



ISSN: 2277- 7695
TPI 2016; 5(4): 07-09
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www.thepharmajournal.com
Received: 11-02-2016
Accepted: 13-03-2016

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Spirulina as dietary supplement for health: A pilot study

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Abstract

Due to its 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 cleansing. 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 a 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, health

Introduction

Spirulina, now named Arthrospira is a photosynthetic, filamentous, spiral- shaped, multicellular blue green micro alga that grows naturally in the alkaline water. Spirulina means “little spiral”. Cultivation of Spirulina is gaining both national and global attention for its high protein content (65-70%) and value added biochemical constituents.

As one of the oldest living plants on the planet, Spirulina is now becoming a health food worldwide. The World Food Conference of United Nations declared Spirulina as “The Best for Tomorrow” and is gaining popularity in recent years as a food supplement

Spirulina is considered as Nutrient-powerhouse because it has a unique blend of nutrients that no single plant source can provide. Today, Spirulina is consumed by health conscious people all over the world. If you are moving away from empty processed food and chemical vitamins to natural foods, start using Spirulina, nature's longest living food.

Spirulina-The healthiest food and clean green energy for everyone

Many essential nutrients recommended by experts to help protect our bodies are concentrated in Spirulina. It contains the most powerful combination of nutrients ever known in any grain, herb or food. Many people use Spirulina in their own self-care strategy for more energy, nutritional insurance, weight control and cleansing. Perfect in between or before meals for good nutrition without the heaviness of bulky food. Athletes discover more endurance and strength. Seniors find better nutrient absorption. Ideal and safe for children, pregnant and nursing mothers.

Spirulina- As vitality

The experience of long time consumers and the scientific evidence suggest that 3 to 10 grams a day will provide significant health benefits. Daily use is most beneficial. Tablets are convenient anytime, between, before, or with meals. Many enjoy mixing Spirulina powder in a green fruit juice smoothie as an instant breakfast, or a vegetable juice smoothie in the afternoon.

Health benefits of Spirulina

Developed healthy babies

Ordinary food lacks lysine, threonine and methionine which are found high content in Spirulina. Spirulina helps develop healthy babies, and is especially helpful to those

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Not mother-milk-feeding babies. Sufficient trace minerals prevent babies from deficiency of iron, calcium, and zinc. Spirulina is the highest source of Vitamin B and B complex which makes it a super nutritional supplement for the monophagia children.

Maintain high energy for the adults

Vitamin B12 in Spirulina is three times more than that of in animal's liver. Vitamin B is essential for healthy nerves. Science study shows that Spirulina is two times stronger in anti-anoxia and fatigue than ginseng.

Table 1: Nutritional composition of Spirulina

A. general composition			
Protein	63%	Carbohydrates	21%
Minerals	9%	Fat	7%
B. Essential fatty Acids			
(1.6g)	20.63 mg	Gamma linolenic	18.75 mg
C. Essential amino acids			
Leucine	8.2%	Phenylalanine	4.4%
Valine	6.2%	Lysine	4.4%
Isoleucine	5.4%	Methionine	2.2%
Threonine	4.7%	Tryptophan	1.4%
D. Non-essential amino acids			
Glutamic acid	14.1%	Serine	4.4%
Aspartic acid	12.1%	Proline	4.1%
Arginine	7.9%	Tyrosine	4.0%
Alanine	7.7%	Histidine	2.5%
Glycine	5.3%	Cystine	0.9%
E. Vitamins (1.6g)			
Beta-carotene	5.63mg	Pantothenic acid	7.5mcg
B-6	8.25mg	Inositol	1.25mcg
B-12	4.13mg	Biotin	0.61mcg
Thiamin	63.75mg	Folic acid	0.56mcg
Riboflavin	61.88mg	Vitamin E	28.13mcg
F. Minerals (1.6g)			
Potassium	2.83mg	Iron	2.0mg
Phosphorus	19.5mg	Manganese	48.75mcg
Sodium	13.69mg	Boron	18.75mcg
Magnesium	9.0mg	Copper	1.88mcg
Calcium	7.5mg	Zinc	22.5mcg
G. Pigments (1.6g)			
Phycocyanin	208.13mg	Carotenoids	7.5mg
Chlorophyll	14.82mg		

Help to delay senility for the elderly

Spirulina has multiple anti-aging substances: beta carotene, Vitamin E, GLA (Gamma linolenic acid), superoxide dismutase (SOD), etc. On the one hand, these substances via anti-oxidant effectively prevent human cells from aging by removing free radicals. One the other hand, these substances helps prevent people from gonad degeneration, hyperlipemia, and arteriosclerosis so that senility is slowed down.

