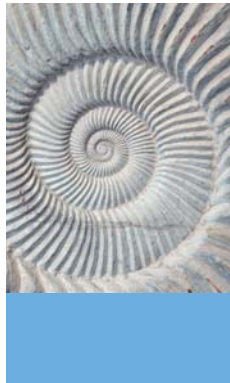




PRODUCT DOCUMENTATION

# SKELETIN





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# Text of the leaflet

**Skeletin** is a bioinformation product containing cuttlefish bone, collagen, fish oil, hip and nettle extracts, and manganese.

## Use:

The effects of this special combination of natural substances are particularly useful for joint diseases (arthrosis, arthritis, rheumatism and gout). The product alleviates stabbing and general pain in the joints, as it protects joint cartilages and supports their regeneration. It has positive effects on joint inflammations. Skeletin also supports bone growth and sufficient bone mineralisation, influencing positively the production of bone mass in the period of growth and reducing bone mass loss in older age (especially after menopause). It acts as prevention of osteomalacia and osteoporosis. The effects of Skeletin are also apparent in improved hair and nail quality and skin elasticity. Importantly, Skeletin also acts as the prevention of dental caries.

## Recommended Skeletin applications:

- For joint and spine pain caused by wear and/or inflammation
- In excessive load of joints caused by sport or high body weight
- In the period of growth
- In post-menopausal period and in the old age to decelerate bone mass loss
- During pregnancy, to support the healthy development of the baby's skeleton
- For excessively breaking nails, hair loss and tired skin

## **Composition:**

### **Cuttlefish bone**

It enhances kidney function and is a source of biologically available mineral substances (Ca and Mg) essential for bone production.

### **Collagen**

It protects and regenerates joint cartilages, improves the quality of all connective tissues – sinews, ligaments, bones and skin.

### **Fish oil**

It is a source of vitamins A and D and of unsaturated fatty acids. It has anti-inflammatory effects and supports good bone and skin condition.

### **Rosehip extract**

It is a source of a number of vitamins (A, K, B, E), and particularly of natural vitamin C. It enhances cartilage regeneration and protects cartilages from damage caused by toxic agents.

### **Common nettle**

It is a source of chlorophyll, a range of vitamins (B, K, E, C) and minerals (Si, Fe, P, Ca, Mg, etc.). It cleanses the blood and lymph, and has potent anti-rheumatic effects.

### **Manganese**

It is involved in cartilage and bone production, it enhances the healing process and alleviates pain. It is essential for smooth foetal skeleton development.

## **Recommended dosage:**

2 capsules 1–3 times per day.

Do not exceed the recommended daily dose.

Due to the chronic nature of the problem and with regard to the fact that bone and cartilage tissue regeneration requires longer periods of time, it is recommended to use Skeletin for the minimum period of three months.

## **Warning:**

The product is not intended for children under 3 years of age, pregnant and breast-feeding women. Not recommended for persons with bee, soybean and seafood product hypersensitivity. Dietary supplements must not be used to substitute all-day varied diet.

## **Storage method**

With respect to the content of unsaturated fatty acids the product should not be exposed to excessive light or heat. The ideal storage temperature is 10–25°C. Do not freeze.

# Introduction to the topic

The human skeleton comprises of approx. 206 bones which are connected to form a sophisticated support system anchoring skeletal muscles. Without the skeleton, one could not move at all. The essential role in connecting individual bones lies with the cartilaginous tissue which protects the surface of the bones at the stressed sites of joint connections from excessive wear. Without cartilages, one could not move painlessly. The bone and the cartilage are living, changing tissues which are, in the course of life, catabolised and metabolised, and it is therefore necessary to supply the body with sufficient amounts of the building stones for this ongoing turnover. Bone metabolism requires mineral substances which represent 60% of bone tissue (these are primarily calcium, phosphorus and magnesium) and collagen, which represents 24% of bone tissue. The remaining percentage is water and fat. Due to the content of minerals, bones are solid and hard and due to collagen also elastic in tension and pressure. Where bones lack mineral substances, they become softer (osteomalacia) and reduced in density (osteoporosis), with a tendency to bend, and are easy to break. Where bones lack elastic collagen, they are hard, but very fragile; they cannot withstand the necessary load and are also easy to break. Collagen is also the essential chemical substance which, in as much as 40%, forms the cartilaginous tissue. The cartilage envelopes the contact areas of joint connections, pads the space between vertebral bodies, and protects them from wear. Where the

