.

A preliminary study in Germany among 20 men and women (average age 54) with tinnitus found that 100 mg of CoQ10 taken three times daily for 16 weeks resulted in *no overall effect* on tinnitus symptom scores. Only among participants who began the study with lower blood concentrations of CoQ10 was there a modest reduction from baseline levels in the severity of associated symptoms (such as emotional distress and sleep disturbance), although there was no improvement in physical symptoms, and there was no placebo group, which is needed to prove efficacy (Khan, Otolaryngol Head Neck Surg 2007).

A preliminary study in Iran among 50 men and women (average age 58) with tinnitus found that taking 100 mg of CoQ10 daily in addition to standard medication (25 mg/day of nortriptyline) resulted in a greater average reduction in self-reported tinnitus severity (-17 points on a scale of 0 — 100) than those given standard medication plus placebo plus (-4 points). However, CoQ10 did not appear to improve quality of life, and the quality of the overall report was somewhat suspect, as the researchers did not include complete data, such as tinnitus severity scores at the beginning of the study. The study also did *not* measure blood levels of CoQ10 (Abbasi, Iran J Otorhinolaryngol 2025).

Strength and athletic performance

CoQ10 and ubiquinol have been touted for enhancing **athletic performance**, but results from clinical studies have been mixed, with a review of studies in 2022 indicating that results were inconclusive (Drobnic, Nutrients 2022). Subsequent studies have continued to yield mixed results. A study in Spain among 68 *athletically-trained* men (average age 39) showed that taking 200 mg of ubiquinol (Kaneka QH, Kaneka Corporation) with water once daily in the morning (before eating) for 2 weeks while participating in high-intensity resistance training did *not* consistently increase **strength** compared to placebo (Moreno-Fernandez, Antioxidants 2023). In contrast, a study in Thailand among 42 *untrained* men (average age 26) showed that a single, 300-mg dose of ubiquinol taken with lemon-flavored water 10 minutes after completing a round of resistance and cycling exercises increased strength during exercises performed one hour later and slightly reduced **muscle soreness** 1 and 3 days post-exercise compared to placebo taken with lemon-flavored water, with the benefits similar to the effects of drinking a lemon-flavored sports drink (Gatorade) after exercising (Thar, Sports Med Health Sci 2025).

Genetic Conditions Affecting CoQ10

Although rare, **primary CoQ10 deficiency** can result from mutations in genes involved in the formation of CoQ10 in the body. This condition is typically diagnosed in infancy and early childhood due to its severe symptoms -- typically affecting the brain (encephalopathy) and/or kidneys. Patients may respond well to oral CoQ10 supplementation, although the condition must be recognized sufficiently early, before irreversible tissue damage has occurred (Mantle, Antiox (Basel) 2023).

Certain genetic variations (known as single nucleotide polymorphisms or SNPs) can also affect CoQ10 formation, elimination, and conversion to its active form, ubiquinol, in the body. For example, a SNP known as **NQO1** affects the conversion of CoQ10 to its active form, ubiquinol. A small study suggested that people who are homozygous (i.e., inherited from both parents) for this SNP have slightly higher blood levels of CoQ10, likely because CoQ10 it is not converted as well to ubiquinol, but it is not known if giving such people ubiquinol is beneficial. NQO1 SNP is most common among East Asians (22%) and least common among Caucasians (4%) -- and being homozygous for it is even less common (Fischer, BMC Res Notes, 2011).

Other Uses

A preliminary study suggested that CoQ10 (200 mg three times a day for 60 days) improved **ovarian response** to gonadotrophin stimulation in young women with low ovarian reserve (Xu, Reprod Biol Endorinol 2018), although no such benefit was reported when adding CoQ10 (amount not published) to treatment with DHEA (Ryan, Fert Steril 2013 - abstract).

Some research on **autism spectrum disorder (ASD)** has proposed oxidative stress as a potential cause of neuronal dysfunction and clinical symptoms in autism. Ubiquinol, taken at 50 mg twice per day, at morning and lunchtime, for three months, was found to improve communication, sleep, and decrease food rejection in a small study of children with autism, based on parental reports (Gvozdjakova, Oxid Med Cell Longev 2014). The authors noted that in the first days of supplementation, a small subset of children had *increased* anger, hyperactivity or sleep disturbance, which was managed by modifying the timing of the doses to morning and evening. More research is needed to confirm whether ubiquinol supplementation is beneficial for autism.

Quality Concerns and Tests Performed:

No U.S. government agency is responsible for routinely testing CoQ10 or ubiquinol supplements for their contents or quality. ConsumerLab began testing CoQ10 supplements in 2000, which revealed that not all CoQ10 supplements contain their claimed amounts of active ingredient. In March 2020, an established brand, NOW Foods, conducted its own tests of lesser known competing brands of CoQ10 purchased on Amazon.com in February 2020. Those tests suggested that products from several companies (*NasaBe'Ahava*, *Healthy Way*, *aSquared Nutrition*, *Mental Refreshment Nutrition*, *We Like Vitamins*, and *NusaPure*) contained less than 8% of their listed CoQ10, with some having no detectable amount. ConsumerLab.com was not involved in this testing and cannot vouch for its accuracy but was made aware of the results from an online merchant, iHerb.com, which is an established online vendor that posted the results as a PDF on its own site.

In this review, ConsumerLab.com again evaluated CoQ10 products, as well as ubiquinol products, to determine whether they contained the amounts of CoQ10 or ubiquinol stated on their labels. Any product containing whole herb, rice bran, or rice hull, and/or 250 mg or more of minerals per daily serving was tested for potential contamination with arsenic, cadmium, lead, and mercury. In addition, all regular tablets were tested to determine if they would properly disintegrate. (See How Products Were Evaluated for information on testing methods and passing score.) [Note: In some past reviews, ConsumerLab.com checked CoQ10 and ubiquinol products for idebenone, a potential manufacturing by-product, but, as none was found, ConsumerLab has stopped testing for idebenone.]

The majority of products tested in this Review are from popular and, generally, well-established brands, as we are guided in our product selection by our readers' interests in specific products as conveyed in our periodic product surveys and annual survey.

What CL Found:

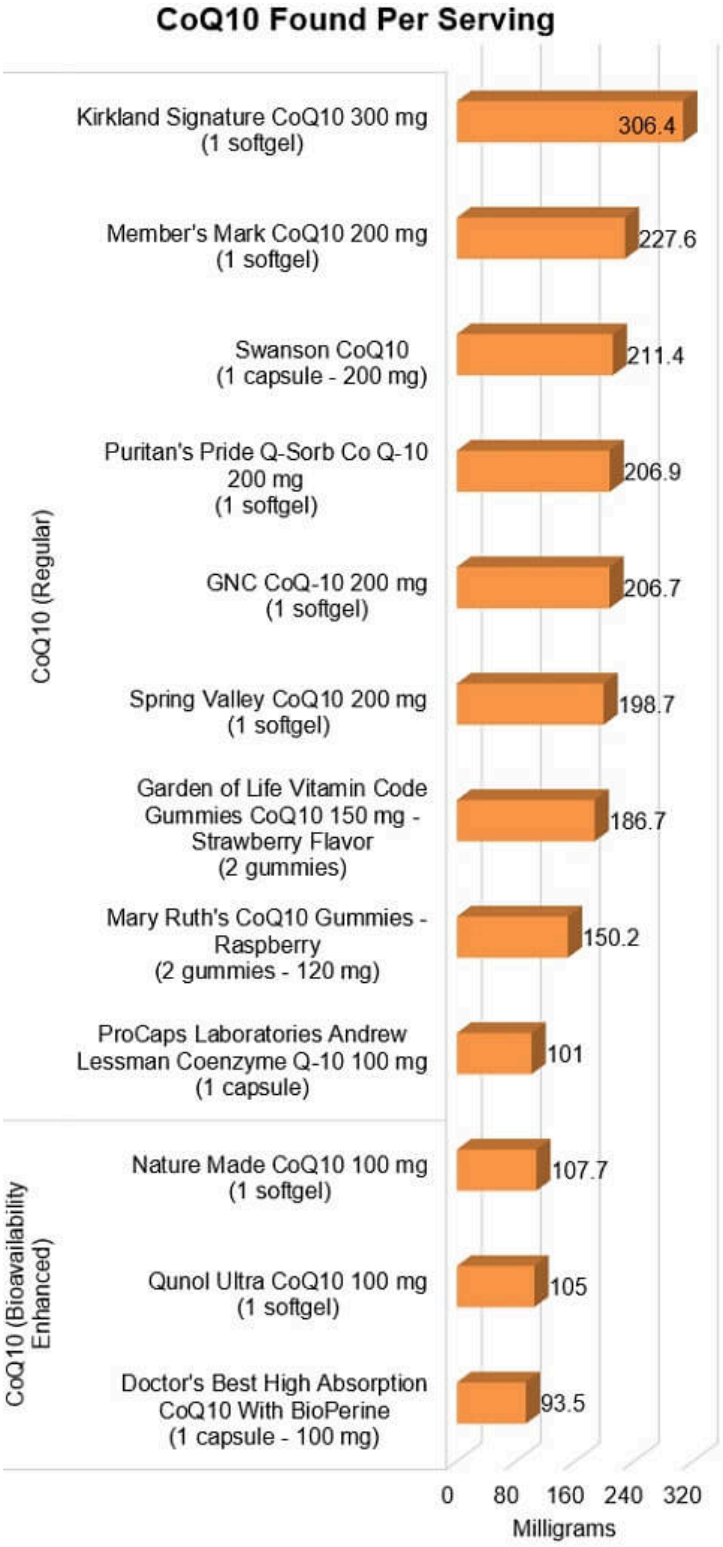
All 16 of the CoQ10 and ubiquinol products ConsumerLab.com selected for review passed quality testing and label review. An additional four products that underwent the same testing and review were Approved through ConsumerLab.com's voluntary Quality Certification Program.