Enhance human immune system

Polysaccharide in Spirulina is a natural broad spectrum booster for human immune system. It enhances human immune system by improving the productivity of marrow cells, functions of thymus and spleen, facilitating the synthesization of serum protein. Phycocyanin and allophycocyanin make great contribution to human immune system improvement by increasing white blood cells in human body.

Restrain malignant tumors

Cancer stems from damaged cells by increasing free radicals in the body. Beta carotene is the active substance capable to effectively restrain free radicals, and it is the main resource for Vitamin A as well. Spirulina beta carotene is ten times more concentrated than carrots. It is widely recognized in the medical science world that Spirulina polysaccharide and phycocyanin have positive effects on cancer and tumor treatment. Clinical studies show Spirulina has a 54% of

restraint rate upon ascetic type of hepatitis cancer cells. Spirulina also has notable effect in recovering organ damages caused by chemical and radiation treatment.

Cure hepatitis diseases

Spirulina provides patients with high content of protein and vitamins so as to improve symptoms. GLA in Spirulina is protective to human liver.

Prevent cardio-vascular diseases

Spirulina is very rich in chlorophyll, serine, Sylvie and Vitamin B6 which help synthesize syncline, 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.

Vision care

According to the study by Orient Medical Science University of Japan, diet therapy with Spirulina has an 80% of effective rate on 480 cases of senile cataracts, diabetic retinopathies, and hypertensive retinopathies.

Effective in curing of Gastrosis and enteritis

Many people suffer from excessive gastric acid which could cause gastrosis and gastric ulcer. Spirulina is calescent food and chlorophyll, beta carotene and rich protein in Spirulina are very effective to rebuild and regenerate epithelium of

alimentary tract. Spirulina has particular effect on precancerous atrophic gastritis.

Prevent Anemia

Spirulina iron is 45 times more concentrated than spinach. Iron is an anti-anemia element which provides oxygen to cells and which has the features of anti-oxidation, anti-inflaming and anti-aging.

Prevent 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.

Rheumatism

GLA in Spirulina is very helpful to improve rheumatoid condition.

Dysmenorrhea

GLA in Spirulina can improve premenstrual symptom complex, such as headache, anxiety, oppression, etc.

Skin care

GLA in Spirulina can improve allergic dermatitis condition. High content of beta carotene and superoxide dismutase (SOD) is very important to maintain skin resiliency and remove skin color spots. Spirulina is added to world known cosmetic products made in France.

Helps to lose weight

Spirulina contains a substance named phonylanine which helps Spirulina takers satisfy appetite so that they eat less. The perfect combination of high content of protein, low fat and low sugar provides human body with sufficient nutrition. Spirulina can not only relieve hunger but also adjust incretion disorder. So it helps people lost weight while keep them energetic at the same time.

Nutritional food for Diabetics

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.

Spirulina promotes lower blood pressure and LDL cholesterol

Studies with men in Japan and India showed that several grams of Spirulina daily can reduce serum LDL and improve the cholesterol ratio. Human studies in Germany and India found a weight reduction effect from Spirulina along with the cholesterol normalizing effects.

In a 2007 study reported in *Lipids Health Digest*, 36 human subjects ingested 4.5 grams of Spirulina daily for six weeks without making any other modifications in their diets or lifestyles during the course of the study. After the six week period, total cholesterol concentrations and levels of body fat were lowered. Systolic and diastolic blood pressure was reduced.

Healthy digestive tract

Spirulina provides a tremendous boost to digestive functioning. When it is added to the diet, an improvement in

regularity and elimination is almost immediate. Spirulina suppresses bacteria like e-coli, and stimulates beneficial flora to assure protection against infection and maximum nutrition from food that is eaten.

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. It contains nucleic acids in addition to high level of micronutrients viz. Potassium, sodium and Zinc.

Due to high 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. Now the Spirulina is gaining more attention from medical scientists as a nutraceutical and hence a source of potential pharmaceutical.

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