FLYBOOST SUPPLEMENT

RAW MATERIAL

3c301 D,L-METHIONINE
3c440 L-TRYPTOPHAN
3.2.3. L-LYSINE hcl
3c391 L-CYSTINE
3c410 L-THREONINE
3c361 L-ARGININE
BCAA COMPLEX (VALINE-LEUCINE-ISOLEUCINE 2:1:1)
pari a 3c369 L-VALINE
pari a 2b17012 L-LEUCINE
pari a 3c381 L-ISOLEUCINE
3a911 L-CARNITINE TARTRATE
2b17008 L-HISTIDINE
3a890 CHOLINE HCL (50% choline hcl+50% silica colloidal)1
2b16056 TAURINE
3c401 L-TYROSINE
VITAMIN A 500.000 UI/g
VITAMIN D3 100.000 UI/g
VITAMIN E (50% polvere)
3a820 thiamine hcl (VITAMIN B1)
VITAMIN B2-riboflavin
3a831 VITAMIN B6
VITAMIN B12
3a841 VITAMIN B5 (calcio D-pantothenate)
3a880 BIOTIN
3a300 VITAMIN C
3a316 FOLIC ACID
CALCIUM GLUCONATE
ALGAE SPIRULINA powder
ECHINACEA ANGUSTIFOLIA plant powder
INACTIVE DRIED BEER YEAST
DRIED EXTRACT OF MARIAN THISTLE
GUARANA SEEDS powder
3b405 PENTAHYDRATE BLUE STONE

3b104 HEPTAHYDRATE IRON SULPHATE
3b201 POTASSIUM IODIDE
3b605 MONOHYDRATE ZINC SULPHATE
MAGNESIUM OXIDE
3b503 MONOHYDRATE MANGANESE SULPHATE
3b817 SELENOMETHIONINE (SELEMAX 2000ppm)
DEXTROSE POWDER
MALTODEXTRINE
FOS-fructo-oligosaccharides

Supplement formulation according to each single nutrient:

METHIONINE

Methionine l-methionine is an essential amino acid, fundamental for many vital functions of the body. This substance helps to balance the system of metabolism and growth, providing sulfur compounds which eliminate all the dangerous damages of free radical. Furthermore, the right amount of methionine l-methionine in the body, reduces the risk of skin, feathers, and talons diseases, favoring their healthy and thriving growth. Methionine is involved in the synthesis of cysteine, carnitine, and taurine, through the process of trans-sulfidation, in the synthesis of lecithin and in the synthesis of phosphatidylcholine and other phospholipids. An inappropriate metabolism of methionine can lead to arteriosclerosis. In the form of S- adenosylmethionine (SAM), it is a methyl agent. Last but not least, methionine is a chelation agent.

TRYPTOPHANE

Tryptophane is an essential amino acid, the precursor of serotonin, involved in the modulation of mood, the precursor of melatonin, involved in the control of sleep, and the precursor of niacin or B6 Vitamin. Tryptophane is an essential part of the protein structures of our body. It is studied for its unique ability to increase concentration and improve pain tolerance.

LYSINE HCL

Lysine is one of the 9 essential amino acids (those who are not directly synthesized by the body). Therefore, it is important to integrate them through proper nutrition or additional integration, to avoid all those serious health problems. Lysine, in particular, improves cartilage and tissues health, improves the production of collagen, treats osteoporosis, and increases bone density. Together with arginine and ornithine, lysine contributes to the production of the growth hormone (GH)

CYSTINE

Cystine is a sulfide amino acid, obtained by two molecules of cysteine. In particular, cystine is essential for the process of keratinization, so it is of vital importance for birds of prey. So, it is used to favor the growth and preservation of plumage, talons an beak. Furthermore, cystine, associated with glutamate, is a very important element biosynthesis of glutathione, one of the fundamental antioxidants, for the control of free radicals, and the protection of red blood cells from oxidation.

Therefore, cystine has important anti-aging functions. Usually, cystine is used in case burns or medical surgeries, to improve skin cellular regeneration.

