



PRODUCT DOCUMENTATION

CHLORELLA



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Text of the leaflet

Chlorella is a bioinformation product manufactured and packaged under the tightest ecological conditions (guaranteed biological quality). This, apart from other, guarantees also the naturally high nutritious value of the product. Chlorella pressed tablets contain the fresh-water *Chlorella pyrenoidosa* alga, which is a rich source of a whole range of biologically bound vitamins, mineral substances, amino acids, fibre, and chlorophyll. It stimulates the immune system, improves bowel function, protects cells from the effects of free radicals, and enhances body detoxification. It influences cell regeneration and wound healing, improves resistance to stress and reduces body odours.

Chlorella influences, in particular, the meridians of the stomach, spleen, colon, liver, gall bladder, pericardium, and the meridian of the three energizers.

Chlorella pyrenoidosa:

- cleanses the digestive tract, particularly the colon, helps to develop useful intestinal microflora, improves the intestinal function and the peristaltic activity of the intestines;
- helps combat chronic constipation;
- stomach inflammation and peptic ulcerations; Crohn's disease affecting the small intestine; ulcerative colitis affecting the large intestine;
- enhances natural immunity of the body;
- its essential component – chlorophyll – exhibits antibacterial, antiviral and antimycotic activity;
- due to its high content of the amino acid lysine it helps combat cold sores;
- eliminates toxins, heavy metals and chemicals from

- the body;
- has positive effects upon haematopoiesis and the activity of both red and white blood cells;
- exhibits outstanding effects on tissue regeneration and support of cell division and growth;
- due to its alkaline effects it reduces the acidity of the internal environment;
- reduces cholesterol levels, stabilises blood sugar levels;
- cleanses blood, hence having a pronounced protective effect on both the kidneys and liver;
- neutralises free radicals and decelerates the ageing of the organism;
- due to its high content of nucleic acids (RNA 10% and DNA 3%) it provides rejuvenating effects;
- enhances the overall regeneration of the organism;
- improves the quality and health of the skin;
- is a source of all important vitamins, mineral substances and amino acids, incl. essential ones;
- contains high amounts of CGF (Chlorella growth factor), which is considered to be the most effective component of Chlorella in replenishing the energy potential of the organism.

The use of Chlorella:

Due to its high content of naturally valuable nutritious substances, Chlorella is a suitable everyday dietary supplement for healthy lifestyle. Its use is ideal in any weight-reduction diet or for vegetarians. It helps to build good dietary habits in children.

It may facilitate the treatment of acne, rashes, inflammations, eczemas, but also when nursing any

poorly healing surface wound or damage (such as scalding, acid, alkali and general burns, etc.).

It enhances regeneration and convalescence of an organism exposed to long-term stress or strain. Its use is suitable after surgeries or any irradiation. Chlorella helps to detoxify the body, and is ideal for persons exposed to polluted environment in the long term. It prevents the multiplication of various microbes and fungi, and acts preventively against the development of cancer. Long-term use of Chlorella, furthermore, improves mental health in general.

Dosage:

2 tablets 1–3 times a day.

After three weeks of application it is recommended to discontinue the product for one week.

Do not exceed the recommended daily dose.

When taking this product it is necessary to ensure an adequate intake of fluids.

Warning:

The product is not intended for persons with chlorophyll hypersensitivity.

Not intended for children!

Dietary supplements are not intended to substitute varied diet.

Store out of reach of children!

Store at 10–25 °C in a dry and dark place.

Introduction to the topic

Green food

Recently, green food has been gaining growing popularity, which is not surprising at all, as most of the food that gets onto our tables is, to a certain degree, chemically treated or has been handled in production or processing in a way drastically reducing the contents of nutrients and biologically active substances. For example, due to acid rains precious mineral substances are washed away from the soil, and hence they cannot then be naturally integrated into the tissues of the concerned crop plants. Moreover, all heat-processed products contain a significantly lower amount of vitamins and minerals which easily succumb to oxidation under higher temperatures, and thus deteriorate in quality. Our plates then basically hold mere shadows of the original food.