A high approval rate was also seen in 2021, when all products passed testing, and 2019, when all but one product passed (the one product that did not pass contained nearly twice as much CoQ10 as labeled). However, the higher approval rate may not reflect the quality of most products on the market, as ConsumerLab's goal is to identify the best quality products and, with each successive review, we select products that have demonstrated high quality from previous tests as well as those popular among our members (who are generally well-informed consumers and health professionals).

While quality is high among the products in this review, there is a great amount of diversity among products in terms of dose, cost, and additional ingredients — primarily bioavailability enhancers -- as discussed below.

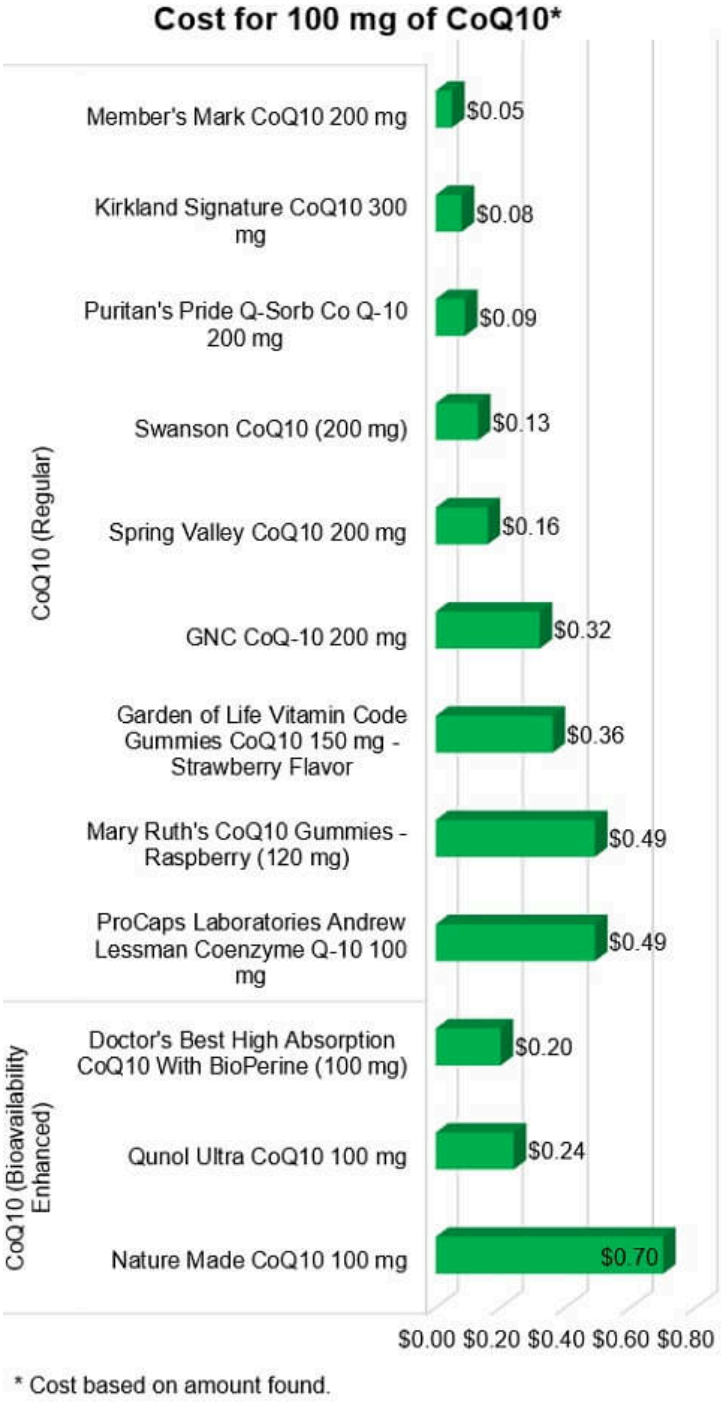
CoQ10:

As shown below, tested products claimed 100 mg to 300 mg of CoQ10 per serving, and the amounts found were close to these amounts. Products with enhanced bioavailability (shown in the lower portion of the graph) clustered at 100 mg per serving. Although not tested this year, smaller amounts tend to be in products for pets -- such as 10 mg in *VetriScience Coenzyme Q10*, which passed our tests in 2021 but was not tested again this year. It's important to know the dose of CoQ10 that's appropriate for your particular use -- see ConsumerTips for dosage information.



There were major differences in cost among the CoQ10 products. As shown in the graph below, the cost to obtain 100 mg of CoQ10 ranged from 5 cents (*Member's Mark CoQ10 200 mg* [Sam's Club]) to *14 times* that amount — 70 cents (*Nature Made CoQ10 100 mg*).

Lower-priced products tended to provide CoQ10 alone in oil without other ingredients that may enhance absorption/bioavailability. More expensive products tended to represent delivery vehicles other than capsules and softgels — such as gummies -- or include bioavailability enhancers and/or additional ingredients. For example, *Nature Made CoQ10 100 mg* includes 5 mg of black pepper extract which is 95% piperine, which can boost bioavailability by about 30% -- although, in our opinion, this does not justify its higher price, particularly as *Doctor's Best* provided the same amount of CoQ10 and black pepper extract at much lower cost. Other bioavailability enhancers may be more effective and not necessarily more expensive.



Absorption and Bioavailability Enhancers:

Before focusing on specific Approved products, it is important to note that only a small amount of CoQ10 is actually absorbed, although it can still significantly increase CoQ10 blood levels. CoQ10, especially the dry dosage form (tablet or capsule), is **best absorbed when fats or oils are present in the gastrointestinal tract**, such as during a meal.

The small amount of oil (typically less than 1 gram of rice bran oil, soybean oil, sunflower oil, vitamin E, or medium chain triglycerides listed as "Other Ingredients") in softgels and some other formulations will improve absorption, although not nearly as much as a fat- or oil-containing meal, which could easily provide 5 to 40 grams (or 1 to 8 teaspoons) of fats. The much larger amounts of fats in a meal will stimulate the release of bile into the intestine, greatly facilitating absorption of fat-soluble compounds, such as CoQ10 and ubiquinol, while also slowing digestion, allowing more time for absorption. Studies have shown maximal bile release with at least 6.5 grams (about 1.5 teaspoons) of fats or oils (Marciani, Eur J Clin Nutr 2013).

A study among 30 young adults following a low-fat diet given a single 200-mg dose of CoQ10 (formulated as a powder or with 500 mg of rice bran oil or omega-3 monoglycerides) found that the oil formulations tripled absorption of CoQ10 compared to the simple powder formulation. However, this was still just a small fraction of the 200 mg dose taken: The total amount of CoQ10 that reached the blood stream within 48 hours was just 2 mg with powdered formulation and only 6 to 7 mg with the oil formulations. In all cases, women tended to absorb somewhat more CoQ10 than men. The study also showed that the proprietary omega-3 formulation (MAG-OM3, the maker of which funded the study), was no better than rice oil (Beaulieu, J Nutr Sci 2022).

Supplements with **special absorption enhancers**, such as polysorbate 80 or cyclodextrin can make CoQ10 and ubiquinol more absorbable. These formulations tend to cost more, but you may be able to use a lower dose. On the other hand, if you will be taking the supplement with meals containing fats/oils, solubility enhancers like polysorbate 80 may not be as necessary.

- Formulations designed to be water-soluble

Greater absorption may be achieved with CoQ10 that has been solubilized with *polysorbate 80* (such as "Qunol Ultra CoQ10" and "Q-Gel") or formulated as *water-soluble beadlets* (sold as "All-Q"). These formulations reduce the need for fats, as they make the product water soluble. Bioavailability tests in people with softgels containing Q-Gel, for example, showed that it achieved CoQ10 blood levels *more than twice* that of softgels containing CoQ10 in oil, capsules containing CoQ10 powder, or tablets made with CoQ10 powder. Another human bioavailability test showed All-Q to be nearly equal to Q-Gel and both to be superior to Q-Sorb (which is not a solubilized formula but does include rice bran oil).

Be aware that some people have sensitivity to polysorbate 80 and it can affect metabolism of other compounds including certain prescription medications.

Another water-soluble form of CoQ10 is a *cyclodextrin complex* (sold as "Chew-Q" and "Hydro-Q-Sorb"), which has been associated with increased absorption in laboratory models. Water-soluble formulas do not have to be taken with fats or oils. However, it is still best to take them with food because food slows down the transit time through the small intestine, which is where CoQ10 and ubiquinol (and all vitamins and minerals) are absorbed. Longer time in the intestine creates more opportunity for absorption. Water-soluble formulas of CoQ10 and ubiquinol should, obviously, also be taken with water. A study in older people given a CoQ10 cyclodextrin complex in syrup form (*Q10Vital* from Valens Int., Slovenia) found that a 5 mL dose (containing 100 mg of CoQ10) increased ubiquinol levels in the blood 144% more than taking the same amount of CoQ10 from a standard capsule and was statistically equivalent to taking 100 mg of ubiquinol from a standard capsule. However, all products were taken with a light breakfast that may have contained little fat, so it is possible that results for the two CoQ10 products would have been more similar if both had been taken with a fatty meal (Pravst, Nutrients 2020).

"Nano" formulations are those in which very small amounts of CoQ10 are microencapsulated with substances to make CoQ10 more dispersible in water and improve absorption (Zhou, Biomed Res Int 2014; Cheuk, Food Chem 2015). Examples include:

- *VESISorb CoQ10* (SourceOne Global Partners, Inc.) consists of an oily core (triglycerides/orange oil/CoQ10) that becomes encapsulated by surfactants (polysorbate/polyglycerol esters). A small double-blind study that compared the bioavailability of a single dose of 120 mg of *VESISorb CoQ10* to the same dose of other commercially available CoQ10 products (which were not named) showed that the CoQ10 from *VESISorb* had 622% and 499% of the bioavailability of an oil-based formula and of another solubilized formula, respectively (Liu, Alt Ther 2009). The study was funded by the maker of *VESISorb*. (*VESISorb CoQ10* was not included in this Review.)