THREONINE

Threonine is an essential amino acid, with marked depurative functions not only for the body in general but for liver and kidneys in particular. Among all the numerous functions of threonine, we cannot underestimate the one dedicated to tissue regeneration, with a specific action on elastin and collagen. This amino acid can be effective in maintaining tissues young and elastic. Thanks to its role in the formation of antibody, and being a part of it, threonine has vital functions for the immune system. Being an essential part, the lack of l-threonine can cause serious problems for the body, as birds and mammals are not able to independently synthesize it from other elements. The lack of this substance would extend to metabolism and to non-essential amino acids.

ARGININE

Although arginine is not part of those 9 essential amino acids, it plays an important role in the health and well-being of those trained individuals exposed to intense physical stress. In particular:

- it helps the muscular development and the simultaneous burn of fats

- it boosts the immune system

- it improves the supply of nutrients in muscles

In the Seventies, arginine has been intensely studied, due to its ability to stimulate the growth hormone (HGH) spontaneously, and also due to its involvement in reinforcing the insulin system. Some studies have observed a remarkable peak of this "main hormone" after injections of 30gr of arginine per day, observing also a remarkable peak of HGH in blood. The result was really surprising, due to the fact that all people involved in this experiment, during the month of therapy, have reported a strong increase in musculature, and a dramatic decrease of body fat. Branch chained amino acids (BCAA) are a group of three of the 9 essential amino acid, and they are represented by leucine, isoleucine, and valine. Branch chained means that their structure forms a branching, and they represent about 35% of the essential amino acids in muscular proteins.

VALINE

Valine plays an important role in the reconstruction of tissues, muscular tissues in particular. It is part of those essential amino acids and its therapeutic properties are numerous. It is an anti-inflammatory, it is a mild stimulant thanks to its ability to improve the functioning of the nervous system, it helps to regenerate tissues, and rebalance nitrogen.

ISOLEUCINE

Isoleucine is one of those essential amino acids which are part of the group of BCC (Branch chained amino acids). The body uses isoleucine to synthesize proteins and to produce energy in the phase of muscular strain. After its consumption, isoleucine is absorbed by the small intestine and transported from blood to liver, where a part of it is canalized for the protein synthesis, while another part is metabolized, in presence of Vitamin B12, for the production of energy. Isoleucine,

other than being part of the process of energy production, it also favors muscular recovery after the training session, together with the other two branch chained amino acids, valine, and leucine.

LEUCINE

Leucine is the last and most important of the three BCAA. It increases energy levels, it reinforces muscles, it is able to burn fats and increase the muscular mass. It is mainly used to increase metabolism, to burn exceeding calories, to improve feathers health, muscular reparation, and growth, to increase resistance and performance, to maintain sugar level in the blood, and to develop new cells.

CARNITINE

Carnitine is a carboxylic acid (those compounds who contain a hydroxyl group connected to a carbonyl group). This amino acid is synthesized by two other amino acids, lysine and methionine. in order for this to happen, Vitamin C and other vitamins of B group are necessary. Carnitine plays an important role in the process of b-oxidation, which is the oxidation of fatty acids. Due to the fact that Acyl-CoA (Intermediate of fats oxidation) are not able to go through the internal mitochondrial membrane, nature has excogitated a countermeasure, the use of a conveyor, carnitine, and the use of three enzymes which make the action possible. Acil-CoA will get shorter and shorter (chain), up to becoming Acetyl-CoA, which is the substrate of the Krebs cycle which has, as a final result, the production of adenosine triphosphate (ATP), which is energy. We can deduce the importance of carnitine for our complex metabolic system. Furthermore, we can have acetyl-carnitine (ALC). It is formed by carnitine and from acetyl-coenzyme A. We can find it in our body, and it represents about 7-10% of carnitine. It is a kind of energy stock, as the acetyl group can be given to other oxidative processes at the mitochondrial level. ALC has the role of neuromodulation in our brain.

HISTIDINE

Histidine is one of the 9 essential amino acids and it is fundamental for all those processes of growth and reparation of tissues. It is fundamental for the conservation of the myelin sheath, and it increases the immunological response. This essential amino acid protects from possible exposure to radiations and heavy metals. It plays a fundamental role in the production of white and red blood cells and, together with histamine, it has an effect on the muscular functions and the dilation of blood vessels. Furthermore, it regulates the process of formation of talons, beak, and feathers.

CHOLINE HCL

Choline, or Vitamin J, is an amine and an essential coenzyme for the formation of cell membranes and neurotransmitters (acetylcholine). Choline is an essential molecule for the human body as it is directly involved in the synthesis of biologically precious mediators.

