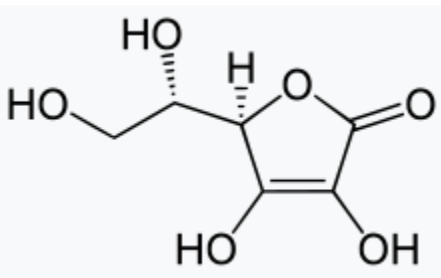


## C-1000 with Bioflavonoids & Rutin

### TECHNICAL SUMMARY

Vitamin C is an essential nutrient well known for its support of healthy immune system function.\* As a powerful antioxidant, it can protect the body's structures from oxidative damage generated by cellular metabolism.\* Vitamin C plays an important role in a number of metabolic functions, including the regeneration of vitamin E and the activation of folic acid.\* Because vitamin C is a critical cofactor in the formation of collagen, it helps maintain the connective tissue that supports skin, bones, teeth, and arterial walls.\*

#### Structure Formula:



**Chemical Name:** Ascorbic 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

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.\*

### NATUROKINETICS®

**Liberation:** Disintegration of the vegetable capsule is tested in water using a USP method with disintegration between zero to 60 minutes.

**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).

**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

## Supplement Facts

Serving Size 1 Veg Capsule

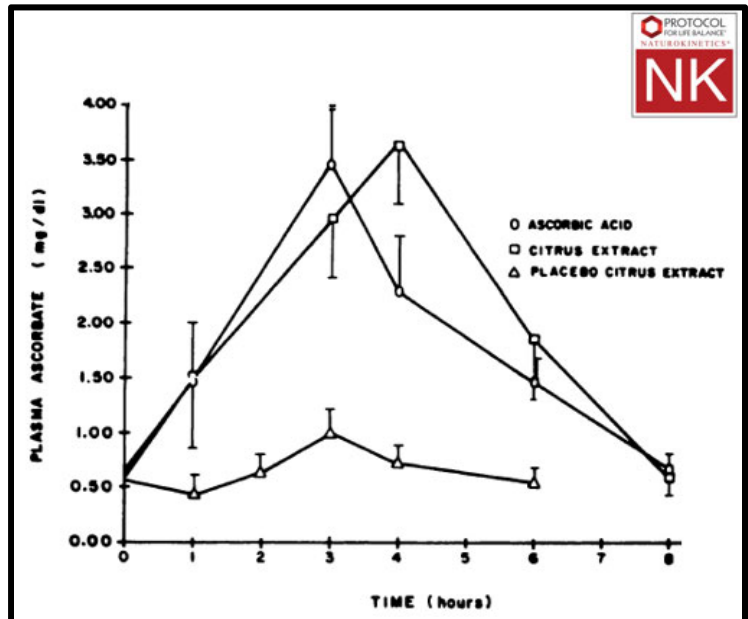
	Amount Per Serving	% Daily Value
Vitamin C (as Ascorbic Acid)	1 g (1,000 mg)	1111%
Citrus Bioflavonoid Complex	100 mg	†
Rutin Powder ( <i>Sophora japonica</i> ) (Flower Bud)	25 mg	†

† Daily Value not established.

Other ingredients: Cellulose (capsule), Stearic Acid (vegetable source), Magnesium Stearate (vegetable source) and Silica.

### • Antioxidant Power of Vitamin C\*

**SUGGESTED USAGE:** Take 1 capsule daily, 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).

concentrations are found in the brain, neurons, the eye, phagocytes, and adrenal glands.

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

**Elimination:** Vitamin C is excreted in the urine.

## CLINICAL VALIDATION

- **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.<sup>1,3</sup>

**Contraindications:** Individuals who are diabetic, glucose-6-phosphate dehydrogenase deficient, taking iron supplements or have problems absorbing iron, have sickle cell disease<sup>5</sup>, or have undergone a recent angioplasty should consult their physician before taking vitamin C.

## 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 consult their physician before taking vitamin C.

**Supplement Interactions:** Rosehips and acerola naturally have high amounts of vitamin C. These botanicals administered with vitamin C could result in exceeding the tolerable upper limit of 2 g/d for adults.

**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.

## STORAGE

Store in a cool, dry place in original sealed container.