cartilaginous lining is impaired (e.g. in arthrosis and other degenerative joint diseases), the mutual friction is stronger causing so called joint erosion. This is a much painful situation and very often results in highly restricted mobility, not rarely causing disability. Good bone condition is jeopardised primarily by lack of exercise, as in this case bone tissue degradation prevails over its production, which means that bone mass is rapidly decreasing. The condition of bones is also adversely affected by the use of some medicines – corticoids, antiepileptic agents, antacids and medicines used for immune disorders and functional disorders of the thyroid gland. The use of these medicines results in bone mass reduction as well as strong smoking and excessive consumption of coffee and alcohol or high amounts of toxic substances (particularly cadmium and lead) in the environment. Well-known is also the correlation between bone mass loss and lack of sexual hormones (especially estrogens) which, moreover, increases bone sensitivity in respect of the above-described adverse effects. At the old age, joints are naturally worn due to the life-long load. Statistics, however, point out that joint diseases are becoming increasingly frequent also among very young people. This is caused by both internal factors (congenital abnormalities in joint positions or genetically conditioned metabolic disorders) and, particularly, external factors, which include excessive stress, diet, and effects of viruses and toxic substances. The smooth surface of the cartilage is disrupted by these

factors, movement is limited and, with increasing wear, the degree of pain also grows. The inherent regenerative capacity of the cartilage is relatively low, and it is therefore necessary to consider the use of so called chondroprotectives – substances which protect the cartilage and effectively stimulate its growth - as early as in youth. The following is, therefore, essential to maintain healthy bones and joints: to exercise sufficiently, yet reasonably, for the one's lifetime, to provide the body with sufficient amounts of substances essential for the production and regeneration of these tissues, and to prevent their damage by toxic substances (toxic substances from the environment and metabolic waste products). It should be pointed out that the bone is subjected to constant changes; new bone production is going on, enabled by bone cells called osteoblasts, and, at the same time, bone resorption or bone mass degradation is under way, which is managed by osteoclasts. This process in general is called bone turnover or bone remodelling. Bone turnover before the age of 25–30 years is much in favour of osteoblastic new bone formation – bone mass hence grows. Following a variously extensive period of balanced bone turnover, a gradual bone mass loss occurs in all individuals, due to a turnaround in the bone remodelling in favour of osteoclastic resorption. Hence we can actively work on producing as much bone mass as possible only by the age of 30, as from our thirtieth birthday on we can only influence the rate of its loss. Bone and joint diseases are gradually

moving into the category of so called civilisation diseases, whose development is partially caused by our unhealthy lifestyle and environmental pollution. Due to its unique and well-balanced combination of active substances, Skeletin is an ideal product for the support of bone tissue growth in adolescence, for decelerating the rate of bone tissue loss at a later age, and for the protection and enhancement of joint cartilage regeneration.

## Osteoporosis

Osteoporosis is defined as a syndrome with pathologically escalated bone resorption accompanied by a structural disorder in bone micro-architecture, conditioning higher susceptibility to fractures. Statistical data suggest that in a civilised society the incidence of this disease has been pronouncedly growing. The causes of this growth are considered to be especially the unhealthy lifestyle (lack of exercise, poor dietary habits, use of addictive substances, environmental pollution, etc.), genetic factors and long-term stress. Another understandable cause is the gradual ageing of the population. Thinning of the bones (as osteoporosis is sometimes called) usually develops without any signs and demonstrates only at an advanced stage by the incidence of fractures occurring also at a very low degree of load. The incidence of osteoporosis is estimated at approx. 7% of the population, but with regard to the symptom-free period, its actual rate of occurrence is expected to be much higher.

# Introduction to the topic

Thanks to the application of sophisticated diagnostic methods, particularly densitometry, these “silent” cases may be identified and treated in time. According to the CTK press agency, 10 patients die every day in the Czech Republic for complications associated with this disease (these usually represent pneumonia). The most frequent and most serious complications are hip neck fractures, which jeopardise particularly seniors and post-menopausal women. Other typical osteoporosis-related fractures include fractures of the vertebral body and carpal bones.