More specifically, Choline:

- Protects the integrity and fluidity of cellular membranes, acting as a precursor of a very important membrane phospholipid
- Sustains the average cellular vitality, controlling the synthesis of sfingo-myelin; it is known that a lack of this factor induces an apoptotic process

- Together with Betaine, it contributes to maintaining the average cardiovascular function, antagonizing the deleterious effects of Homocysteine
- Preserves the average nervous functionality

TAURINE

Taurine is a non-essential amino acid containing sulfur

Taurine is different from other amino acids for two main reasons:

- it is not used for the synthesis of proteins, but it can be found without connections, or in small chains of peptides

- it has a different structure from other amino acids: in taurine, the sulfur group substitutes for the carboxylic acid

Taurine is an important regulator and its main role is to maintain the stability of the cellular membrane. It regulates heartbeats, prevents an excessive activity of brain cells, and it is essential in the visual process. Furthermore, it plays an important role in the conjugation of bile acids and in detoxification. It has an antioxidant action, it stabilizes membranes, it regulates the osmotic process, and it modulates the levels of cellular calcium. Taurine contrasts the process of aging thanks to its anti-free radicals action. This precious amino acid is important for the synthesis of the nitric oxide, a strong vasodilator. In trained individuals, taurine seems to stimulate cardiac efficiency and contractility, increasing the supply of blood to the myocardium.

TYROSINE

Tyrosine is a fundamental amino acid for the human body; its consumption becomes essential in case of lack of phenylalanine. It can be found in certain foods, but it also can be synthesized from phenylalanine, adding a hydroxyl group to its aromatic ring. Being an essential amino acid, tyrosine belongs to the category of semi-essential amino acids. Tyrosine is the original amino acid for the synthesis of important neurotransmitters, like dopamine, adrenaline, and noradrenaline. Adrenaline and noradrenaline are vital for the process of adjustment in case of intense and rapidpsychophysical stress. For this reason, tyrosine has adaptogen properties, useful to improve the response of the body to different kinds of stress.

VITAMIN A

Discovered last century by the Swiss chemist Kerrer, Vitamin A is a fat-soluble vitamin that can be found in foods of animal origins and in vegetables, in different active forms, such as retinaldehyde, essential for eyesight, and retinoic acid, essential for growth, since embryonic stage. Retinol and its derivatives, come from foods of animal origins, like retinoids, and from vegetables, like carotenoids, also known as pro-vitamin A. Carotenoids are essential, thanks to their antioxidant action. They protect cells from aging and from degenerative damages produced by free radicals. Vitamin A has several functions:

- it reinforces and keeps feathers, beak, and talons healthy
- it protects lungs from infections
- it favors skin resurfacing

- it takes part in the enzymatic processes, which are necessary for the proper development of bones, and for the proper functioning of the ovarian and testicular system
- it is vital for the proper functioning and health of the retina

VITAMIN D3

Vitamin D3, or cholecalciferol, is the most important among the 5 forms of vitamin D, a set of fat-soluble vitamins, vital for our health. Vitamin D, in particular, is mainly produced with sunlight exposure, and it has many vital functions:

- it regulates bone metabolism
- it reinforces bones
- it helps to prevent autoimmune diseases
- it regulates neuromuscular functions
- it reinforces the structure of feathers

Vitamin D is vital for reinforcing bones, beak, and talons, favoring mineralization and growth. It helps the absorption of calcium and phosphorus in the intestine and the absorption of calcium in kidneys. Furthermore, vitamin B3 prevents the manifestation of autoimmune disorders (like rheumatoid arthritis, Lupus and type 1 diabetes), and disorders of the nervous system, along with the symptoms of depression.