- *NanoCell-Q*, from Metagenics, is promoted as having better absorption than standard CoQ10 based on a preliminary study by Metagenics, but the study is not published and details of the study, such as the dose used, are not available.

- *NanoCoQ10* (Pharmanex) is a "nano" formula that utilizes cyclodextrin polysaccharides to improve dispersion and claims to be up to "10 times more bioavailable" than "powdered" CoQ10, but no research seems to be offered to support this claim.

- Formulations designed to inhibit CoQ10/ubiquinol breakdown

Another approach to improving the bioavailability of CoQ10, as well as ubiquinol, is taking it along with *black pepper extract*, also known as piperine and sold as the branded ingredient Bioperine, which is also frequently added to other supplements such as those containing turmeric or curcumin. Piperine inhibits enzymes that breakdown CoQ10 and ubiquinol, allowing you to achieve higher levels. A small clinical study showed that when given daily for 30 days, adding 5 mg of piperine to 120 mg of CoQ10 (taken together 30 minutes after a fatty breakfast) resulted in a 30% increase in the amount of CoQ10 in the blood compared to the same amount of CoQ10 taken without piperine (Badmaev, J Nutr Biochem, 2000).

- Formulations that may not enhance absorption

If you see "crystal-free" CoQ10 formulations, such as *CoQsol-CF* and *Q-Best* (Best Formulations), these are simply liquid CoQ10, meaning dry CoQ10 crystals have been dissolved and, typically, combined with oil to enhance absorption. For example, Q-Best contains liquid CoQ10 along with conjugated linoleic acid (CLA), flaxseed oil and monoglycerides (a company-sponsored clinical trial apparently showed improved absorption with this compared to dry CoQ10 powder, although the results do not appear to have been published in a peer-reviewed journal).

"Liposomal" formulations have sometimes been promoted as improving absorption of CoQ10, but it is not clear that all of these formulations provide a benefit. A liposomal formulation is one in which COQ10 or ubiquinol is encapsulated in small spheres. This is typically done by mixing the CoQ10 or ubiquinol with a phospholipid, such as from the lecithin in sunflower oil or soy oil. One study concluded that the bioavailability of a such a liposomal formulation taken orally as a liquid was no better than from a regular CoQ10 capsule when each was taken with a light breakfast (Vitetta, J Funct Biomater 2018). (For this reason we have not classified all liposomal formulations as "bioavailability enhanced" in this Review unless they include ingredients such as polysorbate 80 or cyclodextrin or suggest superior absorption in their labeling).

Ubiquinol:

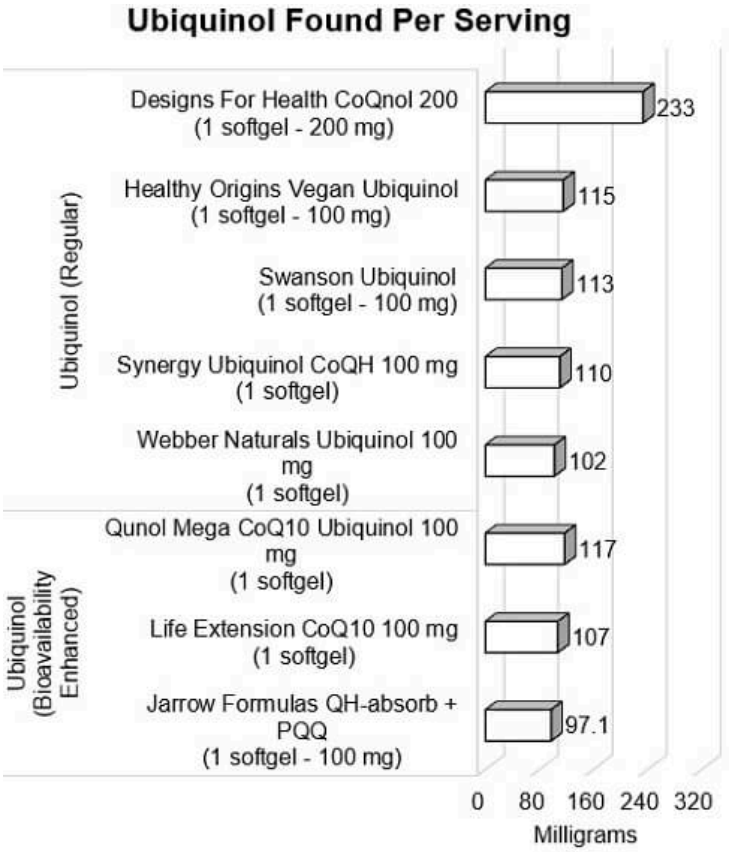
The CoQ10 found in most supplements is in the *oxidized* state (ubiquinone), but once in the body it readily goes into the *reduced* state (ubiquinol), which is its active, antioxidant form. Ubiquinol predominates in the body. You can purchase supplements in which CoQ10 is already in the active ubiquinol state. Ubiquinol is sometimes referred to as CoQH-10 or CoQH2-10 (because, chemically, it is CoQ10 with two added hydroxyl groups) and is marketed by a major supplier, Kaneka, as QH.

Ubiquinol appears to have superior bioavailability to CoQ10. A small study (funded by Kaneka) in healthy volunteers (ages 18 to 50) comparing 200 mg of each ingredient in identical softgel capsules found that, after taking one or the other with dinner for, each significantly raised blood levels of total CoQ10 (i.e., the sum of ubiquinone and ubiquinol), but ubiquinol raised it 72% more than CoQ10 (Langsjoen, Clin Pharmacol Drug Dev 2014). Similarly, a small study (also funded by Kaneka) in older men (average age 63) who took either 200 mg of CoQ10 or 200 mg of ubiquinol with a meal once daily for two weeks found that only the ubiquinol supplement led to a statistically significantly increase in average blood levels of total CoQ10, increasing it by 154% compared to 63% with CoQ10, which was not considered statistically significant (Zhang, Food Funct 2018).

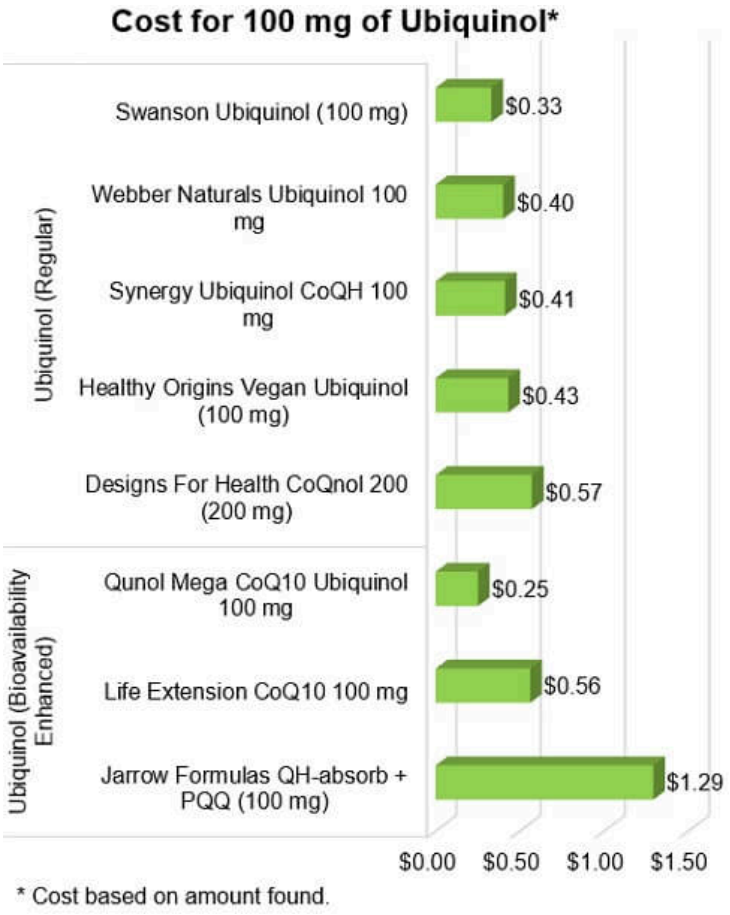
Ubiquinol is also sold by one company in solubilized and stabilized forms as "Li-Q-Nol," "Quinogel," "Q-Nol" and "Carni-Q-Nol" (a formula that includes L-carnitine). Like CoQ10, ubiquinol products may have better absorption if they are "solubilized."

In the Results table below, products with bioavailability enhancers (excluding small amounts of oil) are grouped separately and the second column of the table indicates the specific enhancement compounds they claim to contain, as well as other ingredients.

As shown below, the amount of ubiquinol per serving of all but one supplement was 100 mg, while *Designs for Health CoQnol 200* claimed 200 mg. The actual amounts found were all very close to the amounts listed, with most products containing somewhat more than listed.



Considering the possible superior bioavailability of ubiquinol over regular CoQ10, the prices of most ubiquinol products were quite reasonable. As shown below, the cost to obtain 100 mg ranged from just 25 cents from *Qunol Mega* (which is bioavailability enhanced) to just under 60 cents, although *Jarrow Formulas QH-absorb + PQQ* — a combination of ubiquinol with PQQ — was an outlier at $1.29.



Top Picks:

Taking into consideration our findings regarding product quality, cost, and special features, such as bioavailability enhancement, below are our *Top Picks* among the products reviewed.

Overall Top Pick Among CoQ10 and Ubiquinol Supplements:

If you need to choose one product from among all the CoQ10 and ubiquinol products in this Review, which should it be? We suggest our *Top Pick* for regular CoQ10 — ***Member's Mark CoQ10 200 mg*** (11 cents per 200 mg capsule) and recommend that it be taken with a meal containing at least a tablespoon of fats or oils — to optimize absorption.

Why CoQ10 and not ubiquinol? Although ubiquinol raises blood levels of activated CoQ10 about twice as well as CoQ10, it costs at least 4 to 5 times as much per milligram, so it is less expensive to use CoQ10 at a higher dose than ubiquinol. In addition, there is more clinical experience with CoQ10.