Our organism is constantly exposed to a number of undesirable influences and it is known that the morbidity of the world's population keeps increasing, despite the ever growing costs of health care. It is because the human body has much difficulty to cope with the sudden changes of the environment. Man, used to live in a close contact with the nature for thousands of years, has been, in the past 100 years (in a mere fragment of its existence), thrown into an environment full of synthetic chemical substances, polluted air, toxins in food, and stress. It is understandable that life in such conditions poses an excessive burden on the immune system; toxic substances accumulate in the body, and the human organism then easily succumbs to various diseases. And this is the very sphere where

alternative therapeutic methods availing of purely natural substances which detoxify and regenerate the organism, restore energy and vitality in man come into play. One of the most important groups of natural substances which have the ability to constantly and effectively improve the balance to benefit the human health is the green food. The category of green food includes such vegetable products which are prudently obtained from organically grown plants at the initial stage of their development. For this reason green food which includes algae and young sprouts offers a naturally high content of vital substances together with the biological information about growth and survival.

Guaranteed biological quality of the Chlorella product

This product has been processed in compliance with the tight principles of organic agriculture and complies with the conditions governing organic "BIO" labelling. The main component – *Chlorella pyrenoidosa* – comes from a well-known Taiwanese supplier, the biggest exporter to the most demanding Japanese market, and a holder of the ISO 9001 quality management certificate.

"The organic "BIO" labelling is associated, in particular, with environmentally friendly agriculture, natural animal breeding, and high quality of natural food. People who buy organic food express their responsibility towards their health as well as towards nature, the life of animals, and the balance in the ecosystem."

Quoted from the Organic Cookery Book by Hanka Zemanová.

Chlorella composition

Product form: pressed tablets

Tablet weight: 500 mg

Pack size: 200 tablets

Active substances

Ingredient	Content in a single tablet
Chlorella pyrenoidosa	495mg

Excipients:

Silicon dioxide, magnesium stearate

Recommended dosage

The product may be used any time during the day, ideally with meals. Tablets may be crushed or swallowed whole. It is possible to use them to enrich any usual meal the temperature of which, however, does not exceed 60°C in order to avoid potential destruction of substances of high nutritional value.

Recommended daily dose: 2 tablets 1–3 times a day. After three weeks of application it is recommended to discontinue the product for one week. Do not exceed the recommended daily dose. When taking this product it is necessary to ensure an adequate intake of fluids.

Warning:

The product is not intended for persons with chlorophyll hypersensitivity. Not intended for children. Dietary supplements are not intended to substitute varied diet. Store out of reach of children!

Storage method

Do not expose the product to excessive heat or cold, store at a dark, dry place. Ideal storage temperature is 10–25°C.

Description of effects exhibited by Chlorella

CHLORELLA PYRENOIDOSA

Chlorella pyrenoidosa is a microscopic emerald-green freshwater alga, the shape and size of which are similar to those of a red blood cell. Its entire body is formed by a single spherical cell, 3–8µm in diameter. The alga was detected under microscope as late as in 1890. Its size is reflected also in its name which in translation means “small and green”. Chlorella is likely to be one of the oldest organisms living on the planet Earth. Its age is estimated to be some 2.5–3 billion years and it is possible that it was this very alga which developed the useful photosynthetic mechanism without which life could hardly exist. The reason why this alga has survived such an unbelievable period of time without any change may be found in its extraordinary genetic stability and effective DNA error-correcting mechanism.

Due to the high content of valuable nutrients chlorella may be considered fully-fledged food, and for this reason it is often called a “concentrated vegetable”. As its multiplication rate is very high, it is often considered to be the ideal prospective food for cosmonauts. The potential for its culturing in zero gravity conditions has been subject to investigations for some time.

