PROTOCOL FOR LIFE BALANCE®

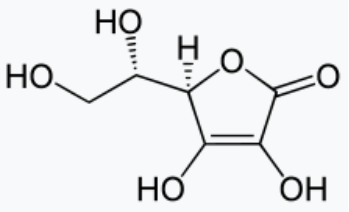
Dietary Supplement Information
for Physicians with Naturokinetics®
PRODUCT CODE: P1120
CATEGORY: IMMUNE SUPPORT*

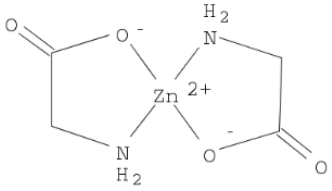
C-1000 + Zinc-15

TECHNICAL SUMMARY

C-1000 + Zinc-15 combines vitamin C with zinc for powerful immune system support.* This product utilizes TRAACS™ Zinc Bisglycinate, a form of zinc that has been shown in clinical studies to have superior bioavailability compared to other forms of supplemental zinc.

Structure Formula:





Chemical Name: Ascorbic acid, zinc bisglycinate.

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

Delivery Form: Vegetable capsules.

ROLE AS NUTRIENT/FUNCTION

Vitamin C plays multiple roles in many biochemical reactions in the body.* It is known as a redox agent, able to undergo reversible reduction-oxidation reactions, which allows it to donate electrons in enzymatic reactions.* It also acts as a co-factor in the biosynthesis of neurotransmitters and neuropeptides.* Its chemical structure makes it an excellent antioxidant, allowing it to neutralize free radicals.* Vitamin C is also essential to collagen synthesis and connective tissue integrity and helps regulate iron and folic acid levels.*

Zinc functions as a co-factor for nearly 100 different enzymes.* Zinc is also an indispensable structural element for certain proteins.* Its presence contributes to the unique 3-dimensional shape of these proteins.* A protein's biological function often depends on its unique 3-D shape; therefore, any shape alteration due to a modification of its zinc content might affect the function of these proteins.* Some of these proteins have roles in gene regulation as DNA binding transcription factors.* Zinc is also involved in cell signaling, hormone release, and apoptosis and is required for T-cell differentiation.* Zinc also appears to play particularly important role in prostate health, where zinc levels are at least 10 times higher than in other soft tissues.* Due to its ubiquitous involvement in metabolic processes, mild zinc deficiency is hard to recognize because it lacks specific symptoms that may include general malaise, impaired immunity, and tissue repair.*

NATUROKINETICS®

Liberation: Dissolution of the vegetable capsule is measured in water using a USP testing method with dissolution between zero and 60 minutes.

Supplement Facts

Serving Size 1 Veg Capsule

	Amount Per Serving	% Daily Value
Vitamin C (as Ascorbic Acid)	1 g (1,000 mg)	1111%
Zinc (from 75 mg Zinc Bisglycinate) (Albion™)	15 mg	136%

Other ingredients: Hypromellose (cellulose capsule), Hydroxypropyl Cellulose, Stearic Acid (vegetable source) and Silicon Dioxide.