## **General principles of osteoporosis treatment:**

- 1) adequate exercise – although one might think that people prone to fractures should avoid movement, the very opposite is true, as natural physical exercise stimulates the osteoblastic activity and thus physiologically supports bone tissue formation;
- 2) sufficient calcium intake – this has both preventive and therapeutic effects (see below);
- 3) availability of the active form of vitamin D (1, 25-dihydroxycholecalciferol)
- 4) limiting negative influences – smoking, alcohol, toxins, stress, medicines enhancing bone resorption.

A major risk factor for the development of osteoporosis is, in addition to those which we can principally influence, a reduction in sexual hormones

which occurs naturally after the menopause. As much as one third of menopausal women are reported to develop osteoporosis due to dropping estrogen levels, which have a proven protective effect on the bone. Naturally then, also women with prematurely removed ovaries are in higher risk of osteoporosis. Hormone replacement therapy is hence justified also with a view to reducing the risk of fractures. Osteoporosis – the “silent bone thief” may develop over an extensive period of time without any signs and pain; its presence may be indicated by a bending back and a gradual decrease in body height. Bone mass loss is an inevitable fact and osteoporosis proper is currently considered an incurable disease and for this reason it is necessary to pay attention to bone mass loss prevention well in advance!

## **The effects of Skeletin in respect of bone mass loss:**

Skeletin is a source of all minerals necessary for healthy bone formation – calcium, magnesium, phosphorus and silicon. Due to the content of cuttlefish bone, it effectively enhances kidney function, positively influencing the hormonal control of calcium metabolism in the body. Vitamins A, D and K support bone tissue production. Manganese, silicon, vitamin K and phytoestrogens from soybean oil have also a preventive role in the development of osteoporosis.

## Arthrosis and other degenerative joint conditions

**ARTHRITIS** – acute joint inflammatory condition demonstrating as oedema, redness, pain and restricted movement

**ARTHROSIS** – a gradual process resulting in joint cartilage loss and damage

**RHEUMATOID ARTHRITIS** – a type of arthrosis caused by an immune system disorder and by accumulation of antibodies in the joint lining

**GOUT** – or uratic arthritis, a joint damage caused by accumulation of uric acid

Experts report that joint cartilages begin to wear off as early as after the 25th year of life. At the age of 40, 15% of people suffer from arthrosis and at the age of 70 as much as 90% of population are affected by this disease. In the Czech Republic, inflammatory joint damage is the most frequent reason for getting disability pension and the second most frequent cause of working disability. Most often, large bearing joints (knees, hips and shoulders) and the spine are affected. Joint cartilage wear may have various causes – excessive load due to active stress sport or due to excess body weight, a trauma, inflammation, congenital abnormality, old age or connective tissue

metabolic disorder. Regardless of the cause, joint cartilage degeneration results in restricted mobility and crackling in the joints, a constant pain, and often leads to necessary replacement of the damaged joint with endoprosthesis. Traditional conservative therapy consists of the administration of analgesics (paracetamol), non-steroidal anti-inflammatory agents (NSAIDs - Ibuprofen, Diclofenac, Naproxen, Indomethacin) and locally applied corticoids. Long-term administration of paracetamol for alleviation of joint pain is, however, known to result in a severe liver and kidney disorder, and, furthermore, it is necessary to bear in mind that eliminating the joint pain has no therapeutic effect whatsoever, and, on the contrary, results only in further excess load and damage. NSAIDs induce the development of gastric ulcers and have negative effects on the cardiovascular system. The therapeutic effect of corticoids is rather short-term and, moreover, quite disputable, as they suppress natural immunity and the application of these substances into the joint paradoxically results in suppressed production of cartilage collagen. The traditional pharmacotherapy of joint conditions hence seems to bring more risks than benefits. Joint cartilage regeneration by natural substances has no adverse effects and is the often sought therapeutic approach for degenerative alterations, as advanced degeneration of joint cartilage is, from the perspective of official medicine, incurable. Arthrotic alterations are in close correlation with the function of the kidney and it is therefore important to

# Introduction to the topic

focus particularly upon this organ when treating this disease, as it is through the activity of the kidneys that waste products, including uric acid (a protein metabolism waste product) are excreted from the body. Where the kidney function is weakened, uric acid, in the form of small crystals, accumulates in joints as well as in soft tissues, supporting inflammatory processes and causing pain. Uric acid production may be limited by adjusting one's diet – restricted consumption of alcohol, meat and smoked products, black tea and in particular salt, which is involved in the retention of uric acid in the body.

