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## Spirulina as dietary supplement in chronic disease

**Dr. Seema and Sonia**

### Abstract

Due to highly unusual nutritional profile, this super food, Spirulina has emerged as a great diet potential. It is widely used as a food supplement for all age groups. It provides new hope to feed millions of undernourished people and promises several health benefits for those who consume it. Many people use Spirulina for more energy, nutritional insurance, weight control and leansing. This is a natural green energy which is good for everyone. Apart from its use as a food supplement in ameliorating nutritional deficiencies. Spirulina is gaining more attention from medical scientists as a nutraceutical and a source of potential pharmaceuticals. Spirulina or Arthrospira is blue-green alga that became famous after it was successfully used by NASA as a dietary supplement for astronauts on space missions. It has the ability to modulate immune functions and exhibits anti-inflammatory properties by inhibiting the release of histamine by mast cells.

**Keywords:** Spirulina, dietary supplement and chronic disease

### Introduction

According to world health organization (WHO), Spirulina is an interesting food, rich in iron and protein which can be administered to children without risk. WHO also declared it as the best food for future. Spirulina (Arthrospira), a filamentous unicellular alga is a cyan bacterium grown in certain countries as food for human and animal consumption. This alga is a rich source of proteins, vitamins, amino acids, minerals and other nutrients. Its main use, therefore, is a food supplement. Over the last few years, however, it has been found to have many additional pharmacological properties. Thus, it has been experimentally proven, in vivo and in vitro that it is effective to treat certain chronic diseases. Several of these activities are attributed to spirulina itself or to some of its components including fatty acid; omega-3 and omega-6, alpha-tocopherol, beta-carotene, phycocyanin, phenol compounds and a recently isolated complex, Ca-spirulina (Ca-Sp).

### What does Spirulina contain?

With over 100 nutrients, Spirulina is often described as the most complete food source in the world. The American National Aeronautical and Space Agency includes it in their astronauts diet and plans to grow Spirulina in it's space station. It's easy to see why.

Japan has some good examples of some Japanese seniors who have only relied on Spirulina and water for more than 20 years showing how good is Spirulina for the human body.

### How should Spirulina be stored?

High temperature, moisture or pollution will reduce the beneficial effects of Spirulina.

1. Buy and keep not more than 6 months worth.
2. After opening the packet should be used within three months.
3. After usage, ensure you reseal the packing as soon as possible.
4. Keep the product away from any possible heat source.
5. Keep the product away from sun or any exposure to strong light.

### Who should take Spirulina?

1. Children who don't like or get enough vegetables and or have an imbalanced food intake.
2. Teenagers during their rapid growing period need a sufficient injection of nutrients. Spirulina is ideal for this.
3. Pregnant ladies who need extra nutrients.
4. Seniors who have difficulty in having reasonable average 3 meals per day.
5. Sport lovers or athletics who need extra nutrients to keep their energy levels up.

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6. Modern busy people who don't have the time to eat good meals.
7. Patients or people who need high volumes of nutrients to assist recovery (please consult your doctor)
8. Vegetarians who require extra nutrient sources

### **How much Spirulina should be taken?**

We suggest 10~ 20 tablets a day for adults, 6~ 10 tablets for children under 12 years old. If you have special requirements for extra nutrients, please consult your chemist or your health practitioner.

### **How should Spirulina be taken?**

1. Take only with cold or warm water, (not juice, soft drinks, coffee or tea)
2. After taking Spirulina, avoid alcohol, soft drinks or coffee for 30 minutes as these drinks can destroy some of the Spirulina nutrients and enzymes
3. Take at least an extra half litre of water a day
4. It doesn't matter if you take it once a day or twice a day, so long as you take enough for a day.

Recommend dosage for adults is 10 ~ 20 tablets a day, children under 12 should take 5 ~10 tablets a day.

### **Spirulina Vegetable protein vs animal protein**

Spirulina contains more than 60% vegetable protein, which is much higher than fish, pork, or beef (which contains about 15 ~20 %). Animal protein is a much bigger molecule than vegetable protein, and is much harder to for our system to digest.

Most modern people overindulge in animal protein, by eating fish, beef, pork etc. When too much animal protein is eaten, it is deposited in our body as fat. Too much fat will cause high cholesterol levels and may impact our heart and blood vessels. Vegetable protein is water soluble, and is much smaller than animal protein. If you eat too much vegetable protein, it is simply discharged by your system as waste and not stored as fat. Animal protein is a much bigger molecule than vegetable protein, and is much harder to for our system to digest.

