

# Vitamin C1000 Gold

DIETARY SUPPLEMENT



Vitamin C is the best known vitamin by far. Vitamin C is well known for helping to keep the immune system healthy. However, vitamin C also has many other less well-known functions. For example, it is involved in the formation of collagen, which is important for bones. It is also important for the nervous system and for energy metabolism. As an antioxidant, vitamin C helps to protect healthy cells in the body.

Fruit and vegetables are excellent sources of vitamin C. Normally, a varied diet will meet a person's basic vitamin C requirements. However, top athletes place greater demands on their system. Athletes who put their body to the test day in day out can opt to take extra vitamin C.

Vitamin C helps to maintain a healthy immune system during and after training and athletic performance (at least 200 mg of vitamin C per day, in addition to the recommended daily intake of vitamin C). It is therefore important for athletes to pay particular attention to achieving a good vitamin C intake during a strenuous training regime.

Altitude training (involving at least three weeks of training at altitude) is a well-known phenomenon in the sports world. At high altitude, the air pressure and thus the oxygen pressure are lower. In order to deal with this, the body adjusts itself by producing more red blood cells. Vitamin C increases the amount of iron in the blood. During altitude training, it is common practice to take a vitamin C supplement. The reason for doing so is because vitamin C increases the absorption of iron.

## NZVT Certified

Vitamin C1000 Gold is produced in accordance with the anti-doping standards and other standards of the NZVT system (Anti-Doping Authority for the Netherlands) and therefore displays the NZVT logo. Vitamin C1000 Gold can be used by top athletes with confidence, so that they can concentrate on delivering an optimum athletic performance with peace of mind.

## Additional information

This product does not contain any known allergens and is suitable for vegetarians and vegans.

## Recommended use

Take one capsule daily with plenty of water or as otherwise advised.

## Health Claims

- Antioxidant
- Supports the immune system
- Boosts the immune system during and after physical exercise
- 1000 mg of vitamin C per vegetarian capsule
- Boosts energy metabolism

### Composition per daily dose (one capsule)

Ingredient	Quantity	% RI	Compound
Vitamin C	1000 mg	1250%	
RI = Reference intake / * RI not determined			



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The human body is unable to produce vitamin C and is completely dependent upon obtaining it from food. Fruits, vegetables, and potatoes are just some examples of foods rich in vitamin C. Vitamin C is a powerful antioxidant and helps to protect cell and tissue structures in the body from excessive quantities of free radicals (oxidative stress) that are formed as a result of exposure to smoke, alcohol, environmental pollution, sunlight, stress, and also strenuous physical exercise.

In addition to its antioxidative effect, vitamin C also acts as a co-enzyme in the body, which means that it helps other enzymes do their job. For example, vitamin C helps in the formation of collagen and connective tissue, which are needed for the formation of skin, bones, tendons, ligaments, blood vessels, and cartilage.

Vitamin C therefore supports a wide range of processes in the body but it is useful to know that there are also situations in which it is advisable to be cautious with vitamin C. Over the past ten years, various studies have been published which show that an intake of large quantities of antioxidants (one of which is vitamin C) can inhibit training adaptation. It was initially thought beneficial to give vitamin C in combination with training in order to combat the formation of free radicals and to protect cells against oxidative stress. It has since become clear that the formation of free radicals resulting from training is needed to improve aerobic metabolism (production of new mitochondria). High doses of vitamin C or the intake of other antioxidants neutralize these free radicals, which may reduce the effects of training.

Whether or not it would be beneficial to take additional vitamin C depends on the situation. During periods of training, the intake of large doses (more than 1000 mg) must be limited. According to current literature, an intake of 200–250 mg of vitamin C per day through food (around five servings of fruit and vegetables) is enough to achieve tissue saturation, reduce oxidative stress, and keep vitamin C levels in immune cells stable without inhibiting the effect of training (Levine, 1999; Braakhuis, 2012). When the body is exposed to excessive stress, such as when falling ill or during training days, a higher vitamin C intake may be of benefit (Braakhuis, 2012).

## Vitamin C intake in the Netherlands and among athletes

- The Dutch diet includes an average intake of 73–96 mg of vitamin C for men and 82–94 mg for women (Dutch Food consumption survey 2007–2010)
- 12–28% of Dutch adults consume less than 75 mg of vitamin C per day on average (Dutch Food consumption survey 2007–2010)

## Cold environment and vitamin C

- People who do strenuous physical exercise or who exercise in the cold may benefit from additional vitamin C. An intake of 250–1,000 mg has been shown to halve the risk of getting a cold (Hemilä, 1996, 2013, and 2017)
- Furthermore, a systematic review has shown that vitamin C shortens the duration of a cold by 8% on average (3% to 12%) and also reduces its severity (Hemilä, 2013), although this was not always confirmed in later follow-up research involving patients
- The amount of the vitamin C dose seems to be a factor in the extent to which the duration of illness can be reduced. High doses (6,000–8,000 mg/day) show a reduction in the duration of illness but the same cannot be seen with an intake of 3,000–4,000 mg per day (Hemilä, 2017). It is therefore worth testing athletes who catch a cold individually to see how much extra vitamin C has a positive effect
- It is also worth mentioning that vitamin C supplementation does not reduce the risk of a cold among the general population (meta-analysis Hemilä, 2013)



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## Advice on vitamin C when training daily

In persons in good health, the plasma is saturated at a concentration of 70  $\mu\text{mol/L}$  with an intake of 200 mg per day (Levine, 1996). A higher intake is therefore not expected to have any effect in healthy people

Vitamin C supplementation is not recommended in combination with aerobic and strength training. Several studies have shown that the training effect is inhibited with an intake of 1000 mg or more (Gomez-Cabrera 2008; Paulsen, 2014; Merry, 2015)

A daily intake of 200–250 mg of vitamin C, obtained from five servings of fruits and vegetables, is enough to reduce oxidative stress without inhibiting training adaptation (Braakhuis, 2012; Hemilä, 2017)

## Other situations in which vitamin C can be used

- When there is an inadequate intake of vitamin C (for example, due to a strict diet)
- During training camps, altitude training, or other situations in which the body experiences additional stress or oxidative stress
- When there is exposure to harmful substances, such as smog, smoke, and UV radiation. For example, when competitions or tournaments take place in areas with a high level of smog
- With reduced iron values. Vitamin C ensures better absorption of iron (non-haem iron from plant-based sources)
- To aid the healing of wounds and injuries, supplemental vitamin C can be taken for the formation of collagen



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