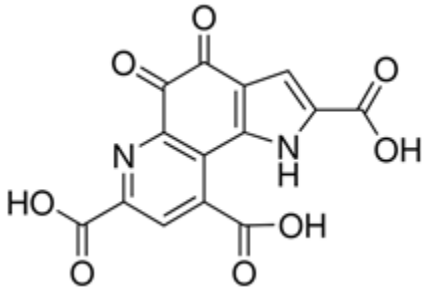


Extra Strength PQQ

TECHNICAL SUMMARY

Pyrrroloquinoline quinone (PQQ) is a B vitamin-like compound that not only helps to protect mitochondria from free radicals, it also promotes the production of new mitochondria within cells.* Mitochondria are the parts of the cell that produce energy. While all cells have them, the heart and brain are especially dense with mitochondria due to their high energy demands. PQQ may thus help to maintain robust cellular energy production, support heart health, and promote normal cognitive function.* Extra Strength PQQ includes alpha-lipoic acid to complement its free radical scavenging abilities.*

Structure formula:



Chemical name: Pyrrroloquinoline quinone (PQQ) is also known as methoxatin or 4,5-dioxo-1H-pyrrolo[2,3-f]quinoline-2,7,9-tricarboxylic acid.

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

Delivery Form: Veg Capsules

ROLE AS NUTRIENT/FUNCTION

PQQ was initially discovered as a coenzyme for methanol dehydrogenase in bacteria using methanol as source of carbon.

PQQ is known to be involved in a multitude of biological processes within the human body. PQQ activates several cell signaling pathways associated with mitochondrial biogenesis and regulation of cellular energy metabolism.* It also plays a protective role in neuronal cell death and DNA fragmentation.* The reduced form of PQQ has been shown to be a potent free radical scavenger in chemical essays.* In laboratory experiments, PQQ has been shown to counteract toxin- and free radical-induced neurodegeneration, and to enhance the synthesis of nerve growth factor.* In adults, the daily intake of PQQ from the diet has been estimated as 0.1 – 1 mg/day.

NATUROKINETICS®

Liberation: PQQ Complex capsules pass standard disintegration test in water (<60 min).

Supplement Facts

Serving Size 1 Veg Capsule

Amount Per Serving

PQQ (Pyrrroloquinoline Quinone) (as PQQ disodium salt)	40 mg*
Alpha-Lipoic Acid	200 mg*

* Daily Value not established.

Other ingredients: Rice Flour, Hypromellose (cellulose capsule), Magnesium Stearate (vegetable source) and Silicon Dioxide.

- With 200 mg Alpha-Lipoic Acid
- Mitochondrial Health*

SUGGESTED USAGE: Take 1 capsule daily with a meal, or as directed by your healthcare practitioner.

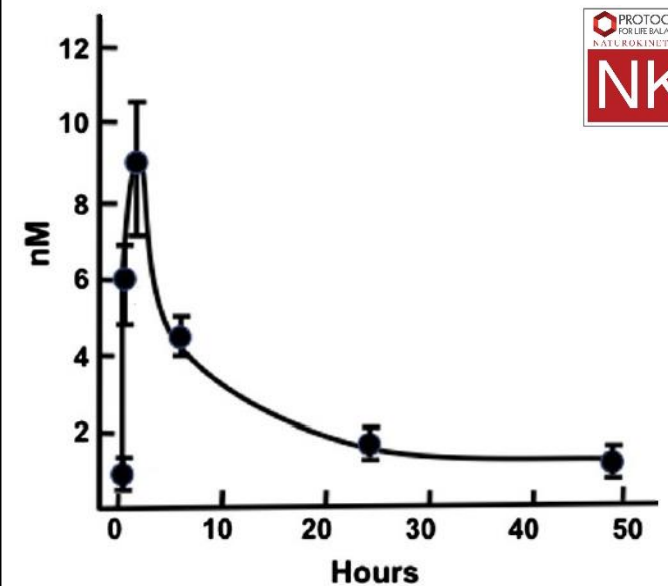


Figure 1: Serum level of PQQ in response to a single oral dose of 0.2 mg/kg in healthy individuals. Adapted from original publication.

Absorption: Based on published data on animal models, PQQ is readily absorbed in the lower intestine. After oral ingestion, peak PQQ plasma is reached after 2 hours. (Figure 1)

Distribution: In blood, PQQ is mainly found in the cell fraction, not serum. Six hours after oral ingestion of a single dose in animal models, PQQ can be found in most organs including the kidney, liver, and skin and at lower concentrations in the lungs, spleen, and heart. In the same experiment, there was no significant presence of PQQ in the brain and adrenal gland.

Metabolism: Details of PQQ metabolism in the body have not yet been elucidated; however, it has been suggested that it is extensively metabolized prior to elimination.

Elimination: PQQ is excreted via urine.

CLINICAL VALIDATION

- In an open label clinical study on 10 healthy individuals ingesting 0.3 mg PQQ/kg/day for 3 days, authors observed a significant reduction of already healthy CRP levels by 45% ($p < 0.05$).^{*} They also observed a significant decrease in IL-6 levels ($p < 0.05$).^{*} (Figure 2) In the same study, a significant reduction of urinary methylated amines and changes in urinary metabolites, which are indirect markers of enhanced mitochondria-related function.^{*}

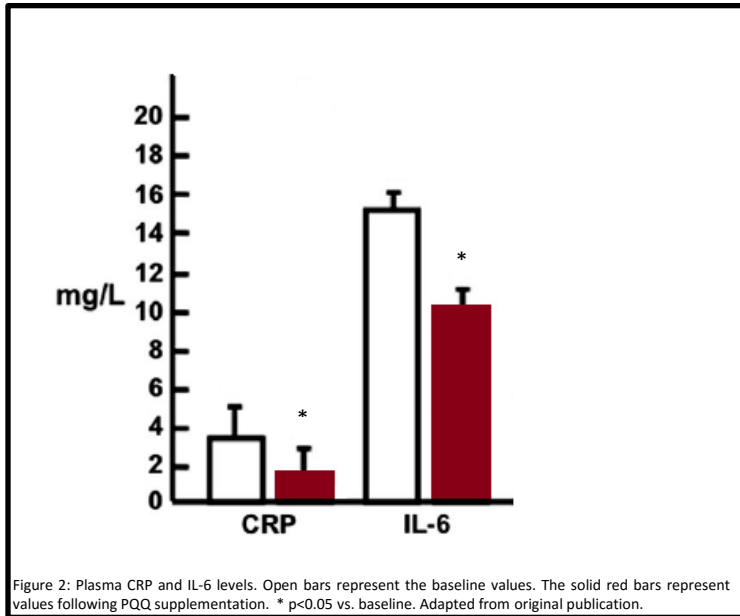


Figure 2: Plasma CRP and IL-6 levels. Open bars represent the baseline values. The solid red bars represent values following PQQ supplementation. * $p < 0.05$ vs. baseline. Adapted from original publication.

SAFETY INFORMATION

Tolerability: PQQ is typically well tolerated.

Contraindications: None known.

INTERACTIONS

Drug Interactions: Not known.

Supplement Interactions: Not known.

Interaction with Lab Tests: Per above mentioned clinical study, PQQ supplementation may decrease CRP levels in healthy individuals. In a 3-day supplementation study no effect was shown on blood lipid levels, liver enzymes, blood glucose, creatinine, uric acid, or total protein.

STORAGE

Store in a cool, dry, and dark environment in original sealed container. Protect from extended exposure to direct sunlight, heat, and moisture.