Why not choose a bioavailability-enhanced product? If you take CoQ10 with a meal containing fats, it may not matter which version you take, and the bioavailability enhanced versions cost at least 5 times as much as *Member's Mark*.

However, if you won't be taking the supplement with a fat-containing meal, we suggest our *Top Pick* among bioavailability-enhanced ubiquinol supplements — ***Qunol Mega CoQ10 Ubiquinol*** (25 cents per 100 mg capsule), as it is likely to raise your CoQ10 levels more than any other product and it is relatively inexpensive — costing no more than bioavailability-enhanced CoQ10.

CoQ10 *Top Picks*:

Regular CoQ10

If you are using a dose of 200 mg of CoQ10, we found many good, high-quality products. Our ***Top Pick* is *Member's Mark CoQ10 200 mg***, as it provides 200 mg in a softgel for just 11 cents (5 cents per 100 mg) — the lowest cost for CoQ10 among all products tested. This product is similar to the other tested 200 mg products *Swanson CoQ10*, *Puritan's Pride Q-Sorb Co Q-10* (our previous *Top Pick* in this category), *GNC CoQ-10A*, and *Spring Valley CoQ10*, which cost 19 to 67 cents per softgel or capsule. None of these products contain bioavailability-enhanced formulations.

Be aware, however, that *200 mg is a somewhat high dose* for CoQ10, particularly if you are only taking it to offset a decline in CoQ10 due to statins. A lower dose, such as 50 mg twice daily, may be sufficient. Unfortunately, none of the reviewed products provides this lower dose, but one option is our ***Top Pick* CoQ10 gummy, *Garden of Life*** (75 mg per gummy for 33 cents), which has a slightly sweet, fruity taste from organic fruits and no added sugar. We prefer it to *Mary Ruth's CoQ10 Gummies*, which are more expensive (60 mg per gummy for 37 cents) and have added sugar.

Another, lower-dose option is the 100 mg capsule from *ProCaps* for 50 cents, which is expensive for 100 mg of CoQ10, although it does include fairly large amounts of B vitamins (particularly B-2, B-6 and B-12) and vitamin C (400 mg). Although not tested this time around, 100 mg capsules of *GNC CoQ-10* were tested and Approved by us in 2022 and cost less -- 33 cents per capsule.

Should you need a much **higher dose of CoQ10, *Kirkland Signature* [Costco] CoQ10 300 mg** is a good choice and very well priced at 25 cents per softgel (just 8 cents per 100 mg of CoQ10).

As noted earlier, these products do not contain bioavailability enhancers, but as long as you take them around the time of a meal containing oils or fats (ideally, at least 1½ teaspoons or more), this should not matter, as the fats will increase absorption.

We did not test **CoQ10 for pets**, but, in 2022, we tested *VetriScience Coenzyme Q10 10 mg — For Dogs and Cats*. It passed our tests, providing its claimed 10 mg per capsule (currently 13 cents). While this is not expensive for a pill, it's relatively expensive for just 10 mg of CoQ10 and there is nothing special about the capsules, which are similar to other cellulose-based (vegetarian) capsules for people.

Bioavailability-Enhanced CoQ10

For those who can't time their dosing to a meal and need to take CoQ10 with just water, it's best to use a product that has been formulated to be water-soluble. The choices are products that use either polysorbate 80 (in the ingredient QGel) or cyclodextrin (in the ingredient HydroQsorb) to make the CoQ10 more water soluble. Among the products we tested, the least expensive by far is ***Qunol Ultra CoQ10*, making it our *Top Pick* for bioavailability-enhanced CoQ10**. *Qunol Ultra* provides 100 mg of bioavailability-enhanced CoQ10 for just 25 cents per softgel, about ½ the price of the other water-soluble CoQ10 supplements. Be aware that each softgel also contains 68 mg of vitamin E, which is more than 4 times the daily requirement for adults, but this is far below amounts that pose a concern. If you take CoQ10 with only water (and not with a meal to boost CoQ10 absorption), this supplement will potentially double the amount of CoQ10 that you absorb when taking regular CoQ10 with only water.

Although not water-soluble, even less expensive than *Qunol Ultra* is *Doctor's Best High Absorption CoQ10*. It may modestly boost CoQ10 levels (by about 30% compared to regular CoQ10) due to its inclusion of 5 mg of black pepper extract, which is mostly piperine — a compound that interferes with the breakdown of CoQ10 in the body. It costs just 18 cents per 100 mg capsule. *Nature Made CoQ10 100 mg with Black Pepper Extract* also includes piperine but costs much more -- 75 cents per softgel. Be aware that black pepper extract can interact with other medications you take (see Concerns and Cautions for black pepper extract).

Ubiquinol *Top Picks*:

Regular Ubiquinol

Our ***Top Pick* for regular ubiquinol is *Swanson Ubiquinol***, which claims to provide 100 mg per softgel of Kaneka Ubiquinol "Enhanced Bioactivity," although we found a bit more (113 mg). This is the same form of Kaneka ubiquinol in the 100 mg products that we tested from *Healthy Origins*, *Synergy*, and *Webber Naturals*, but those cost a bit more per pill (40 to 43 cents) versus 37 cents for *Swanson*. Note that the term "Enhanced Bioactivity" is meaningless — it simply indicates that ubiquinol is the active form of CoQ10 and does not connote enhanced *bioavailability*.

If you prefer a vegan product, we suggest the *Healthy Origins* product.

We also tested *Designs for Health CoQnol 200*, which has twice the dose of ubiquinol per softgel as the other tested products in this category and includes a second ingredient, geranylgeraniol. It is more expensive than the other products at $1.33 per softgel and it is not clear if the added ingredient offers additional benefit, as there are no human clinical studies of the efficacy of geranylgeraniol alone or in combination with ubiquinol.

Bioavailability-Enhanced Ubiquinol

If you want ubiquinol with an absorption enhancer, like polysorbate 80, our ***Top Pick* is *Qunol Mega CoQ10*** at just 25 cents per softgel providing 100 mg of ubiquinol. This was also our *Top Pick* for this category in 2019 and 2021, when the price was a little higher (34 cents in 2019 and 28 cents in 2021). Interestingly, the current price makes this the least expensive source of ubiquinol among the ubiquinol products in this review, including those without an absorption enhancer.

We included two products in this group that seem to promote special absorption, but, other than containing small amounts of oils (sunflower oil in *Life Extension Super Ubiquinol CoQ10* and medium-chain triglycerides in *Jarrow Formulas QH-absorb + PQQ*), they don't seem to have special bioavailability enhancements. They both contain about 100 mg of ubiquinol per softgel, like Swanson, but cost much more (60 cents for *Life Extension* and a whopping $1.25 for *Jarrow Formulas*), although they each include an additional ingredient: 10 mg of PQQ in *Life Extension* and 100 mg of shilajit in *Jarrow Formulas*. However, there is no clinical evidence indicating that they provide added benefit.

Test Results by Product:

Listed alphabetically below are the test results for 20 CoQ10 and ubiquinol supplements. ConsumerLab.com selected 16 of these products. Four others (each indicated with a CL flask) were tested at the request of their manufacturers/distributors through CL's voluntary Quality Certification Program and are included for having passed testing.

Shown for each product is the labeled amount of CoQ10 or ubiquinol per labeled serving, identified bioavailability enhancers, and the daily serving size. The calculated cost to obtain 100 mg of CoQ10 or ubiquinol is provided in the 4th column along with price information. Notable features regarding allergens and significant amounts of other active ingredients are noted in the 5th column, and the full list of ingredients for each product is shown in the final column.

Pill sizes:

Due to the relatively large amounts of CoQ10 and ubiquinol in pills (typically softgels or capsules), be aware that the pills tend be larger than for most other supplements. In case you have trouble swallowing large pills, we've included pill size information for each product in the 3rd column of the results table, and the sizes are defined in a pop-up information box at the top of that column. To give you a better idea of the sizes, below are examples (from left to right) of a large softgel, medium/large softgel, and medium softgel.

Jump to results for:

- CoQ10 Supplements
- Ubiquinol Supplements

Results of ConsumerLab.com Testing of CoQ10 And Ubiquinol Supplements

(Price Checks are not included in printed reviews)

Approval Status **Product Name**	**Claimed Amount of CoQ10 or Ubiquinol**	**Pill Size** **Suggested Serving on Label**	**Cost Per Suggested Serving** **[Cost Per 100 mg CoQ10 or Ubiquinol *Found*]** **Price**	**Notable Features and Precautions on Label**	**Full List of Ingredients Per Serving**
CoQ10 (Regular):					

APPROVED Top Pick for CoQ10 gummy Garden of Life® Vitamin Code® Gummies CoQ10 150 mg - Strawberry Flavor  Dist. by Garden of Life LLC	2 gummies 150 mg CoQ10 (Found **186.7 mg** ✓) **Heavy Metals:** Pass Lead: 0.49 mcg Arsenic: 0.12 mcg Cadmium: Mercury:	Medium/large gumdrop gummy Adults chew 2 gummies. No intended for children. *Taste: Slightly sticky, rounded gummies with slightly sweet, fruity flavor (from organic fruits and no added sugar).*	$0.67/2 gummies **[$0.36]** $19.99/60 gummies	Organic fruit blend 25 mg & *Bacillus subtilis* DE111® (250 Million CFU) 2.5 mg per 2 gummies *Non GMO Project Verified seal. NSF Certified Gluten-Free seal. Carbonfund.org Certified A Carbon Neutral Product seal. No Added Sugars. Kosher. Made without dairy* *Additional Information* *Organic fruit blend 25 mg & Bacillus subtilis DE111® (250 Million CFU) 2.5 mg per 2 gummies* *Non GMO Project Verified seal. NSF Certified Gluten-Free seal. Carbonfund.org Certified A Carbon Neutral Product seal. No Added Sugars. Kosher. Made without dairy or soy ingredients, peanut or shellfish. Vegan, No Soy, Gluten Or Nuts. No Stevia. We Buy 100% Certified Renewable Energy.* ***Precaution:*** *Manufactured in a facility that also processes fish.*	2 gummiesCalories 20, Total Carbohydrate 5 g, Dietary Fiber 3 g, Total Sugars [Includes 0 g Added Sugars] 1 g, Coenzyme Q10 150 mg, Organic Fruit Blend [Organic Strawberry (fruit), Organic Raspberry (fruit), Organic Blueberry (fruit), Organic Tart Cherry (fruit) Additional Information 2 gummiesCalories 20, Total Carbohydrate 5 g, Dietary Fiber 3 g, Total Sugars [Includes 0 g Added Sugars] 1 g, Coenzyme Q10 150 mg, Organic Fruit Blend [Organic Strawberry (fruit), Organic Raspberry (fruit), Organic Blueberry (fruit), Organic Tart Cherry (fruit), Organic Elderberry (*Sambucus nigra L.*), Organic Cranberry (fruit)] 25 mg, *Bacillus subtilis* DE111® (250 Million CFU) 2.5 mg. Other Ingredients: Fructooligo-saccharides, water, ascorbic acid, citrus pectin, agar agar, tapioca starch, natural flavor, black carrot (for color), trisodium citrate, sodium ascorbate, carnauba wax.