VITAMIN E

Vitamin E is a fat-soluble vitamin, found in foods in eight chemical forms, divided into two main categories, tocopherol (alpha, beta, gamma, and delta) and tocotrienol (alpha, beta, gamma, and delta). Alpha-tocopherol is the one synthesized by the human body. Absorbed by the intestinal mucosa, thanks also to the presence of edible fats, the concentration of Vitamin E in the blood is regulated by the liver. The presence of Vitamin E in the intestine favors the absorption of other vitamins, like Vitamin A, Vitamin C, and those of group B. Vitamin E is a strong antioxidant; it protects from the damages of free radicals, food toxins, and pollution, which could cause damages to the fatty acids in the cellular membranes, determining the rise of degenerative diseases. Other than protecting organs and tissues from cellular aging, its anti-oxidant action is precious for many upsets. The high antioxidant power of Vitamin E protects eyesight, especially from the macular degeneration of the retina. The anti-inflammatory and antioxidant action of Vitamin E contrasts the formation of nitrosamine (carcinogenic substances formed in the stomach by the nitrites of foods), protecting the cells. Furthermore, it reinforces the immune system. The consumption of Vitamin E contributes to keeping blood fluid and vessels clean, preventing the formation of blood clotting and senile plaques, which could lead to venous thrombosis or heart disease. Furthermore, Vitamin E tones capillaries up, improves the elasticity of blood vessels, simplifies the transportation of oxygen from red blood cells, regulates blood pressure, increasing muscular strength and contrasting tiredness. Vitamin E protects neurons from oxidative stress, protects tissues from the degenerative action of free radicals, and improves feathers elasticity.

THIAMINE HCL (VITAMIN B1)

Vitamin B1 contributes to the development of the important process of conversion of glucose in energy. Like Vitamin B2, Vitamin B1, also called Thiamine, synthesizes the energetic processes of the body, assuring the necessary energy levels to carry out daily activities.

VITAMIN B2 (RIBOFLAVIN)

Like Vitamin B1, it contributes to helping energetic processes. Riboflavin, as an essential component of coenzymes FMN and FAD, takes part in the redox reaction of many metabolic pathways (carbohydrates, fats, and proteins) and cellular respiration. Flavin-dependent enzymes are oxidase (in aerobiosis, they transfer hydrogen to molecular oxygen, to form H2O2), and dehydrogenase (anaerobic). Among oxidase, we can find:

- the glucose 6P dehydrogenase, containing FMN, which transforms glucose in phosph-gluconic acid
- D - amino acid oxidase (with FAD)
- L- amino acid oxidase (FMN), which oxidizes AA into the correspondent keto-type acids
- xanthine oxidase (Fe and Mo), which participates to the metabolism of purine bases, and transforms hypoxanthine in xanthine, and xanthine in uric acid.

Important dehydrogenase, like cytochrome reductase and succinic dehydrogenase (containing FAD), intervenes in the respiratory chain, which matches the oxidation of substratum to phosphorylation and ATP synthesis.

Acyl-CoA-dehydrogenase (FAD-dependant) catalyzes the first dehydrogenase of the oxidation of fatty acids, and one flavoprotein (with FMN) is necessary for the synthesis of fatty acids, starting from acetate. A-glycerophosphate dehydrogenase (FAD-dependant) and lactic acid dehydrogenase (FMN) intervene in the transportation of equivalents reducing from the cytoplasm to mitochondria.

Red blood cells glutathione reductase (FAD-dependant) catalyzes the reduction of oxidized glutathione.

VITAMIN B6

Vitamin B6 is involved in amino acids, fatty acids, and sugar metabolism, and contributes to the formation of hormones, and white and red blood cells. Vitamin B6 plays the fundamental role of building the immune barrier in defense of diseases, stimulate brain functions and prevents aging.

VITAMIN B12

Vitamin B12, or cobalamin, is involved in the metabolism of amino acids, nucleic acids (equal to folic acid which helps the synthesis of DNA and RNA), and fatty acids. It plays an important role in the production of red blood cells, and bone marrow.

VITAMIN B5 (calcium d – pantothenate)

Vitamin B5, or pantothenic acid, plays an important role in fat, proteins and carbohydrates metabolism, and it is involved in the synthesis of cholesterol and hormones.
In particular, Vitamin B5 is recommended for the protection of feathers, talons, beak, and cere, and helps to prevent stress and tiredness.

3a880 BIOTIN

Vitamin B8, or biotin, takes part in the protein-based metabolism, and the actions of synthesis of fatty acids and glucose. Vitamin B8 helps in preserving the integrity of feathers, talons, beak, cere, and muscles.