- **Seasonal Support Formula***
- **Antioxidant Protection***

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

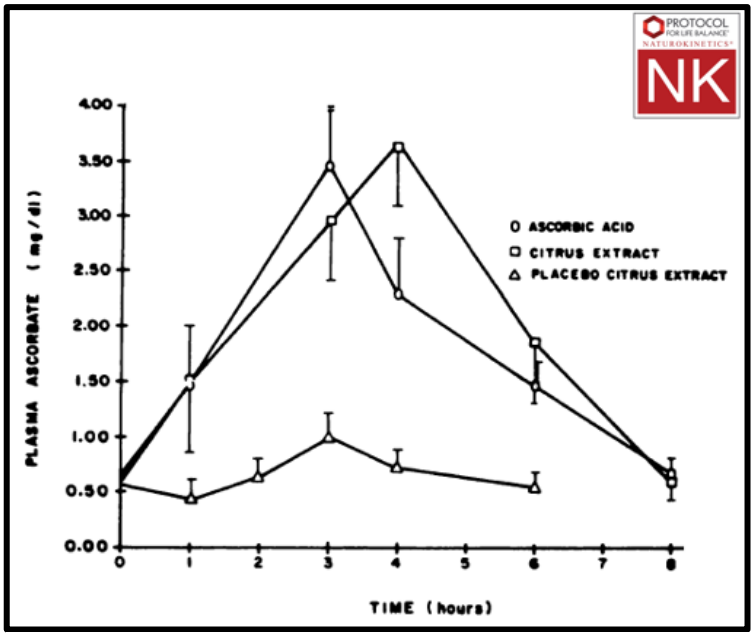


Figure 1. Plasma time-concentration curves for 8 fasting subjects supplemented with 500 mg of ascorbate alone (AUC= 590 ± 117) or with 2 g of a citrus extract or 2 g placebo citrus extract (797 ± 82) (mean +/-SD).

Absorption: Vitamin C is absorbed in the small intestine by facilitated diffusion, which follows a concentration and electrochemical gradient. Its absorption is facilitated by the sodium-dependent vitamin C transporter (SVCT). Bioflavonoids, such as hesperidin that naturally accompany ascorbic acid in citrus fruits, have been shown to slow rate of absorption of vitamin C but result in the higher overall bioavailability, as measured by area under the curve (AUC) (Figure 1).

The absorption rate of zinc depends on actual zinc status. Most dietary zinc is absorbed in the small intestine via an active saturable mechanism. Approximately 15-40% of zinc from food is absorbed. In a randomized

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cross-over pharmacokinetic study in 12 healthy volunteers who were receiving a single administration of zinc bisglycinate with 15 mg elemental zinc, maximum serum concentrations were reached within 2 hours (T_{max}). The overall bioavailability of zinc from zinc bisglycinate was 43.4% higher than zinc from the form of gluconate salt (Figure 2).

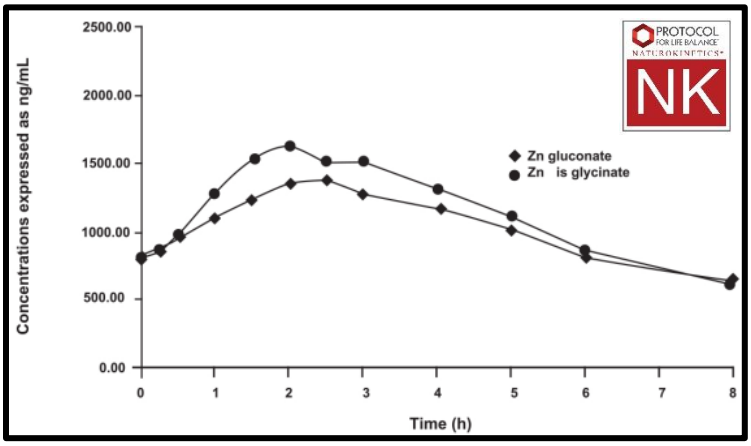

Figure 2. Mean zinc serum concentrations during 8 hours after a single administration of zinc gluconate or zinc bisglycinate (Albion®) (both delivering 15 mg elemental Zn) in twelve healthy volunteers.

Clinical data suggest that vitamin C does not interfere with zinc absorption.

Distribution: In tissues, there are two types of SVCTs. SVCT1 transports ascorbate into epithelial cells and is found in the liver, kidney, and intestine. SVCT2 is found in the rest of tissues. Higher vitamin C concentrations are found in the brain, neurons, the eye, phagocytes, and adrenal glands.

Zinc reserve pools are primarily found in skeletal muscle, bone, and prostate, which comprise approximately 85% of total body zinc stores. Plasma zinc is only 0.1% of this total, and its concentration is tightly regulated.

Metabolism: Because of its ability to reversibly donate its electrons, ascorbic acid can be regenerated and used again in other biochemical reactions.

The liver is responsible for zinc homeostasis in the body. Stress, acute trauma, and infection can result in lower plasma zinc concentrations. Fasting, on the opposite, can result in increased plasma zinc concentrations.