Chlorella effectively works in **cleaning the gastrointestinal tract**, the colon in particular, and supports the development of useful intestinal microflora, **thus enhancing the natural immunity of the body**. It is involved in the **detoxifying process of the organism** as it is capable of eliminating toxins, heavy metals and harmful chemicals received with

food and air from the body. Its detoxifying effects are assumed to be based both on the content of chlorophyll in the alga and on the composition of its cellular wall which has three layers. The thickest, medium layer contains cellulose microfibrils (=high content of fibre), the external one is structurally a polymerised carotenoid substrate called **Sporopollenin**. This very substance has the ability to bind toxins and then eliminate them from the body. The three-layer cellular wall is extremely hard and firm and this certainly contributes to chlorella’s extraordinary viability, yet the human body is not able to digest it effectively enough. For this reason Chlorella pyrenoidosa in Probiosan is treated with so called disintegration through which the cellular wall is broken up and hence the alga is easier for the body to digest and its content may be utilised more effectively.

Research of the detoxifying properties of chlorella:

Research in Japan, a country suffering from polluted environment, has been concentrating on the detoxifying effects of chlorella. Elimination of radioactive substances, heavy metals or organic toxins from the body, such as U, Pb, Hg, Cu, Cd, PCBs (polychlorinated biphenyls) and dioxin has been evidenced. A Japanese study investigating cadmium in respect of the toxic potential of heavy metals discovered how useful chlorella was in individuals suffering from cadmium poisoning – following 24 days of usage, the elimination of cadmium from the body through stool grew three times and through urine seven times compared to

normal. Chlorella is also used for persons in risk of intoxication with other poisonous substances (PCB, insecticides, pesticides).

A Scottish study from 1986 has demonstrated that cadmium (as well as other heavy metals) accumulates inside the alga as a result of a two-stage follow-up process. Stage one includes a rapid physiological and chemical absorption of cadmium into the cellular wall structure. This is followed by a slow, fixed intracellular binding. Another example of the detoxifying effects of chlorella was shown in a study describing an experiment in which a lethal dose of four highly toxic substances – Hg, Cu, Cd, and PCB – was added to a live ale yeast culture. When chlorella extract was mixed with the combination of the aforementioned toxins, the ale yeast remained alive.

Of all plants on the Earth, chlorella contains the highest amount of **chlorophyll** – the green plant pigment. This substance enhances the overall regeneration of the organism, as it exhibits toning and stimulating effects on the metabolism. It has beneficial effects on the formation of blood and due to its ability to neutralise free radicals it slows down the ageing process in the body. Chlorophyll has anti-inflammatory effects; it accelerates tissue growth and healing and supports the immune system. It has, moreover, provable disinfecting and deodorising properties. Chlorophyll contains biologically bound magnesium, which is an element essential for the normal function of the heart, muscles, nerves and for mental health; in addition, it also has an ability to alleviate asthma attacks. During the administration of chlorella, an outstanding effect on **tissues**

regeneration and enhanced cellular division and growth was observed. Due to this effect, chlorella is effective in the treatment of chronic inflammations, eczemas, burns, and poorly healing wounds. It also helps to regenerate the body exposed to long-term stress, after any surgery or exposure to radiation. These properties are present in the alga due to the **CGF substance (Chlorella growth factor)** considered to be the most effective component of chlorella. Of all species of algae within the Chlorella genus, Chlorella pyrenoidosa has the highest amount of this growth factor (as much as 14%). CGF is a water-extractable fraction containing free amino acids, glycoproteins, vitamins, and mineral substances.

The identified effects of CGF are remarkable. Many scientific studies have shown that CGF supports tissue regeneration, particularly cellular division and growth. In childhood it even improves and accelerates the overall growth and development of the organism. It stimulates the production of white blood cells (leukocytes), their phagocytic activity targeted at foreign substances and also the production of B lymphocytes responsible for the synthesis of antibodies. Through these processes it naturally **enhances the immunological potential** of the human body without any side effects. Application of CGF may even result in excellent prevention of tumour diseases (experiments with tissue cultures and laboratory animals). CGF is also a suitable dietetic agent as it beneficially influences the composition of intestinal microflora, hence improving the bowel function and supporting normal peristaltic activity of the intestines, which acts as prevention against constipation and also has its role in inhibiting

Description of effects exhibited by Chlorella

re-absorption of toxins from stool to the portal blood circulation.