3a300 VITAMIN C

Vitamin C is probably the most common and important vitamin. Nowadays, we know a lot about this precious vitamin; researches have showed that it is a strong anti-oxidant, protects cells from the damages of free radicals, facilitates the absorption of iron, strengthen the immune system, stimulates the synthesis of collagen, improves metabolism, has an anti-hemorrhagic and healing action, intervenes in most part of metabolic reactions, improves the absorption of minerals, and speeds the elimination of toxic metals. It is a general tonic for the body and the immune system.

3a316 FOLIC ACID

Folic acid, or vitamin B9, is a water-soluble vitamin, essential for the synthesis of DNA and proteins, two vital processes for growth, metabolism, and cell replication, without which it not only it would be impossible to renew body tissues, but also guarantee its general functioning Being necessary for cell replication, vitamin B9 is particularly necessary for growing tissues, exposed to a fast cell replication. In particular, this micro-nutrient is a unique support for the synthesis of hemoglobin, the formation of red blood cells (which occurs constantly to reintegrate aged and damaged red blood cells, eliminated by the spleen), the mucosa turn over, and proliferation and differentiation of embryonic tissues. Vitamin B9 is very important for the proper functioning of the nervous system during all life, full efficiency of sexual organs, and the conservation of male and female fertility (production of mature ovum and sperm, suitable for fecundation). Moreover, folic acid prevents cardiovascular illnesses and hypertension. An appropriate supply of vitamin B9 is useful to reduce the levels of homocysteine, an amino acid which, if in excess in the blood, can cause a rise of cardiovascular risk.

CALCIUM GLUCONATE

Calcium is a precious mineral for our body, necessary to keep bones strong and guarantee the implementation of numerous bio-metabolic reactions. almost all reserves of this substance are stored in bones, feathers, beak, and talons, where it contributes to give structure and hardness, but it must be taken daily through nutrition 8even if only 30% is absorbed by the intestine, while the rest is eliminated through feces. Calcium is used by the body to move muscles and let information pass from the brain to the rest of the body through nerves. Furthermore, it helps circulation and the release of hormones and enzymes, proteins which influence almost all the body functions.

SPIRULINA ALGAE powder

Spirulina has many nutritional and therapeutic properties, thanks to the substances it contains:

- Proteins of high biologic value; the high quality of proteins. This parameter can be evaluated based on the presence of essential amino acids (amino acids which are not produced by the body but must be introduced through nutrition). Spirulina contains all 8 essential amino acids (Phenylalanine, Isoleucine, Lysine, Methionine, Threonine, Tryptophane, Valine)
- Essential fat acids: Omega 3 and Omega 6

- Carbohydrates: rhamnose and glycogen
- Vitamins: A, D, K e vitamins of group B.
- Mineral salts: iron, sodium, manganesium, calcium, iodine, and potassium.

ECHINACEA ANGUSTIFOLIA plant powder

Echinacea is the common name of a group of herbaceous (Echinacea Angustifolia, pale and purple) originating from North America, and very popular from Mexico to Canada. The dried extract, with therapeutic effects, is obtained by its red and rose flowers. Echinacea has an immunostimulant effect, though the increase of immune cells (such as white blood cells), which act phagocytizing pathogenic agents. It improves resistance from external aggressions. It contains caffeic acid, circoric acid, and echinacoside, which help individuals to improve resistance to pathogenic agents.

INACTIVE DRIED BEER YEAST

l lievito alimentare è un'ottima fonte di tiamina, riboflavina, niacina, acido folico, vitamina B6 e vitamina B12. Questi elementi nutritivi sono essenziali per contribuire a rilasciare energia dagli alimenti e creare cellule sane.

MARIAN THISTLE DRIED EXTRACT

Marian thistle (Silybum marianum = Cardus marianum) is a wild herbaceous plant, widespread in all the Mediterranean area. This drug is made of bright black fruits, with yellow spots, about 1cm long. Marian thistle has been used since old times for its numerous benefits. In particular, it has been used, and it is still used, to cure hepatic diseases.