### **Spirulina helpful in chronic diseases**

#### **Prevent cardio-vascular diseases**

Spirulina is very rich in chlorophyll, serine, sylvite and Vitamin B6 which help synthesize sinkaline, lower blood pressure, decrease blood glutinousness, and maintain softness of blood vessels. GLA in spirulina can reduce cholesterol content in the blood so as to prevent heart disease and stroke. Scientists around the world have been confirming spirulina's cholesterol lowering benefits and its ability to lower blood pressure. Studies with men in Japan and India showed that several grams of spirulina daily can reduce serum LDL and raise HDL. Human studies in Germany and India found a weight reduction effect along with cholesterol reduction.

#### **Kidney disease**

Many heavy metals and drugs impose harm on kidney. Spirulina has 10 times more chlorophyll than ordinary vegetables. Chlorophyll can cleanse blood by exporting waste, neutralizing the toxins produced by heavy metals and drugs.

#### **Diabetes**

Spirulina is an ideal nutritional food for diabetes patients

because of its high content of protein and vitamins and low content of carbohydrate. Furthermore, GLA, zinc and magnesium in spirulina can promote the synthesization of natural insulin. Type 2 diabetes is an epidemic in the Western world today. It is really a cluster of related pathologies, including insulin resistance, obesity, dyslipidemia and hypertension. Spirulina has been shown to benefit diabetics in the following ways:

- Reducing systemic inflammation. (Insulin resistance has come to be associated with a state of systemic low-grade inflammation.)
- Improving vasodilation in those who are obese as a result of high fructose diets (which has benefits for diabetics, as well as for those with hypertension and cardiovascular disease).

Diabetic patients given 2 grams per day of spirulina showed improved glycosylated hemoglobin and better lipid profiles

### **Spirulina's increased antioxidant protection reduces cancer risks**

The free radical molecules generated by pollution, poor diet choices, stress and injury damage the cells of our bodies. Antioxidant nutrients fight these free radicals and stimulate our immune system to guard against cancer and other diseases. They also modulate the aging process. Spirulina contains a wealth of antioxidant vitamins C and E, and beta carotene, as well as the antioxidant minerals selenium, manganese, zinc, copper, iron and chromium. Research has shown spirulina to protect vitamin C from potency loss.

The Ecotoxicology and Environmental safety Journal, April 2008 report a study finding that spirulina plays a role in reducing the toxic effect of cadmium, through its antioxidant properties that seem to mediate a protective effect.

Another studies in phytotherapy Research finds that spirulina preparations were useful for reducing oxidative stress and the generation of free radicals in the course of inflammatory processes. Food chemical toxicology, recently reports a study finding that spirulina provides protection against mercuric chloride induced oxidative stress.

### **Spirulina and Your Liver**

The accumulation of fats in your liver is closely associated with metabolic syndrome and strongly raises the risk of death from cardiovascular disease. Non-alcoholic fatty liver disease (NAFLD) is the most common cause of chronic liver disease in North America and notoriously difficult to treat, at least with traditional medical measures.

Studies show that spirulina does the following for your liver:

- Prevents the buildup of triglycerides in liver
- Inhibits lipid per oxidation
- Reduces liver inflammation

Protects liver from damage by heavy metals, like lead and mercury

### **Spirulina and Brain**

The third leading cause of death in India as well as in other countries is stroke. Diets high in antioxidants have been shown to lower risk for stroke. In another study, three antioxidant-rich diets (blueberries, spinach, and spirulina) were compared for their neuroprotective effects. Spirulina was found to have the highest neuroprotective effect, possibly due to its ability to squelch free radicals and reduce

inflammation.

Two studies (one in the Journal of Agricultural and Food Chemistry, the other in the British Journal of Nutrition) showed that Spirulina reduces platelet aggregation, which plays an important role in vascular diseases by reducing risk for thromboembolism.

### **Conclusion**

Spirulina is considered as a nutrient power house because it has a unique blend of nutrients that no single plant source can provide. It has high protein concentration including all the eight essential amino acids in balanced proportion. It has high level of beta carotene, vitamin E, iron and is richest source of vitamin B12 and also has been experimentally proven that it is effective to treat certain chronic diseases i.e cardio vascular diseases, diabetes, cancer, kidney diseases and brain stroke.

Due to high nutritional profile, this super food Spirulina has emerged a great diet potential and widely used a supplements for all age groups. It provide new hopes to feed millions of undernourished people and useful for reducing stress. Spirulina protects liver from damage by heavy metals like lead & mercury. It also reduces platelets aggregation, which reduces risk for thromboembolism. Daily intake of Spirulina can reduce serum LDL and raise HDL and reduce cholesterol.

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