## **Skeletin effects in the treatment of joint diseases:**

Due to its content of cuttlefish bone, Skeletin is capable of supporting and harmonising kidney function.

The protection of cartilaginous cells from toxic damage is safeguarded by a number of substances with synergic effects contained in Skeletin. Vitamins C, A, E as well as bioflavonoids and manganese are substances with pronounced antioxidative effects. Moreover, chitin and chitosan together with vitamin C are involved in elimination of heavy metals. When treating a joint disease, it is of utmost importance to act against the inflammation. This is the ability of n-3 unsaturated fatty acids, chlorophyll, silicon, sulphur and vitamins E and C. The contents of collagen and substances which enhance collagen production – vitamins C, D, A and manganese, as

well as substances with healing effects – manganese, chlorophyll and vitamins C and E safeguard joint cartilage regeneration. Cartilage synthesis is supported also by vitamins of the B range and magnesium. Moreover, Skeletin has the ability to alleviate pain due to its content of calcium, vitamin C and manganese.

# Skeletin composition

**Product form:** soft gelatinous capsule

**Capsule size:** 770mg

## Active substances

Ingredient	Content per capsule
Micronized cuttlefish bone	100 mg
Hydrolysed collagen	52.5 mg
Fish oil (obtained from <i>Engraulis japonicus</i> )	35 mg
<i>Urtica dioica</i> (extract)	15 mg
Manganese sulphate ( $MnSO_4$ )	12.2 mg (of which 3mg Mn)
<i>Fructus cynosbati</i> (extract)	10 mg

**Excipients:** Soybean oil, lecithin, beeswax

## Recommended dosage

Due to the chronic nature of the problem and with regard to the fact that bone and cartilage tissue regeneration requires longer periods of time, it is recommended to use Skeletin for the minimum period of three months.

### Recommended daily dose:

2 capsules 1–3 times per day, ideally after meal.  
Do not exceed the recommended daily dose.

### Warning:

The product is not intended for children under

3 years of age, pregnant and breast-feeding women. Not recommended for persons with bee, soybean and seafood product hypersensitivity. Dietary supplements must not be used to substitute all-day varied diet.

## Storage method

With respect to the content of unsaturated fatty acids the product should not be exposed to excessive light or heat. The ideal storage temperature is 10–25°C. Do not freeze.

## Approval of the Czech Ministry of Health

OVZ – 35.0 – 18.4.06 – 18772

# Description of effects of individual ingredients

## CUTTLEFISH BONE

**Zoology:** Cuttlefish bone is a reduced shell deposited inside the body of the sepia –cephalopod class (Cephalopoda), mollusc family (Mollusca)

**English name:** cuttlefish bone, cuttlebone

**Latin pharmacology name:** os sepiae seu sepiellae

**Name in Traditional Chinese Medicine:** wu zeì gu

Cuttlefish bone is formed by calcium carbonate ( $\text{CaCO}_3$ ), calcium phosphate ( $\text{Ca}_3(\text{PO}_4)_2$ ), sodium chloride ( $\text{NaCl}$ ), magnesium chloride ( $\text{MgCl}_2$ ), chitin and chitosan. Furthermore, it contains valuable mineral substances such as iron (Fe) and iodine (I). It is valued especially as an outstanding and biologically readily available source of calcium, phosphorus and magnesium, whose supply is necessary for proper bone and teeth mineralisation (micronized = finely ground).

### Calcium (Ca)

1) Calcium is a mineral which is necessary for the formation of bones and teeth. Of the total amount of calcium in the human body, 99% is deposited in bones and teeth and the rest in the form of hydroxyapatite  $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ , which is responsible for their hardness and strength. This bone mineral represents as much as 60% of weight of bone and tooth tissue. Lack of calcium is signalled, apart from other, by increased

development of dental caries.