APPROVED GNC CoQ-10 200 mg  Dist. by General Nutrition Corporation	1 softgel 200 mg CoQ10 (Found **206.7 mg** ✓)	Medium/large softgel Take one to two softgel capsules daily after a meal.	$0.67/softgel [**$0.32**] $39.99/60 softgels	*Gluten Free. No Sugar, No Starch, No Artificial Flavors, Sodium Free, No Wheat, Gluten Free, No Corn, No Dairy.*	1 softgel Coenzyme Q-10 (Natural) 200 mg. Other Ingredients: Soybean Oil, Gelatin, Glycerin, Soy Lecithin, Chlorophyll (Color), Titanium Dioxide (Mineral Whitener).
APPROVED Kirkland Signature [Costco] CoQ10 300 mg  Dist. by Costco Wholesale Corporation	1 softgel 300 mg CoQ10 (Found **306.4 mg** ✓)	Large softgel Take one (1) softgel daily, preferably with a meal or a directed by a physician.	$0.25/softgel [**$0.08**] $24.99/100 softgels	*USP Dietary Supplement Verified® seal. No Artificial Colors. No Artificial Flavors. No Yeast of Gluten. No Lactose.* **Precaution:** Contains soy ingredients.	1 softgel Calories 10, Total Fat 1 g, Coenzyme Q-10 300 mg. Ingredients: Soybean Oil, Coenzyme Q10 (Ubidecarenone), Gelatin (Bovine), Glycerin, Soy Lecithin, Silica.

APPROVED Mary Ruth's® CoQ10 Gummies - Raspberry  Dist. by MRO MaryRuth, LLC	2 gummies 120 mg CoQ10 (Found **150.2 mg** ✓)	Large heart-shaped gummy Adults take 2 gummies per day or as recommended by a physician or healthcare professional. *Taste: Slightly dry, heart-shaped gummies with sweet, raspberry flavor (sweetened with 1.5 grams of cane sugar per gummy).*	$0.73/2 gummies [**$0.49**] $21.95/60 gummies	Sodium 20 mg per 2 gummies *Gluten Free. Vegan. No Gelatin. This Product Is Made Without: Gelatin, Soy, Yeast, Wheat, Gluten, Milk, Eggs, Peanuts, Fish and Shellfish.* Product of Canada	2 gummies Calories 20, Total Carbohydrate 5 g, Total Sugars [Includes 3 g Added Sugars] 3 g, Sodium 20 mg, Coenzyme Q10 120 mg. Other Ingredients: Organic Cane Sugar, Organic Tapioca Syrup, Purified Water, Pectin Additional Information 2 gummies Calories 20, Total Carbohydrate 5 g, Total Sugars [Includes 3 g Added Sugars] 3 g, Sodium 20 mg, Coenzyme Q10 120 mg. Other Ingredients: Organic Cane Sugar, Organic Tapioca Syrup, Purified Water, Pectin, Natural Raspberry Flavor, Citric Acid, Sodium Citrate, Black Carrot (for color), Coconut Oil, Carnauba Wax.
APPROVED Top Pick OVERALL and for regular CoQ10 Member's Mark [Sam's Club] CoQ10 200 mg  Dist. by Sam's West, Inc.	1 softgel 200 mg CoQ10 (Found **227.6 mg** ✓)	Medium/large softgel Adults, take one softgel daily with food as a dietary supplement.	$0.11/softgel [**$0.05**] $19.98/180 softgels	*No Artificial Flavors, No Synthetic Dyes, No Salt, No Sugar, No Gluten, No Lactose.* Product if China.	1 softgel Calories 5, Total Fat 0.5 g, Coenzyme Q-10 200 mg. Ingredients: Sunflower Oil, Coenzyme Q-10 (Ubidecarenone), Gelatin, Glycerin, Purified Water USP. Contains 2% Or Less Of Sunflower Lecithin.

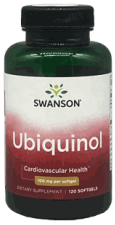
APPROVED ProCaps Laboratories Andrew Lessman Coenzyme Q-10 100 mg  Mfd. by ProCaps Labs	1 capsule 100 mg CoQ10 (Found **101 mg** ✓)	Large capsule Consumer one capsule daily with food containing a small amount of fat. Increase your intake based upon your needs and as guided by your physician.	$0.50/capsule [**$0.49**] $29.90/60 capsules	Vitamin C 400 mg, thiamin 5 mg, riboflavin 5 mg, niacin 5 mg, pantothenic acid 5 mg, vitamin B6 5 mg, folate 67 mcg DFE, biotin 50 mcg & calcium 40 mg per capsule *Contains No Additives Or Common Allergens.*	1 capsule Vitamin C (as calcium ascorbate/ palmitate) 400 mg, Vitamin B1 (as thiamin hydrochloride) 5 mg, Vitamin B2 (as riboflavin) 5 mg, Niacin (as niacinamide) 5 mg, Pantothenic Acid (as calcium pantothenate) 5 mg Additional Information 1 capsule Vitamin C (as calcium ascorbate/ palmitate) 400 mg, Vitamin B1 (as thiamin hydrochloride) 5 mg, Vitamin B2 (as riboflavin) 5 mg, Niacin (as niacinamide) 5 mg, Pantothenic Acid (as calcium pantothenate) 5 mg, Vitamin B6 (as pyridoxine hydrochloride) 5 mg, Folate (as L-5-methyltetra-hydrofolate) 67 mcg DFE, Biotin 50 mcg, Calcium (as calcium ascorbate/ pantothenate) 40 mg, Coenzyme Q-10 (natural ubiquinone) 100 mg. Other Ingredients: Gelatin capsule, Proprietary Proactive Methyl B12 Matrix.

APPROVED Puritan's Pride® Q-Sorb™ Co Q-10 200 mg  Mfd. by Puritan's Pride, Inc.	1 softgel 200 mg CoQ10 (Found **206.9 mg** ✓)	Medium/large softgel For adults, take one (1) softgel one to two times daily, preferably with meals.	$0.19/softgel [**$0.09**] $139.98/6 bottle of 120 softgels (720 softgels)	*Non-GMO. No Artificial Color, Flavor or Sweetener, No Sugar, No Starch, No Milk, No Lactose, No Gluten, No Wheat, No Yeast, No Fish. Sodium Free.* **Precaution:** Contains soy ingredients.	1 softgel Calories 5, Total Fat 0.5 g, Coenzyme Q-10 200 mg. Other Ingredients: Rice Bran Oil, Gelatin, Vegetable Glycerin. Contains <2% of: Silica, Soy Lecithin.
APPROVED Spring Valley [Walmart] CoQ10 200 mg  Dist. by Wal-Mart Stores, Inc.	1 softgel 200 mg CoQ10 (Found **198.7 mg** ✓)	Large softgel Adults, take one softgel daily, preferably with a meal.	$0.32/softgel [**$0.16**] $18.96/60 softgels	*No Gluten, Yeast, Wheat, Milk or Milk Derivatives, Lactose, Sugar, Preservatives, Artificial Color, Artificial Flavor, Sodium (less than 5 mg per serving).* **Precaution:** Contains Soy.	1 softgel Calories 5, Total Fat 0.5 g, Coenzyme Q10 200 mg. Other Ingredients: Rice Bran Oil, Gelatin, Glycerin. Contains <2% of: Silica, Soy Lecithin.
APPROVED Swanson® CoQ10  Dist. by Swanson Health Products	1 capsule 200 mg CoQ10 (Found **211.4 mg** ✓) **Heavy Metals:** Pass Lead: 0.01 mcg Arsenic: 0.07 mcg Cadmium: Mercury: 0.001 mcg	Large capsule Take one capsule per day with food and water.	$0.28/capsule [**$0.13**] $24.89/90 capsules	None.	1 capsule Coenzyme Q10 200 mg. Other Ingredients: Rice flour, gelatin, magnesium stearate, silica.
CoQ10 (Bioavailability Enhanced):					

APPROVED Doctor's Best® High Absorption CoQ10 With BioPerine®  Dist. by Doctor's Best, Inc.	1 veggie cap 100 mg CoQ10 (Found **93.5 mg** ✓) *Bioavailability enhancement:* Black pepper extract **Heavy Metals:** Pass Lead: 0.01 mcg Arsenic: 0.07 mcg Cadmium: Mercury: 0.001 mcg	Large veggie cap Take 1 capsule daily, preferably with food for maximum absorption, or as recommended by a nutritionally informed physician.	$0.18/veggie cap [**$0.20**] $11.07/60 veggie caps	Black pepper extract 5 mg per veggie cap *Vegan. USP Verified, Naturally Fermented CoQ10. Non-GMO / Gluten Free / Soy Free / Vegan.*	1 veggie cap Coenzyme Q10 (Ubiquinone) 100 mg, Black Pepper Ext. (*Piper nigrum*) (fruit) (standardized to contain 95% Piperine) (BioPerine®) 5 mg. Other Ingredients: Rice powder, hypromellose (vegetarian capsule) Additional Information 1 veggie cap Coenzyme Q10 (Ubiquinone) 100 mg, Black Pepper Ext. (*Piper nigrum*) (fruit) (standardized to contain 95% Piperine) (BioPerine®) 5 mg. Other Ingredients: Rice powder, hypromellose (vegetarian capsule), magnesium stearate (vegetable source), silicon dioxide.
APPROVED Nature Made® CoQ10 100 mg with Black Pepper Extract  Dist. by Nature Made Nutritional Products	1 softgel 100 mg CoQ10 (Found **107.7 mg** ✓) *Bioavailability enhancement:* Black pepper extract	Medium/large softgel Adults, take 1 softgel daily with water and a meal.	$0.75/softgel [**$0.70**] $22.49/30 softgels	Black pepper fruit extract 5 mg per softgel *USP Verified, No Color Added - CoQ10 is Naturally Orange in Color. No Artificial Flavors. No Preservatives. Gluten Free.*	1 softgel Coenzyme Q10 (Ubidecarenone) 100 mg, Black Pepper (*Piper nigrum*) fruit extract (Standardized to 95% piperine, 4.75 mg) 5 mg. Other Ingredients: Soybean Oil, Gelatin, Glycerin, Lecithin.