Marian thistle:

- protects the liver from many toxic agents
- Stimulates the regeneration of hepatocytes 8liver cells)
- Reinforce capillary walls
- Acts like anti-oxidant, controlling the damages caused by free radicals

GUARANA SEEDS powder

The most common effects of the use of guarana involve:

- the nervous system (slight excitement, more attention span and mental focus, reduced sense of fatigue)
- the cardiovascular system (guarana causes an increase of heart rate)
- the digestive system (guarana increases gastric secretion, it is a light anti-diarrheal, and has a slight diuretic effect)
- body metabolism

BLUESTONE

Bluestone is involved in many important biochemical events in human cells. Once ingested, it is absorbed by the intestine, tied to albumin, and transported to the liver. It ties with 50 different enzymes and it is carried out through blood in a plasma protein called ceruloplasmin. As cuproenzymes, they are involved with the production of hemoglobin, they regulate the gene

expression and the connective tissue, and they are vital for the system (APT), which is the primary source of adenosine triphosphate energy.

HEPTAHYDRATE IRON SULFATE

It has many functions, but it mainly contributes to the transportation of oxygen to organs and tissues. Iron is necessary for the synthesis of hemoglobin (the protein which transports oxygen in the blood), myoglobin (the protein which is considered the structure of muscles), and collagen (structural protein). Iron is involved in the process of cellular respiration and metabolism of nucleic acids. Furthermore, as it represents the oxygen supply for muscles, it guarantees its efficiency, improving physical strength and performance. In this way, iron guarantees energy and vitality and favors the activity of some enzymes. Furthermore, it is fundamental for the synthesis of neurotransmitters, as serotonin, dopamine, and noradrenaline. The nervous system benefits from this substance, favoring concentration and learning. Then, iron reinforces the immune system and improves stress resistance.

POTASSIUM IODIDE

Potassium plays an important role in the body and intervenes in most part of vital functions. It can be mainly found inside cells, in which it has the same functions of sodium which, on the contrary, can be found outside the cells. Potassium controls neuromuscular excitability, heart rate, osmotic pressure, balance acid-base, and retention.

MONOHYDRATED ZINC SULFATE

Zinc plays an important role for eyesight, sense of smell, and memory; it is fundamental for the structure of proteins and cellular membranes, for the absorption of vitamins and minerals, for the functioning of the immune system, and it is a constitutive element of more than 200 enzymes linked to digestion and metabolism.

MAGNESIUM OXIDE

- Glucose metabolism. Magnesium regulates the action of hexokinase, a key enzyme for glucose metabolism
- Fats metabolism. Magnesium is useful for the absorption of calcium, which favors fat burning.
- Control of cholesterol production. Magnesium intervenes in the reactions of cholesterol synthesis as a coenzyme. Synthesis of nucleic acids (DNA and RNA). The process of bones mineralization, so it is very important for preventing osteoporosis.
- Vasodilation. Magnesium has an antithrombotic and antiplatelet effect, so it has a fundamental role in the proper functioning of the cardiovascular system.

Magnesium is necessary for the production of energy, as co-factor of ATP, and so it is necessary for muscular contraction, protein synthesis, reproduction of cells, transportation of substances from the interior to the exterior of cells, and vice versa. The body continuously produces energy, necessary for its functions, and for the process of energy production, which cannot take place without magnesium.

Magnesium also has electrolytic properties, therefore it regulates the electrolytic balance of the body; it contributes to the balance of other minerals, like calcium, potassium, and sodium. This electrolytic balance has some effects on the management of the nerve impulse, on muscular contraction, on the cardio activity, with a calming and muscle relaxant effect.

MONOHYDRATED MANGANESE SULFATE

Monohydrated manganese sulfate is one of the essential minerals for individuals' health and well-being. In particular, it has some beneficial effects on:

- the nervous system. Manganese is fundamental for brain functions, as it is part of numerous enzymes as arginase, which seems to have a neuroprotective role, and glutamine synthetase, which catalyzes the conversion of glutamate (neuro-toxic, if in excess) in glutamine, important for the transmission of nerve impulses.
- the regulation of metabolism and glycemia. Well-known is the role of manganese in the synthesis of insulin, a hormone which regulates the levels of glucose in the blood.
- the immune system
- the growth of feathers, beak, and talons. It is proved that manganese can stimulate and favor the synthesis of the bone matrix, and the calcification process.
- Antioxidant properties. This function is mainly carried out from the superoxide dismutase enzyme, of which manganese is part. This enzyme catalyzes the transformation of free radical of oxygen in molecules of hydrogen peroxide, decreasing the levels of oxidative stress.