Calcium also works as a balance regulator for those hormones which are responsible for calcium metabolism in the body. It suppresses the secretion of parathormone (hormone of the parathyroid glands, which reduces blood calcium levels and supports calcium deposition in bones).

- 2) In addition to the formation of bone mass, calcium is also involved in nervous impulse transmission, in blood clotting and regulation of heart rhythm.
- 3) Calcium has the ability to alleviate pain in rheumatism and gout.

Although it may seem that there are plenty of calcium sources in our diet, it has been evidenced that its supply in an average individual does not cover the requirement of the organism. Low calcium intake in young people is compensated by increased intestinal calcium absorption which is conditioned by increased production of active vitamin D (D3) in the kidneys. Gradually, however, the ability to increase intestinal absorption grows smaller and in the old age disappears completely. This is why seniors are much more sensitive to lack of calcium. Lack of calcium is also reported to be caused by excess intake of phosphorus, which is present in all flavoured soft drinks and depletes bones of calcium, as well as by excessive use of salt which presents a burden for the kidneys as an organ which is essentially involved in calcium metabolic equilibrium. Also, excessive consumption of proteins increases calcium loss

through urine, due to the increased acidity of the inner environment.

Low calcium intake in children and adolescents results in underdevelopment of bone mass and earlier onset of problems related with increased bone resorption after menopause and in the old age. Higher calcium requirement is also in pregnant and breast-feeding women.

**Signs of calcium deficit:** white spots on the nails.

### **Phosphorus (P)**

Its inorganic form is present in the bones and teeth where it is, together with calcium, involved in their mineralisation. Phosphorus in its organic form is part of phospholipids, phosphoproteins and nucleic acids. It is also decisive for the energy metabolism, as in the form of ATP it acts as the carrier of macroergic bonds that transfer energy.

### **Magnesium (Mg)**

Approx. 70% of magnesium in the body is present in its inorganic form in the bones. The rest is present in soft tissues, particularly in muscles. The chief role of magnesium is hence bone formation and reduction of neuromuscular irritability in muscles. Lack of magnesium does not allow for bone firming, it disrupts the production of collagen and during developmental stages its deficit may cause bone deformations. Magnesium is of primary importance as the supportive element of calcium metabolism, it contributes to maintaining bone and enamel (it

strengthens teeth) and it calms down the nervous system.

### **Iron (Fe)**

Iron is the most frequently occurring element in the human body. Its major task in the body is its involvement in oxygen transport. It forms part of haemoglobin in red blood cells and myoglobin in muscles and it plays a major role in the process of electron transport in the ventilatory chain.

### **Iodine (I)**

Iodine is a trace element whose principal function in the human body is its involvement in the production of thyroid hormones - triiodothyronine and thyroxin. Iodine also prevents the development of dental caries.

## **CHITIN AND CHITOSAN**

Cuttlefish bone contains also chitin and chitosan. Chitin is an amino polysaccharide (beta-1,4-poly-N-acetyl-D-glucosamine) – the most common natural polymer, whose molecular structure is similar to vegetable cellulose. Chitosan is a deacetylated form of the chitin molecule. In the past decade, these substances were subjected to a huge number of experiments and it has been discovered that their effects may be applied in a broad range of industries, from cosmetics, dietetics, and biotechnologies, through agriculture and improvement of the quality of water, to textile and paper industry. Although chitin

# Description of effects of individual ingredients

and chitosan are not digestible for the body and, like cellulose, are not absorbed in blood, their revitalising effects on the whole body have been demonstrated. In the acid environment of the digestive tract chitin and chitosan are dissolved and a positively charged gel is formed, due to which these substances obtain a potent absorption capacity and bind a number of various harmful substances on their surface – in particular heavy metals and toxins from food. They prevent the absorption of fats and cholesterol and, due to this property, they are a popular ingredient of weight-reduction products. Logically, these substances have beneficial effects on the peristaltic activity of the intestines; they prevent constipation and shorten the time of passage of chyme through the intestine, effectively preventing the development of colon cancer. With respect to their beneficial effects on the musculoskeletal system it should be pointed out that chitosan is capable of reducing uric acid blood levels, thus principally reducing the risk of deposition of this waste products in joints and the development of gout. Moreover, it has been discovered that chitosan helps to alleviate pain, it supports calcium absorption and strengthens the bones. Furthermore, its beneficial effects on alleviating the signs of allergies and rheumatism and on the support of good hair, nail and skin condition due to its ability to enhance the healing process have been reported.