APPROVED Top Pick for bioavailability-enhanced CoQ10 Qunol® Ultra CoQ10 100 mg  Dist. by Quten Research	1 softgel 100 mg CoQ10 (Found **105 mg** ✓) *Bioavailability enhancement:* Polysorbate 80 (a solubility enhancer to make CoQ10 water soluble)	Large softgel Adults take one (1) softgel, once per day with food, or as recommended by your healthcare professional.	$0.25/softgel [**$0.24**] $29.69/120 softgels	Vitamin E 68 mg per softgel *Free Of: Milk and milk by-products, egg and egg by-products, fish or fish by-products, shellfish or shellfish by-products, wheat or wheat by-products, and peanuts or peanut by-products. Gluten free. Sugar free* *Additional Information* *Vitamin E 68 mg per softgel* *Free Of: Milk and milk by-products, egg and egg by-products, fish or fish by-products, shellfish or shellfish by-products, wheat or wheat by-products, and peanuts or peanut by-products. Gluten free. Sugar free.* ***Precaution:** Contains Soy. Contains a bioengineered food ingredient.*	1 softgel Calories 7, Vitamin E (as dl-alpha tocopheryl acetate) 68 mg, Coenzyme Q10 100 mg. Other Ingredients: Medium chain triglycerides (palm oil), polysorbate 80, gelatin, glycerin, sorbitol, purified water, hydroxylated soy lecithin Additional Information 1 softgel Calories 7, Vitamin E (as dl-alpha tocopheryl acetate) 68 mg, Coenzyme Q10 100 mg. Other Ingredients: Medium chain triglycerides (palm oil), polysorbate 80, gelatin, glycerin, sorbitol, purified water, hydroxylated soy lecithin and annatto suspension in sunflower oil.
Ubiquinol (Regular):					

APPROVED Designs For Health® CoQnol™ 200  Dist. by Designs for Health, Inc.	1 softgel 200 mg ubiquinol (DuoQuinol®) (Found **233 mg** ✓)	Very large softgel Take 1 softgel per day with a meal or as directed by your health-care practitioner.	$1.33/softgel [**$0.57**] $79.99/60 softgels	Trans-Geranyl-geraniol (GG-Gold®) 125 mg *Does not contain gluten, dairy, soy or GMO's.*	1 softgel Ubiquinol (DuoQuinol®) 200 mg, Trans-Geranylgeraniol (GG-Gold®) [from annatto (*Bixa orellana*)] 125 mg. Other Ingredients: Medium chain triglycerides, softgel ingredients (bovine gelatin Additional Information 1 softgel Ubiquinol (DuoQuinol®) 200 mg, Trans-Geranylgeraniol (GG-Gold®) [from annatto (*Bixa orellana*)] 125 mg. Other Ingredients: Medium chain triglycerides, softgel ingredients (bovine gelatin, glycerine, purified water, annatto [color]), quillaja extract, ascorbyl palmitate.
APPROVED Healthy Origins® Vegan Ubiquinol  Dist. by Healthy Origins®	1 veggie gel 100 mg ubiquinol (Kaneka Ubiquinol™) (Found **115 mg** ✓)	Medium/large veggie gel Adults: Take one (1) vegetarian softgel once or twice daily with food, or as directed by a physician.	$0.50/veggie gel [**$0.43**] $29.99/60 veggie gels	*Not manufactured with wheat, gluten, soy, milk, egg, fish, shellfish, peanut or tree nut derived ingredients. Non GMO. Vegan.*	1 veggie gel Kaneka Ubiquinol™ 100 mg. Other Ingredients: Vegetarian Softgel (Non-GMO) Modified Tapioca Starch, Glycerin, Purified Water), Extra Virgin Olive Oil, Rice Bran Wax, Sunflower Lecithin, Annatto.

APPROVED Top Pick for regular ubiquinol Swanson® Ubiquinol  Dist. by Swanson Health Products	1 softgel 100 mg ubiquinol (Kaneka Ubiquinol™ Enhanced Bioactivity CoQ10) (Found **113 mg** ✓)	Medium/large softgel Take one softgel per day with food and water.	$0.37/softgel [**$0.33**] $44.19/120 softgels	None.	1 softgel Ubiquinol (Kaneka Ubiquinol™ Enhanced Bioactivity CoQ10) 100 mg. Other Ingredients: Flaxseed oil, gelatin, glycerin, beeswax, sunflower lecithin, purified water, carob, d-alpha tocopherol (vitamin E) Additional Information 1 softgel Ubiquinol (Kaneka Ubiquinol™ Enhanced Bioactivity CoQ10) 100 mg. Other Ingredients: Flaxseed oil, gelatin, glycerin, beeswax, sunflower lecithin, purified water, carob, d-alpha tocopherol (vitamin E) (other tocopherols & sunflower oil).

APPROVED Synergy® Ubiquinol CoQH 100 mg  Dist. by Vitacost.com, Inc.	1 softgel 100 mg ubiquinol (Kaneka Ubiquinol®) (Found **110 mg** ✓) **Heavy Metals:** Pass Lead: 0.15 mcg Arsenic: Cadmium: Mercury:	Large softgel As A Dietary Supplement For Adults, Take 1 Softgel Daily With Food Or As Directed By A Healthcare Professional.	$0.45/softgel [**$0.41**] $26.99/60 softgels	**Precaution:** Contains: Soy.	1 softgel Calories 10, Total Fat 1 g, Saturated Fat 1 g, Ubiquinol (reduced form of CoQ10) [Kaneka Ubiquinol®] 100 mg. Other Ingredients: Medium Chain Triglycerides, Gelatin, Vegetable Glycerin, Ascorbyl Palmitate Additional Information 1 softgel Calories 10, Total Fat 1 g, Saturated Fat 1 g, Ubiquinol (reduced form of CoQ10) [Kaneka Ubiquinol®] 100 mg. Other Ingredients: Medium Chain Triglycerides, Gelatin, Vegetable Glycerin, Ascorbyl Palmitate (Antioxidant), Caramel Color, Soy Lecithin, Water, Beeswax, Mixed Tocopherol (Antioxidant), Rosemary And Soybean.

APPROVED Webber Naturals® Ubiquinol 100 mg  Dist. by WN Pharmaceuticals® Ltd.	1 softgel 100 mg ubiquinol (Kaneka QH® CoQ10) (Found **102 mg** ✓)	Medium/large softgel 1 softgel 1-3 times daily or as directed by a physician.	$0.41/softgel [**$0.40**] $41.00/100 softgels	Organic flaxseed oil 297 mg per softgel *Free of artificial colours, preservatives, or sweeteners; no dairy, starch, sugar, wheat, gluten, yeast, soy, corn, egg, fish, shellfish, salt, tree nuts, or GMOs.*	1 softgel Ubiquinol (microorganism) (as Kaneka QH® CoQ10) 100 mg, Organic Flaxseed Oil (*Linum usitatissimum*) 297 mg. Non-medicinal Ingredients: Softgel capsule (gelatin [bovine], glycerin, purified water Additional Information 1 softgel Ubiquinol (microorganism) (as Kaneka QH® CoQ10) 100 mg, Organic Flaxseed Oil (*Linum usitatissimum*) 297 mg. Non-medicinal Ingredients: Softgel capsule (gelatin [bovine], glycerin, purified water, carob), yellow beeswax, non-GMO sunflower lecithin, d-alpha tocopherol (from non-GMO sunflower oil).
Ubiquinol (Bioavailability Enhanced):					

APPROVED Jarrow Formulas® QH-absorb® + PQQ  Dist. by Jarrow Formulas®	1 softgel 100 mg ubiquinol (Kaneka Ubiquinol™) (Found **97.1 mg** ✓) *Bioavailability enhancement:* QH-absorb® is a natural, proliposomal delivery system for enhanced absorption	Large softgel Take 1 softgel once or twice per day with a meal or as directed by your qualified healthcare professional.	$1.25/softgel [**$1.29**] $74.99/60 softgels	PQQ 10 mg per softgel *No wheat, gluten, soybeans, dairy, egg, fish/ shellfish, or peanuts/ tree nuts.*	1 softgel Ubiquinol 100 mg, PQQ (Pyrroloquinoline Quinone Disodium Salt) 10 mg. Other Ingredient: Medium chain triglycerides, softgel (bovine gelatin, glycerin, purified water, annatto [as a light barrier]), sunflower lecithin Additional Information 1 softgel Ubiquinol 100 mg, PQQ (Pyrroloquinoline Quinone Disodium Salt) 10 mg. Other Ingredient: Medium chain triglycerides, softgel (bovine gelatin, glycerin, purified water, annatto [as a light barrier]), sunflower lecithin, beeswax, rosemary extract, natural mixed tocopherols and ascorbyl palmitate (to maintain freshness).
APPROVED Life Extension® Super Ubiquinol CoQ10 100 mg  Dist. by Quality Supplements and Vitamins, Inc.	1 softgel 100 mg ubiquinol (Kaneka Ubiquinol™) (Found **107 mg** ✓) *Bioavailability enhancement:* "Enhanced Delivery System for Maximum Absorption"	Medium/large softgel Take one (1) softgel daily with food, or as recommended by a healthcare practitioner.	$0.60/softgel [**$0.56**] $36.00/60 softgels	PrimaVie® shilajit 100 mg per softgel *Gluten Free. Non GMO.*	1 softgel Calories 5, Total Fat 0.5 g, Ubiquinol (as Kaneka Ubiquinol™) 100 mg, PrimaVie® Shilajit [fulvic acid complex] 100 mg. Other Ingredients: Sunflower oil, gelatin, glycerin, purified water, beeswax, sunflower lecithin, annatto color.