Research of the effects of Chlorella pyrenoidosa on the immune system:

Published scientific studies have shown the stimulation of the immune system by the alga proper as well as through the application of its derivatives. Chlorella increases interferon levels, stimulating increased production of macrophages and the activity of neutrophil granulocytes and T-lymphocytes which actively combat cancer cells, foreign substances, and some chemicals. By these processes it enhances the body's ability to destroy bacteria, viruses, chemicals, and foreign proteins. Chlorella has strong antioxidising effects. Experiments have shown stimulation of certain lymphocytes as well as an increased resistance to the influenza virus. Research into the resistance of the immune system to the influenza virus was conducted in a group of approx. 1,000 Japanese sailors in 1971. Approximately one half of the men were receiving 2 grams of chlorella per day, the other half none. Towards the end of the three-month sailing the untreated group of sailors suffered 41% more flu conditions than the group which was receiving chlorella.

CGF exhibited provable anti-tumour effects in mice with induced sarcoma.

Another important property of chlorella is its ability to **increase the pH** of the internal environment, i.e. to reduce its acidity (to alkalize). If excess acidity is present in the body, the risk of a disease is higher, as the acid environment is favourable for the multiplication of various microbes and fungi. The

ideal pH value for the human body ranges from 7.2 to 7.4. The consumption of chlorella may hence prevent a whole range of diseases.

Furthermore, due to its ability to clean blood, chlorella has been reported to have a pronounced protective effect on the liver and on the viscera involved in the elimination of toxins from the body in general.

Research of the effects of chlorella on clean bloodstream:

In 1975, Japanese researchers published an article which demonstrated that chlorella included in the diet reduces blood and liver cholesterol levels. It protects toxin-burdened, fatty, mineral-deficient liver by chlorophyll which binds toxic substances and is involved in the production of haemoglobin and hence also red blood cells. It enhances bowel function and improves intestinal excretion, which eliminates more cholesterol and fats from chyme and prevents their absorption or re-absorption into the portal bloodstream. Chlorella's high content of DNA/RNA directly stimulates liver tissue regeneration on the cellular level. Blood, haematopoietic and lymphatic tissues free from toxins absorbed from the intestine and rich in oxygenated red blood cells form the basis of strong immunity against diseases. The alga's cleaning activity facilitates the function of the excretory organs (kidneys and liver) and safeguards effective elimination of metabolites from cells and tissues. Provable rejuvenating properties of chlorella are attributed to the relatively high content of RNA (approx. 10%) and DNA (approx. 3%). The sufficient amount of these nucleic acids slows down the ageing

process, increases energy levels and improves immunity – chlorella is therefore a valuable depot of rejuvenating substances.

Due to the alga's ability to detoxify the body, to clean blood, and to enhance the immune system, its effects are positively reflected also in the quality and health of the skin. It may help in the treatment of acne, rash, eczema, but also any surface wound or damage (scalds, acid, alkali and general burns, etc.). Chlorella is also a rich source of a whole range of important vitamins and mineral substances.

Although it is peculiar, chlorella contains 17 times more vitamin C than oranges, which makes it an outstanding prophylactic agent against any infection.

Due to its content of vitamin B₁₂ (higher than that contained in beef liver or ale yeast) chlorella is recommended as supplementation for vegetarian diet, which often includes only insufficient amounts of this vitamin.

Trace elements in the cells of the alga have chelate bonds to amino acids, and therefore are very well absorbable and utilisable for the human body.

Chlorella contains 20 times more iron than spinach and 11 times more calcium than cow milk.