## **Cuttlefish bone in traditional Chinese medicine (TCM)**

In Chinese medicine, cuttlefish bone is classified as a substance of salty taste and slightly warm nature. Its use is related to the kidney, liver and stomach meridian. It is often used as an agent for neutralising excessively acidic environment in the stomach and to alleviate stomach pain. Thanks to its astringent properties it stops bleeding, both external and internal. It is also used to suppress humidity and for the treatment of gynaecological discharges caused by insufficient kidney function, and for the treatment of stomach ulcers. Due to its calcium content, cuttlefish bone in Chinese medicine is also recommended for the treatment of symptoms appearing when the body lacks calcium, such as breaking nails, dental caries, bone softening and thinning, rickets and growth stagnation. Cuttlefish bone is also used to enhance the function of the kidneys which are involved in the maintenance of stable internal environment – they safeguard constant blood concentrations of important minerals, calcium and phosphorus besides others. The kidneys filter toxins and waste products of protein metabolism – uric acid – from the blood. Where the function of the kidneys is not adequate, uric acid is deposited in joints and causes a painful joint disease (uratic arthritis). It is also in the kidneys where the hormone calcitriol (1, 25- dihydroxy cholecalciferol) is produced, known as the active form of vitamin D (D3) which helps to maintain calcium bound in the bones and helps to maintain calcium blood levels by controlling active passage of calcium through the intestinal wall.

## COLLAGEN

Collagen is essential for the proper functioning and formation of joint cartilages, capsules, ligaments of the bones and skin. In the bone, it forms a sort of network thanks to which the bone may be mineralised, and in a cartilage it forms, together with water, hyaluronic acid and proteoglycans (glucosamin and chondroitin sulphate), a part of intercellular mass. Collagen is a fibrous macromolecule which is composed of three polypeptide fibres, which wind around each other and the resulting structure then looks like a strong marine rope.

The amino acid composition of collagen is quite extraordinary – no other protein structure in the body contains such high amounts of glycine, proline, lysine and their hydroxylated forms. This is why it is virtually impossible to substitute collagen with anything in nutrition. When a joint degenerates, collagen loss occurs and collagen then has to be supplied to the body.

Many a study has shown that collagen can modify the activity of cartilaginous and bone cells (chondrocytes and osteoblasts) and its administration may hence help both in starting and advanced forms of arthrosis, which suggests that preventive use of collagen is also beneficial.

In Skeletin, collagen is present in so called hydrolysed form, which means that the original collagen macromolecule has been enzymatically broken down to much smaller particles – peptides and

amino acids. Peptides and amino acids are absorbed through the digestive tube to the blood wherefrom they are transported to the target tissue, cartilage, where they act as building stones for the synthesis of collagen proper as well as stimulants of the synthetic activity of cartilaginous cells – chondrocytes. This is how collagen supports the regeneration process in joint tissues and replaces the collagen lost by excessive strain, inadequate nutrition or inflammatory processes.

A pleasant side-effect of collagen use is improved skin elasticity, smoothness and rejuvenation.

## FISH OIL

Source of fish oil:

**Czech name:** ančovička japonská

**English name:** Japanese anchovy

**Latin name:** *Engraulis japonicus*

Fish oil is a natural source of vitamins A and D and n-3 unsaturated fatty acids. These unsaturated fatty acids (also called omega-3) are transformed in the human body to the anti-inflammatory prostaglandins, which much help in the treatment of all inflammatory conditions, hence also arthritis and rheumatic diseases.

In terms of bone growth and restoration vitamin D has two major roles. It enhances the absorption of minerals (Ca, P, Mg) from the intestine and, also,

# Description of effects of individual ingredients

it much supports calcification or the deposition of calcium into bone mass and prevents calcium depletion from the bones. Lack of vitamin D demonstrates, apart from other, in the form of deteriorated bone mineralisation, and has direct correlation with the development of osteoporosis. Vitamin D in the bones is also important for the production of collagen. The administration of vitamin D is essential especially in winter time (lack of sunlight) and in seniors, whose ability to produce active vitamin D3 in the kidneys is limited. Vitamin A is involved in all major functions of the human body. It is necessary for eyesight, for the function of sexual glands, for healthy look of the skin and also for bone growth and development (it is also involved in the production of collagen). In the last few years, attention has been drawn to its anti-tumour effect.