APPROVED Top Pick for bioavailability-enhanced ubiquinol Qunol® Mega CoQ10 Ubiquinol 100 mg  Dist. by Quten Research Institute, LLC	1 softgel 100 mg ubiquinol (Kaneka Ubiquinol®) (Found **117 mg** ✓) *Bioavailability enhancement:* Polysorbate 80 (a solubility enhancer to make ubiquinol water soluble)	Large softgel Adults take one (1) softgel daily, with or after a meal, or as recommended by your healthcare professional.	$0.29/softgel [**$0.25**] $34.97/120 softgels	Vitamin C 6 mg per softgel *Free Of: Milk or milk by-products, egg or egg by-products, fish or fish by-products, shellfish or shellfish by-products, tree nuts, wheat or wheat by-products, peanuts or peanut by-products, and soybeans or soy by-products* *Additional Information* *Vitamin C 6 mg per softgel* *Free Of: Milk or milk by-products, egg or egg by-products, fish or fish by-products, shellfish or shellfish by-products, tree nuts, wheat or wheat by-products, peanuts or peanut by-products, and soybeans or soy by-products.* *Manufactured and packaged in cGMP compliant USA facilities with USA and imported ingredients.*	1 softgel Calories 6, Vitamin C (as ascorbyl palmitate) 6 mg, Ubiquinol (Kaneka Ubiquinol®) [active form of Coenzyme Q10] 100 mg. Other Ingredients: Medium chain triglycerides (palm oil), polysorbate 80, gelatin, glycerin, sorbitol, purified water Additional Information 1 softgel Calories 6, Vitamin C (as ascorbyl palmitate) 6 mg, Ubiquinol (Kaneka Ubiquinol®) [active form of Coenzyme Q10] 100 mg. Other Ingredients: Medium chain triglycerides (palm oil), polysorbate 80, gelatin, glycerin, sorbitol, purified water and annatto suspension in sunflower oil.

Products tested in 2024

ConsumerTips™:

Dosage

The suggested daily dosage of CoQ10 products varies widely. In this review alone, it ranged from 20 mg to 300 mg of CoQ10 or ubiquinol among products for people. It is probably better to determine your dosage based on amounts that have shown to be clinically effective (as described below) and based on the recommendation of your health care provider.

Using CoQ10 to treat **congestive heart failure** should be considered an adjunct to, not a replacement for, other medications. A daily dose of 100 mg to 300 mg of CoQ10 is generally used. Be aware that improvement in symptoms may take more than one month. Don't suddenly stop taking CoQ10, because symptoms may worsen. Tapering off the supplement is recommended.

Taking 300 mg to 400 mg of CoQ10 (in 2- 3 divided doses) daily may reduce the frequency, duration, and/or severity of **migraines**. Be aware it may take one to three months of supplementation to achieve these benefits (Sandor, Neurology 2005; Nattagh-Eshtivania, Eur J Integr Med 2018).

For reducing **muscle pain associated with statin use**, a dose of 50 mg twice daily may be helpful (Skarlovnik, Medical Science Monitor 2014). CoQ10 can be taken at the same time as statin medication (Bargossi, Int J Clin Lab Res 1994). Additionally, CoQ10 taken at the same time as lovastatin has been reported to reduce statin-related muscle pain in patients with cancer (Thibault, Clin Cancer Res 1996). People who take their statin medication in the evening may prefer to take CoQ10 earlier in the day, as taking CoQ10 in the evening may cause insomnia in some individuals (see Concerns and Cautions). Also, keep in mind that CoQ10 is best absorbed with foods that contain fats or oils. If your statin must be taken without food, take CoQ10 at a different time along with food.

For other diseases, the following daily doses have been used, although optimal dosage levels have not been determined: For reducing the risk of **pre-eclampsia during pregnancy** 200 mg (Teran, Int J Gynaecol Obstet 2009); for **hypertension** 120 to 200 mg; for **angina** 150 mg; for reducing the likelihood of **future heart problems** in people who've had a first heart attack 120 mg; for **HIV/AIDS** 200 mg; for **muscular dystrophy** 100 mg; for **mitochondrial encephalomyopathies** 150 to 160 mg and sometimes higher; for increasing **sperm motility** 200 to 300 mg (Safarinejad, J Urol 2009); for increasing ubiquinol ratios in children with **trisomy 21**, 10 mg of ubiquinol (liquid form) per kilogram of body weight.

A very small Japanese study of eleven healthy elderly subjects given 100 mg per day of ubiquinol showed increases in self-assessed "**vitality**" and "mental health". This dose increased plasma concentrations of ubiquinol by four-fold and increased the ratio of ubiquinol to CoQ10. Interestingly, the effects were correlated with the increased ratio rather than the increased concentration.

A study in veterans with Gulf War illness found that taking 100 mg of CoQ10 (in oil from a softgel) daily for 3 to 4 months appeared to improve physical functioning and, among men, general self-rated health (Golomb, Neural Computation 2014).

Divided dosing (taking two or three equally divided smaller doses instead of one large dose a day) is recommended when the total daily dose exceeds 100 mg in order to maximize absorption (Mantle, Antioxidants (Basel) 2020). It is also recommended that you **take CoQ10 with fatty meals** to help increase absorption.

See the discussion of "Absorption and Bioavailability Enhancers" in the What CL Found section above.

After age 60, the body may be less efficient at converting CoQ10 to its active form, ubiquinol (see What It Is). For this reason, **people over the age of 60** may want supplement with ubiquinol rather than CoQ10.

Natural vs. Synthetic

Naturally formed CoQ10 is 100% in the "trans" isomer form. Synthetically formed material is also predominantly in the "trans" form with a small amount in the "cis" form. Since the fermentation process using bacteria or yeast is much cheaper than chemical synthesis and provides 100% natural (trans) CoQ10, most, but not all, CoQ10 found in the marketplace today is made by a fermentation process. This

is sometimes (but not always) indicated on the label with terms such as "yeast fermentation.;" Branded CoQ10 ingredients known to be natural include *Kaneka QH* and *Q-Gel* (Tishcon).

A compound called **idebenone** is a somewhat similar compound to CoQ10. It can be a by-product of improperly made CoQ10, which is why ConsumerLab.com has tested for idebenone as a contaminant in CoQ10 supplements in the past. Interestingly, some evidence suggests that idebenone could be helpful for slowing cognitive decline in Alzheimer's disease and other forms of dementia (Voronkova, Neurosci 2009; Weyer, Neuropsychobiology, 1997) but not all studies have found a benefit (Thal, Neurology 2003).

Another compound, **mitoquinone (*MitoQ*)** is marketed as a more "effective" form of CoQ10 because the ubiquinone molecule is altered to carry a positive charge that allows it to be better absorbed into the mitochondria of cells — and consequently, can be taken at lower doses than regular CoQ10. MitoQ products were not included in this Review.

In animal studies, *MitoQ* has been shown to be absorbed into heart, brain, liver and kidney cells and appeared to reduce oxidative damage in the mitochondria of some of these cells, after ingestion (Smith, Ann NY Acad Sci 2010). *However, it should also be noted that MitoQ was shown in a laboratory study to cause acute swelling in the mitochondria of animal kidney tubule cells and to damage kidney tissue in mice, possibly due to its ability to increase the permeability of the mitochondrial membrane. The researchers advised that "caution should be exercised before using this compound in renal patients," i.e., patients with kidney disease* (Gottwald, Physiol Rep 2018). Testing in people shows that *MitoQ* has an oral bioavailability of about 10% (compared to about 2% for regular CoQ10 without an absorption-enhanced formula). Doses of 40 mg and 80 mg of *MitoQ* have been shown to reduce certain measures of liver damage in individuals with hepatitis C but had no beneficial effect in Parkinson's disease. Side-effects were similar to those that may be experienced with high doses of CoQ10, such as headache and nausea, although vomiting was also reported (Gane, Liver Int 2010; Snow, Mov Discord 2010).

A small study among healthy older adults (aged 60 to 70 years) with impaired endothelial function (i.e., stiffer arteries) found that 20 mg of *MitoQ* taken daily for six weeks increased flow-mediated dilation of the brachial artery by 42% compared to those who took placebo. There was no significant effect on blood pressure -- although the study participants did not have high blood pressure. Levels of oxidized "bad" LDL cholesterol decreased by 13% in those who took *MitoQ*, while there was no significant decrease in those who took placebo. The researchers speculated that *MitoQ* might be effective in treating conditions affecting vascular function (Rossman, Hypertension 2018). Similarly, a placebo-controlled study among 23 middle-aged and older men and women (average age 62) found that, among those who did *not* regularly exercise, taking a single, 80 mg dose of *MitoQ* (on an empty stomach) *slightly* improved vascular endothelial function and myocardial perfusion (how well blood flows through heart muscle), but did not improve other measures of cardiovascular fitness, such as blood pressure, resting heart rate, aortic stiffness, or aerobic capacity compared to placebo. **However, there was *no significant improvement in any measure compared to placebo among participants who exercised regularly*** (Carlini, J Physiol 2024).

