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Editorial

# *Spirulina:* An Overview with Health Benefits and Side Effects

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## EDITORIAL

*Spirulina* is symbiotic, multicellular, and filamentous blue-green microalgae with symbiotic bacteria that fix nitrogen from air, that can be consumed by humans and animals. It has three species are *Arthrospira platensis, A. fusiformis,* and *A. maxima. Arthrospira* is used as a dietary supplement, also used as a feed supplement in the aquaculture, aquarium, and poultry industries. It is visible by the arrangement of the multicellular cylindrical trichomes in an open left-hand helix along the entire length. The trichomes have a length of 50-500 μm and a width of 3-4 μm. The body surface of *Spirulina* is smooth and without covering, so it easily edible by simple enzymatic systems.

*Spirulina* has a long history of use as a non-toxic effective food. It is already a very common and dietary supplement. It is commercially produced in large outdoor ponds under controlled conditions. Likely health benefits of *Spirulina* are primarily due to its chemical composition, which contains carbohydrates, proteins, vitamins, minerals (calcium, iron, magnesium, manganese, potassium, zinc and selenium), and essential fatty acids, essential amino acids, and pigments. It lacks cellulose cell walls and therefore it can be easily consumed. In this respect, three major bioactive constituents of *Spirulina*, the protein γ-linolenic acid, phycocyanin, and sulfated polysaccharides seem to play substantial roles in imparting improved human body functions. Moreover, experimental evidence supports the immunomodulation and anti-viral effects of *Spirulina* supplementation. Furthermore, the available clinical evidence does not indicate a serious risk to health or other public health concerns due to *Spirulina*.

*Spirulina* is a potent source of nutrients. It also contains a powerful plant-based protein called phycocyanin. Research illustrate this may have pain-relief, anti-oxidant, brain-protective, and anti-inflammatory properties. Many anti-oxidants in *Spirulina* have anti-inflammatory effects in the body. *Spirulina* capsules and pills, there are also blocks, pastries, and containing chocolate bars, marketed as health food. Additionally *Spirulina* products are formulated for weight loss and as an aid for quitting drug-addictions.

### Benefits of *Spirulina*

External use of *Spirulina* can speed up hair growth. Moreover consumption, this algae is used as a component in shampoos and conditioning treatments. It also helps in hair re-growth.

The bioactive potential of *Spirulina* is still being evaluated in pre-clinical studies using animal models. On the other hand, these studies seem to indicate *Spirulina*'s strong anti-oxidant, anti-cancer, and anti-viral properties as well as its capacity to fight diabetes, obesity, and inflammatory allergic responses. It also shows great benefit in Hypercholesterolemia, hyperglycemia, cardiovascular disease, and cancer treatments using nutraceuticals.

*Spirulina* is additionally used to prepare food with alternative ingredients. For example, nutritious blocks, stylish noodles, instant noodles, cookies and beverages.

*Spirulina* is one of the extraordinary quality natural feed additives that can be used in animal and poultry nutrition.

It has the capability to strengthen the immune system, release anxiety and help the body to cleanse. Thus, *Spirulina* effectively release IBS by detoxifying the intestine and stop constipation.

### Side effects

Although few adverse effects are associated with the use of *Spirulina*. Upset stomach, feeling a bit sick, hiccups, hypersensitivity, and mild diarrhoea. Nausea and constipation could come from gastric over acidity and poor digestion. It is advisable in these cases to yield *Spirulina* solely in the morning.

Increased charge of health care has become a driving force in the shift towards interest in wellness, self-care, and alternative medicine, and a greater recognition between diet and health care. The NIH says there is not enough scientific evidence to determine if *Spirulina* is effective in treating any health conditions. However, *Spirulina* is rich in nutrients, some of which aren't found within the average daily vitamin.

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