SELENOMETHIONINE (SELEMAX 2000ppm)

Selenium preserves tissues from degeneration and keeps the feathers elastic. Then, this important mineral stimulates the immune system, has an anti-inflammatory effect, protects the body from infections and viruses. It protects the body from the risk of cardiovascular dysfunctions and other illnesses linked to aging.

DEXTROSE POWDER

Dextrose is a simple sugar, or monosaccharide, important for the diet of trained individuals who need a surplus of energy for muscles and brain.

We can summarize the functions of dextrose for organisms:

1. energetic: as a substratum for the production of energy (some organs are dextrose-dependant, as they cannot glean from other energetic sources)
2. directive: as seen, it implies states of anabolism or catabolism through the induction to the production of certain hormones.
3. structural: it is used for the synthesis of glycogen and other polymers, whose aim is to operate as energetic reserves in certain body tissues, as muscles and liver. In relation to its use as a vitamin supplement, it is mainly extracted from corn starch, which undergoes a process of total hydrolysis.

In sports, it is mainly used for its energetic function, according to two main goals, in particular:

- get an energetic surplus in those cases in which it is not possible to reach the quotes of one's nutritional program through food (carbohydrates, in this case)
- get some benefits in the period just before the training session

MALTODEXTRIN

What exactly is maltodextrin? It is a complex carbohydrate, obtained through the hydrolysis of starches or tubers (as we will see, the source plays an important role). Maltodextrins are formed by glucose molecules, organized in more or less long chains of polymers (and we will also see how their length affects the quality of the maltodextrin). Therefore, it is a unit of D-glucose (usually

from 13 to 17), tied in chains. Smaller are these chains, bigger is the DE (dextrose equivalence, whose value is from 3 to 20), and consequently, maltodextrins will act more likely the dextrose.
Maltodextrin is a complex carbohydrate, but it does not mean that its absorption is low. Its glycemic index is similar to dextrose, and it represents a good substitute, as we will see later. The main use of maltodextrins in sport is due to their energetic function, as dextrose. Maltodextrins are used in aerobic activities or prolonged activities.

FOS-fructooligosaccharides

FOS have a benefic effect for the gut microbiota, defending its biodiversity and functionality.
Microbiota or intestinal flora is the set of microorganisms of the gastrointestinal tract in a symbiotic mutualism. Currently, FOS is used as:

- an intestinal regulator, for the action of forming a mass, and for the activity on the microbiota
- digestive support in case of dyspepsia
- useful vitamin supplements in case of metabolic disorders as hypertriglyceridemia and hypercholesterolemia
- remedy to rebuild an adequate intestinal flora, after an antibiotic therapy
- a vitamin supplements to rebalance the absorption of minerals, like calcium and magnesium
- a vitamin supplements in case of constipation
- a vitamin supplement in case of digestive problems and gastrointestinal disorders

Which are the benefits of FOS? The numerous biological functions of FOS, widely documented from experimental studies and clinical trials, would be connected to the direct action towards the intestinal microbiota. Once taken, FOS reach, almost unaltered, the cecum and the colon, where they selectively stimulate the growth and the metabolic activity of healthy stocks, like infantis, adolescentis, and longum bifidobacteria. These probiotic bacteria use FOS sugars to grow up and reproduce, producing short-chained organic acids (acetic, lactic and formic), which reduce the growth of pathogens. This activity justifies the functional and metabolic role of FOS.

FOS and metabolic disorders

Short-chained fatty acids seem to intervene in controlling the activity of some important enzymes, involved in the synthesis of cholesterol. The regular consumption of FOS seems to be associated with a reduction of concentrations of triglycerides and LDL cholesterol in the blood, carrying out an important preventive action in case of possible cardiovascular complications.

FOS and intestinal infections

The antiseptic action of FOS seems to be attributed to the production of short-chained fatty acids, some of which with direct antibacterial functions, and to the ability to increase vitality with Bifidobacteria and Lactobacilli. These microorganisms are able to actively compete with various pathogenic agents, as Clostridium, salmonella, staphylococcus, shigella, and others.

FOS and minerals

The protective action of short-chained fatty acids seems to be precious towards those chronic-degenerative diseases as osteoporosis. Through not yet known mechanisms, the use of FOS, and the subsequent production of short-chained fatty acids seems to improve the absorption of minerals like calcium and magnesium.