A company-funded study among 16 recreational male cyclists (average age 44) found that 20 mg of *MitoQ* taken daily 30 minutes before breakfast for 28 days resulted in *very slight*, but statistically significant improvements in exercise performance. Aerobic fitness (as determined by VO_{2peak}, a measure of oxygen consumption) improved by 4.4%, and the time it took to complete a 5-mile timed cycling trial decreased (12.91 vs. 13.09 minutes to completion) with *MitoQ* compared to placebo, although *MitoQ* did not decrease perceived exertion (Broome, J Int Soc Sports Nutr 2021).

Tests for measuring CoQ10 levels in the blood

CoQ10 levels can be measured by a blood test and may help to guide dosing for individuals with CoQ10 deficiency, heart disease, or who are taking statin drugs, which are known to lower blood levels of CoQ10. The test, usually referred to as "Coenzyme Q10," "Coenzyme Q10, Total," or "Ubiquinone 50" is available through well-known laboratories such as Quest Diagnostics and LabCorp. The normal reference range for CoQ10 levels using these tests is 0.5 - 1.7 micromol/L (Molyneux, Clin Biochem Rev 2008), or 0.44 - 1.64 mg/L. For people with heart disease, a therapeutic target range of 2 mg/L or greater is sometimes recommended.

CoQ10 levels in the blood do not necessarily reflect the levels found in tissue, such as heart and skeletal muscle but are still considered a useful measure of CoQ10 status. (While some studies have shown that supplementation may increase CoQ10 levels in heart tissue in people with heart disease (Keith, Nutr Metab Cardiovasc Dis 2008; Rosenfeldt, Biogerontology 2002; Folkers, Proc Natl Acad Sci USA 1985), the evidence is mixed. Additionally, because measuring CoQ10 levels in tissue requires taking a tissue sample, or biopsy, this is not considered a practical test for most people.)

Concerns and Cautions:

CoQ10 is generally safe and well-tolerated when taken by adults in appropriate amounts. A study involving over 100 people with cardiomyopathy taking CoQ10 (100 mg daily, divided into three doses) for several years (some as long as 6 years) concluded that CoQ10 was safe — although the study had no control group (Langsjoen, Am J Cardiol, 1990). Doses as high as 1,200 mg per day (divided into four doses taken with meals and at bedtime) were used in a placebo-controlled study lasting 16 months that found CoQ10 to be safe and well tolerated (Shults, Arch Neurol 2002). Gastrointestinal side effects such as **loss of appetite, heartburn, nausea, and diarrhea** have been reported in about 1% of individuals taking CoQ10 in clinical trials; rarely, **headache, fatigue, irritability and skin rash** have also been reported (Hidaka, Biofactors 2008; Bonackdar Am Fam Physician 2005). Gastrointestinal side effects may be minimized by taking smaller, divided doses (Shinde, Internet J Nutr Wellness 2004).

CoQ10's safety has not been evaluated for **pregnant or breast-feeding women**.

CoQ10 has been used safely in **children**, under medical supervision, in doses up to 10 mg/kg/day for up to nine months.

Although some studies have found CoQ10 to lower elevated **blood pressure**, a critical review of these studies concluded that CoQ10 does not have a clinically significant effect in lowering blood pressure (Ho, Cochrane Database Syst Rev 2016).

Certain medications, including some **cholesterol-lowering "statin" drugs, beta-blockers, antidepressants, and antipsychotics** may decrease the body's natural production of CoQ10; therefore, the CoQ10 dosage for individuals taking any of these drugs should possibly be higher than generally recommended.

Taking CoQ10 might **interfere with the blood-thinning effect of warfarin**. There have been reports of CoQ10 decreasing the blood-thinning effect, which could necessitate an increase in warfarin dosage (Spigset, Lancet 1994). Interestingly, CoQ10 is chemically similar to vitamin K2, which can also decrease the effectiveness of warfarin. However, a population-based study suggested the opposite — an increased risk of bleeding with CoQ10 for people on warfarin (Shalansky, Pharmacother 2007), and another study suggested no effect in people with a stable INR (Engelsen, Ugeskr Laeger 2003). In any event, it seems prudent to inform your doctor if you wish to use CoQ10 with warfarin, so that you are properly monitored. It is unclear whether CoQ10 interacts with the drug clopidogrel (Plavix), which works through a different mechanism than warfarin.

A dose of 100 mg or more of CoQ10 taken in the evening may **cause mild insomnia** in some individuals (Pepping, Coenyzme Q10. AJHP 1999). Even if taken during the day, high-dose CoQ10 (300 mg) may also cause sleep problems, as suggested by a small study of veterans with Gulf War illness: 74% reported sleep problems before the study. This fell to 64% among those given 100 mg of CoQ10 daily but increased to 83% among those given 300 mg (Golomb, Neural Computation 2014 — see What It Does, above, for more about this study). If CoQ10 seems to cause insomnia, take it well before dinner time and consider reducing the dose.

Thyroid hormones can affect CoQ10 levels in the body; in hyperthyroidism (overactive thyroid) CoQ10 levels have been found to be the lowest discovered in human diseases, while in hypothyroidism (underactive thyroid), CoQ10 levels tend to be elevated (Mancini, Int J Mol Sci 2013). Treatment of hyperthyroidism in children with methimazole (Tapazole) has been shown to normalize CoQ10 levels in the body (Mancini, Int J Mol Sci 2011). However, it is not known whether CoQ10 supplementation affects thyroid hormone levels and interactions between CoQ10 and medication for hypothyroidism, such as levothyroxine (Synthroid) have not been reported.

There is mixed evidence regarding the use of CoQ10 during **cancer chemotherapy**. A study of women being treated for breast cancer with the drugs cyclophosphamide, doxorubicin, and/or paclitaxel suggested an *increased* risk of cancer recurrence or death among those taking any antioxidant supplements, including CoQ10 (Ambrosone, J Clin Oncol 2020). A study in mice suggested that CoQ10 may also reduce the effectiveness of **cancer radiotherapy** (Lund, Folia Microbio, 1998). On the other hand, several case reports and a small preliminary clinical study found that supplementing with CoQ10 (typically 200 to 300 mg daily) during or following chemotherapy treatment with anthracyclines (e.g., daunorubicin and doxorubicin) helped protect against or improve symptoms of chemotherapy-induced heart damage (Iarussi, Mol Aspcts Med 1994; Folkers, Biochem Biophys Res Commun 1993), although people in the clinical trial were not followed for long-term survival.

There is weak evidence that CoQ10 at doses between 100 to 200 mg per day may decrease **fasting blood sugar and insulin levels** in healthy people and in people with type 1 or type 2 diabetes, while higher doses may *worsen* these measures (Liang, eClinicalMedicine 2022). To be safe, people with type 1 or type 2 diabetes or other conditions that affect blood sugar levels, such as hypoglycemia, and people taking anti-diabetes medications should use CoQ10 with caution.

A case of **insulin autoimmune syndrome (IAS)** possibly caused by CoQ10 was reported in 52-year-old woman Japan who had taken CoQ10 for 3 months. Her symptoms resolved after stopping CoQ10 (Kusano, J Rural Med 2019). Symptoms of IAS include **sweating, shakiness, and weakness** due to hypoglycemia. People of Japanese ancestry may be more predisposed to IAS than others. Many cases of IAS due to alpha-lipoic acid have been reported in Japan, but this is the first reported case associated with CoQ10.

Some products (including several in this review) include **polysorbate 80** to help solubilize CoQ10 or ubiquinol. Although the FDA considers polysorbate 80 to be generally safe, some people may be sensitive to it and there is a limit as to how much polysorbate 80 you should ingest daily. The FDA limits polysorbate 80 in supplements to 175 to 475 mg per daily serving depending on other ingredients, and the World Health Organization (WHO) recommends that adults not consume more than a total 1,750 mg (25 mg per kg of body weight) daily of polysorbate 80, which is also found in food products such as frozen gelatin. The amount of polysorbate 80 in supplements is not listed on labels, but ConsumerLab.com estimates that amounts over 100 mg may be present in CoQ10 and ubiquinol supplements, particularly when the ingredient appears early in the list of "Other ingredients." There are isolated reports of people who have had anaphylactoid reactions to polysorbate 80 from medication given subcutaneously (Price, Allergy Asthma Proc 2007) or intravenously (Coors, Ann Allergy Asthma Immol 2005), but not by mouth. There is theoretical concern that it may be harmful to people with Crohn's disease (Roberts, Gut 2010).

Formulas containing black pepper extract (piperine, Bioperine): Although in people, there do not appear to be any reported adverse effects when these are taken at typical doses and Bioperine® is self-affirmed GRAS (generally recognized as safe), piperine inhibits specific enzymes in the lining of the gut (such as "CYP" enzymes) which otherwise break down certain compounds, and it may also affect the permeability of the intestine. It would be best to avoid formulas containing a black pepper extract if you are taking medications known to be metabolized by CYP enzymes such as phenytoin, rifampin, propranolol theophylline, felodipine, amlodipine and nevirapine. Piperine (at a dose of 20 mg) may increase the bioavailability of the anticonvulsant drug carbamazepine (Tegretol, Carbatro) (Pattanaik, Phytother Res 2009). Laboratory evidence suggests that piperine may have anti-platelet effects. It should be used with caution in people taking blood-thinning medication (Raghavendra, Prostaglandins Leukot Essent Fatty Acids 2009). They may also have diuretic properties (increasing urine output) and stimulate the production of stomach acid (Meghwal, Scientific Reports 2012). One animal study found lower doses of both black pepper extract and piperine to have a laxative effect, while higher doses were found to slow intestinal motility and have an antidiarrheal effect — although in these studies both doses were significantly higher than amounts typically use supplements (Mehmood, J Med Food 2010).

+ 100 sources

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