Elimination: Vitamin C is excreted in the urine.

The pancreas is a major route of endogenous zinc excretion. These losses may range from less than 1 mg/day with a zinc-poor diet to greater than 5 mg/day with a zinc-rich diet. Zinc is primarily excreted in the feces with little excretion via urine.

CLINICAL VALIDATION

- **Seasonal Support**.* In a double-blind, randomized controlled trial, in healthy Thai school children aged 8-13 years receiving daily 15 mg zinc bisglycinate or matching placebo for three months, zinc supplementation did not modify the incidence of seasonal events; however, it significantly shortened the duration of said events.*
- **Antioxidant Protection**.* In a double-blind, placebo-controlled crossover study, oxidative stress and neutrophil reactions resembling acute immune response was induced in 7 professional divers as a response to apnea with or without vitamin C supplementation (1 g/d for one week). Neutrophil catalase activity and glutathione peroxidase activity levels were lower in the supplemented group than in the placebo group.* Nitric oxide synthesis and nitrite levels decreased only in the supplemented group after diving and recovery.*

SAFETY INFORMATION

Tolerability:

Vitamin C is GRAS (Generally Recognized as Safe). Higher dosages that are above the upper limit of 2 g/d increase the likelihood of adverse reactions including diarrhea and gastrointestinal disturbances.

Zinc is well tolerated when used at the recommended doses. It may cause occasional mild gastrointestinal adverse effects such as diarrhea, abdominal discomfort, and nausea.

Cautions:

Individuals who are diabetic, glucose-6-phosphate dehydrogenase deficient, taking iron supplements or have problems absorbing iron, have sickle cell disease, or have undergone a recent angioplasty should consult their physician before taking vitamin C. Zinc supplementation in patients with HIV infection must be monitored.

INTERACTIONS

Drug Interactions:

Taking vitamin C with statins or niacin may affect their efficacy. Vitamin C may affect the absorption and effectiveness of chemotherapeutic drugs and anticoagulant such as warfarin, especially when supplemented in high doses (>2 g/d). When taken with estrogen, vitamin C may increase estrogen levels and estrogen-related adverse reactions. Individuals taking medications containing aluminum, such as medicines for heartburn, should consults their physician before taking vitamin C.

Zinc has been shown to decrease the absorption of penicillamine, quinolone, and tetracycline antibiotics by forming complexes with these medications in the gastrointestinal tract. Patients should be advised to take these drugs at least 2 hours before or 4-6 hours after zinc supplements. Zinc may decrease cephalexin levels by chelation therefore preventing its absorption when taken together. Zinc may also interfere with cisplatin therapy by stimulating production of metallothionein, which binds to and inactivates cisplatin. Amoliride can reduce excretion of supplemental zinc especially when used at doses 10 mg/d or more.

Supplement Interactions: Calcium, chromium, phytic acid, and iron have been shown to decrease the absorption of zinc. High doses of zinc supplements (142 mg/day) or high dietary zinc intake (53 mg/day) may decrease magnesium stores. Concomitant use of high doses of zinc with herbs and other supplements affecting glucose metabolism, such as alpha-lipoic acid, chromium, devil's claw, fenugreek, garlic, and others, could theoretically increase the risk of low blood sugar, and caution is advised.

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Interaction with Lab Tests:

Large amounts of ascorbic acid may affect the results of serum tests for bilirubin, aspartate aminotransferase, creatinine, lactic dehydrogenase, uric acid, vitamin B12, carbamazepine, and theophylline. False-negative for the guaiac test (testing for occult bleeding in stools) have been described for vitamin C supplementation as low as 250 mg/d.

Supplementation with elemental zinc 50 mg per day has increased HbA1C in type 1 diabetics. Zinc supplementation might increase the ratio of low-density-lipoprotein to high-density-lipoprotein (LDL/HDL) cholesterol and test results.

STORAGE

Store in a cool, dry place. Store at ambient and dry conditions in sealed container. Preferable temperatures between 59°F -80°F and <55% relative humidity.

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