SPIRULINA – A HEALTHY SOURCE OF NITRIC OXIDE – GREAT FOR WORKOUTS!

Catharine Arnston  
The Naughty Nutritionist™  
www.naughtynutritionist.net  
carnston@naughtynutritionist.net

Disclaimer: The information contained here is for educational purposes only and is not recommended as a means of diagnosing or treating an illness. All matters concerning physical and mental health should be supervised by a health practitioner knowledgeable in treating that particular condition. Neither Catharine Arnston nor The Naughty Nutritionist™ or anyone employed or associated with The Naughty Nutritionist™ directly or indirectly dispense medical advice, nor do they prescribe any remedies or assume any responsibility for those who choose to treat themselves.

WHAT IS NITRIC OXIDE AND WHY IS IT IMPORTANT?

The merits of Nitric Oxide supplements have only recently come to the attention of the athletic community. What follows is a comprehensive guide to one of the most important molecules known to professional athletes and now you!

What Is Nitric Oxide?

Nitric Oxide is a compound made up of one nitrogen atom and one oxygen atom. In order for the body to create Nitric Oxide, it must do so with the help of arginine (an amino acid) and a family of enzymes called Nitric Oxide synthase (NOS). When arginine and a NOS enzyme come in contact with each other, the reaction produces Nitric Oxide along with citrulline (another amino acid).
What Does Nitric Oxide Do?

Nitric Oxide travels freely from cell to cell in your body directing and ordering a wide variety of functions within the body. Depending on the situation, Nitric Oxide can act as an intracellular messenger, a hormone, or a neurotransmitter. However, for the purpose of athletes, we'll focus on the role of Nitric Oxide as an intracellular messenger regulating one of the body's most important processes--blood flow.

How Does Nitric Oxide Work?

Nitric Oxide is produced within the flat endothelial cells that line the inside of blood vessels. When the endothelial cell is stimulated--such as when the muscle contracts--it synthesizes and releases Nitric Oxide. Once released, Nitric Oxide diffuses across the endothelial cell membrane into the adjacent smooth muscle tissue of the blood vessels, causing them to relax and widen (a process called vasodilation). The result is an increase in blood flow to the stimulated area, which ultimately causes your muscles to get pumped and stay that way for around 40 minutes after training.

So why do your muscles get stronger when you work out? Well, basically, blood, which is the body's primary transport medium, carries all the vital nutrients (e.g., amino acid, creatine, glucose, and oxygen) to the muscle, which are required for energy production, growth, and maintenance. Working out causes more of this to occur! Additionally, blood carries away the byproducts of metabolism (e.g., carbon dioxide and lactic acid) that fatigue the muscle and inhibit performance. Increasing blood flow to the muscle enhances growth, strength development, and recuperation. It's really that simple.

AND Spirulina has been shown to cause improvements in vascular tone by increasing the synthesis and release of nitric oxide...which is what helps your muscles get MORE blood, oxygen & nutrients brought to them so you get stronger and recover more quickly!

MORE BENEFITS OF SPIRULINA

Mental exercise exhausts RNA from the brain, and spirulina is an excellent source for RNA. To prove this..try this experiment:

Get someone to stand in front of you and touches the bridge of your nose with one hand, and then do a muscle test with their other arm (where you have extended your arm straight out to the side and the person in front of you tries to push it down. If your arm tests weak (and they can push it down), you have an RNA deficiency. So, now, take some spirulina (3-4 grams or powder). Wait 15 -20 minutes and do the test again. I bet they will not be able to push your arm down THIS time!

Bottom line...if you are tired or mentally drained, taking spirulina can make a big difference, quickly. Unlike caffeine, it is helping your body by providing nutrients etc., not just acting like a drug to drain your adrenals.

Key Features of Spirulina are:

• 3 g supplies the nutritional equivalent of TWO servings of fresh vegetables!
• Rich in antioxidants
• Boosts energy and cellular health
• Over 60% vegetable protein.
• High in B-12
• Vitamins A, K, B1, B2, B3
• Rich in Minerals including calcium, iron, magnesium, manganese, copper, chromium, potassium and more
• Essential Fatty Acids especially GLA, ALA
• Phytonutrients including Phycocyanin (420 mg), Polysaccharides (200 mg), Sulfolipids (40 mg), SOD (5000 Units),
• Chlorophyll (30 mg),
• Lutein (1.5 mg)

But what makes Spirulina special is the SYNERGY of these ingredients

It is suggested that as well as taking Spirulina as part of your regular diet, that you have tablets on hand at all times. If you get tired, can't think clearly or have sugar cravings, take 6-12 and see what happens!

Spirulina Research and Studies

While Spirulina research conducted over the years has clearly shown its multi-faceted health promoting effects, the two latest studies in the areas of immunomodulation and cancer protection tell the big story.

1. 

Spirulina's stimulates and maintains the immune system.