Basic nutritious values of Chlorella

Proteins	45–65%
Polysaccharides (starches)	20%
Fat	9.9%
Fibre	5%
CGF	10–23%
DNA	3%
RNA	10%
Chlorophyll	1.5–3.5%

Vitamins contained in Chlorella pyrenoidosa

Abbreviation	Name	Major effects	Approximate quantity per 100g of Chlorella
Provitamin A	Beta-carotene	Antioxidant, protects the skin and mucosa, cancer prevention	190mg
B ₂	Riboflavin	Involved in the metabolism of sugars, helps to burn sugars	5.1mg

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Abbreviation	Name	Major effects	Approximate quantity per 100g of Chlorella
B ₃	Niacin	Proper brain function, elimination of fats and cholesterol	19.7mg
C	Ascorbic acid	Against infections and fatigue, essential for the synthesis of collagen	80mg
E	Tocopherol	Antioxidant, supports regeneration and tissue healing, cancer prevention, improves immunity	12mg
B ₅	Pantho-thenic acid	Against allergies, supports immunity and hair growth	3.3 mg

B ₁	Thiamine	Against fatigue, good nerve and mental condition	1.3mg
B ₆	Pyridoxine	A component of enzymes, supports immunity and nervous system functions, involved in the metabolism of fats	1.8mg
B ₉	Folic acid	A component of enzymes, nervous system functions, supports growth and development	3.5mg
B ₁₂	Cobalamine	Against fatigue and anaemia, nervous system functions	0.19mg

H	Biotin	Good skin condition, proper development of the organism	90mcg
K		Influences blood clotting	1.2mg

Mineral substances contained in Chlorella pyrenoidosa

Chemical symbol	Name	Major effects	Approximate quantity per 100g of Chlorella
K	Potassium	Transmission of impulses in muscles and nerves, regulation of the heart and kidney functions	1100mg
Ca	Calcium	Prevention of osteoporosis, against allergies, transmission of nervous impulses, enzymatic processes	400mg

Mg	Magnesium	Against seizures and spasms, a component of enzymes	300mg
Fe	Iron	Against anaemia, supports protein metabolism	150mg
I	Iodine	Enhances thyroid gland function	63µg
Se	Selenium	Antioxidant, anticancer effects	10µg
Zn	Zinc	Part of enzymes, supports the immune system	2.3mg
Cr	Chromium	Part of enzymes	0.19µg
Mn	Manganese	Enzyme activator	3mg
P	Phosphorus	An essential component of nucleic acids	900mg
Cu	Copper		70mcg

Description of effects exhibited by Chlorella

Amino acids contained in Chlorella pyrenoidosa

Name of the amino acid	Remark	Content per 100g of Chlorella
Glutamic acid	Involvement in brain processes	4.8%
Aspartic acid	Increases persistence and energy levels	5.1%
Alanine	Part of connective tissue, involved in glucose metabolism	2.2%
Leucine ♥	Combats pain, accelerates healing	4.2%
Lysine ♥	Against cold sores, viruses, stimulates the production of collagen	4.8%
Arginine	Enhances muscle growth, increases immunity, production of sperm	3.2%
Valine ♥	Neurotransmitter function	2.9%

Glycine	Calming effects, synthesis of other amino acids	4.8%
Phenylalanine ♥	Combats fatigue, depression and pain, supports the production of collagen	3.1%
Threonine ♥	Enhances the immune system, the production of collagen	2.6%
Proline	Major component of collagen	3.1%
Serine	Enhances memory and nervous functions, important for the production of antibodies	2.3%
Tyrosine	Starting material for the production of neurotransmitters and thyroid gland hormones	2.6%
Isoleucine ♥	Protection from muscle wasting	2.8%
Methionine ♥	Eliminates heavy metals	1.3%

Tryptophan ♥	Undisturbed sleep, mental health– starting material for the production of serotonin	1.4%
Histidine ♥	Essential during childhood	1.3%
Cysteine	Eliminates heavy metals, protects from toxins, supports hair growth	0.5%

♥ ... essential amino acids which cannot be produced by the human body itself



**CHIEF HEAD-OFFICE AND HEAD-OFFICE
FOR THE CZECH REPUBLIC**

ENERGY GROUP, a. s.

Trojská 201/39, 171 00 Praha 7

Czech Republic

tel. / fax: +420 283 853 853/54

info@energy.cz, www.energy.cz