*Spirulina's most powerful health benefits lie in its ability to stimulate and maintain immune system activity.* The results of the Mao, Van De Water and Gershwin study, published in the Journal of Medicinal Food (2000), and conducted at the university of California at Davis School of Medicine, provide continued understanding and proof of the awesome power of Spirulina. The study, performed on Spirulina grown by Earthrise Nutritionals, demonstrated that Spirulina was able to raise the levels of three cytokines (specialized proteins produced by immune system lymphocytes) particularly one form of interferon (IFN)-y, to 13.6 times basal levels, and two forms of interleukins, (IL)-1 beta to 3.3 times basal levels, and IL-4, to 2.0 times basal levels. This evidence is highly convincing in terms of expanding Spirulina research and it's use in food. Earlier, the results of the Baojiang study, given at the Second Asia-Pacific Conference on Algal Biotechnology, 1994, concluded that polysaccharides of Spirulina platensis, at the dosage of 150-300 mg/kg by injection or taken orally, can increase the percentage of T-lymphocyte in the blood. The results demonstrate that Spirulina polysaccharides can improve cellular and humoral immunity.

2. 

Spirulina Prevents Cancer

*At the 30th Annual Meeting of the Japanese Society for Immunology in November 2000, breakthrough research was reported by the Osaka Institute of Public Health. Spirulina, in conjunction with BCG-CWS, a cell wall component derived from Tubercle bacillus; was able to enhance the anti-tumor propagation effect of BCG-CWS. This inhibitory effect occurred because Spirulina upregulated the tumor destroying activity of natural killer (NK) cells and the cytokine interferon gamma. This heightened activity was observed 1-2 weeks after initiating Spirulina use, continuing 12-24 weeks after treatment ceased. Researchers believe that the clinical findings support the serious potential for Spirulina as an Immunotherapy agent. Mishima and colleagues reported in Clinical & Experimental Metastasis, 1998, that Ca-SP, calcium spirulan isolated from Spirulina platensis, could reduce the lung metastasis of B16-BL6 melanoma cells by inhibiting the tumor invasion of basement membrane probably through the prevention of the adhesion and migration of tumor cells.*
3. **Spirulina Is a Powerful Antioxidant**

As a food additive, *Spirulina maxima* contains beta-carotene, tocopherols and phenolic acids, which are proven to exhibit antioxidant properties. The antioxidant activity of Spirulina can be attributed to phycocyanin, the blue pigment found in blue-green algae that contains phytochemicals with scavenging properties. The Miranda study (1998), published in the Brazilian Journal of Medical and Biological Research, demonstrated a 71% antioxidant capacity for the group taking the Spirulina extract and 54% for the group that did not, indicating strong antioxidant protection. The results obtained indicate that Spirulina provides some antioxidant protection for both in vitro and in vivo systems. The Romay study demonstrated that phycocyanin is able to scavenge the very dangerous hydroxy radical and inhibit the oxidation of lipids in the liver.

4. **Spirulina protects against Heart Disease**

At the Avinashilingam Institute for Home Science, Deemed University in Coimbatore, India, Ramamoorthy and colleagues tested the effects of Spirulina on patients with a combination of high cholesterol (above 250 mg/dl) and ischemic heart disease. They concluded that Spirulina plays a key role, lowering blood cholesterol levels and improving lipid profiles. Spirulina's cell wall is unique too. It is made up of mucopolysaccharides that provide numerous health benefits. Of special interest is the ability of these mucopolysaccharides to lower blood fats. This was also brought to light in a 1976 study showing that Spirulina controlled the tendency and ability of cholesterol and other lipoproteins to bond with arterial receptors and attach to artery walls.

5. **Spirulina Lowers Blood Pressure**

Research studies show that Spirulina was able to cause a significant change in vascular tone by increasing the synthesis and release of nitric oxide and by decreasing the synthesis and release of a vasoconstricting substance from the endothelial cells.

6. **Spirulina Is Anti-Viral**

A 1998 study conducted at the Dana-Farber Cancer Institute at Harvard Medical School has also given us some positive news. Using an aqueous extract of Spirulina, researchers were able to inhibit the replication of the HIV-1 virus in human T-cells of the immune system, mononuclear blood cells and Langerhans cells of the pancreas. While this was a test-tube study, it tends to confirm what is seen in animals fed Spirulina or Spirulina extracts. A 1993 issue of Phytotherapy Research reported scientists feeding Spirulina extract to hamsters infected with a lethal form of Herpes Simplex Virus. Hamsters had prolonged survival times and increased survival rates when fed Spirulina extract before infection.

**Recommended Doses of Spirulina**

While no official guidelines for recommended daily intake have been established at this time, many experts suggest 3 grams per day as a preventive, healthy dose, ideally taken with food in servings of powder, capsules or tablets.

For therapeutic use, 10,000 mg and even 20,000 mg per day is indicated. Spirulina is available in forms that are convenient to take, easy to digest, have no saturated fat, and have not been treated with nor contain chemicals or pesticides. Spirulina is a nutritional wonder food.
A Colorful Conclusion

While many dietary supplements and foods regularly become trendy and suddenly show up in the market with a big bang, they frequently become short lived, trendy items without strong science behind them.

On the other hand, spirulina (and its sister algae – chlorella) is one of earth’s most ancient foods – and has been used/lived over 500 million years! It is finally emerging and being recognized as one of the world’s nutritional wonders. Spirulina and Chlorella together hold the power to nourish, protect and heal the body and extend one’s lifespan. Because the research on Spirulina is extensive, thorough and very convincing, we believe it will be a superfood for years to come.

Be sure to get some spirulina and chlorella into your diet as soon as possible! Your body will thank you!!!