## **MANGANESE SULPHATE (MnSO<sub>4</sub>)**

It is the source of manganese and sulphur.

### **Manganese (Mn)**

Manganese is a biogenic trace element which plays a number of important roles in the human body.

It is, particularly, part or cofactor of the enzyme glucosyl transferase which is essential for the synthesis of mucopolysaccharides important for the formation of cartilages and bones. Manganese supports the healing process and significantly

reduces pain in the joints.

Lack of this element in children may result in growth deceleration and bone deformations due to the deficient function of growth cartilages.

In adulthood, the lack of manganese affects the development of painful degenerative joint conditions and osteoporosis. Lack of manganese in pregnancy even causes foetal damage.

Manganese supports the usability of vitamin C, and this again beneficially influences the condition of connective tissues due to the support of collagen metabolism.

Moreover, manganese is important for the proper function of the brain and sexual glands and it is part of some enzymes which protect tissues from damage caused by free radicals, and hence also acts as an antioxidant.

### **Sulphur (S)**

Sulphur helps to sustain good quality of the skin, hair and nails and it is involved in bone and connective tissue formation. It is essential for the production of collagen (individual collagen polypeptide chains are linked by so called sulphur bridges). Due to its antioxidative and detoxifying effects it helps to eliminate damaged tissues and reduces free radical levels in the joints.

## NETTLE

**Czech name:** kopřiva dvoudomá

**English name:** Stinging Nettle, Common Nettle

**Latinský název:** *Urtica dioica* L.

Stinging (Common) Nettle is a typical cosmopolitan plant which is widely spread across the temperate zone all over the world. It is very modest in terms of its living conditions; it grows in ditches, rubble sites, deserted places and, most of all, on soils rich in nitrogen.

Although this sturdy queen of perennial weeds is not much welcome by gardeners, in folk medicine it has won huge and deserved recognition. Our grandmothers often said “Raise the hat to the elder, and kneel in front of the nettle”, and they surely knew why. In the old times, nettle was considered a magic plant which was to provide protection from witches and demons. It was worn on the body as an amulet, it was added to the forage for livestock, and it was dug into a corner of a freshly ploughed field to protect the crops from caterpillars and birds. No wonder nettle has been considered a miraculous plant, as the spectrum of its therapeutic effects is indeed very broad, and, moreover, it may be used also as full-fledged food. Its definite benefit is also the fact that it does not have any adverse effects and may be taken also in the long term.

Of all plants, nettle has the most potent blood cleansing ability and because it helps the body to

eliminate toxic substances and metabolic products, it is the chief ingredient of all herbal detoxifying mixes. It has beneficial effects on liver, gall bladder, kidney and urinary tract conditions. It cleanses the entire digestive tract and stimulates intestinal activity. Nettle stimulates the formation of blood cells in bone marrow and for this reason it is suitable as a supportive agent in anaemia treatment and in large blood losses. Due to its ability to reduce blood sugar levels, nettle is a suitable supportive drug in diabetes. Recently it has been demonstrated that nettle may be applied in the treatment of allergies. In terms of joint diseases, the application of nettle in the treatment of arthritis, rheumatism and gout in respect of its anti-inflammatory and healing effects and due to its ability to support the elimination of uric acid from the body is essential. The active substances found in the nettle include primarily chlorophyll, silicic acid, organic acids, and a range of vitamins and minerals.

The importance of chlorophyll in human nutrition has not been sufficiently recognised as yet, although it is known that it is a substance which enhances the overall regeneration of the body, as it has toning and stimulating effects on the metabolism. It has beneficial effects on blood cell formation and due to its ability to neutralise free radicals it decelerates the ageing of the organism. Chlorophyll has anti-inflammatory effects; it accelerates tissue growth and healing, and supports the immune system. Nettle is one of the richest sources of chlorophyll in the vegetable kingdom.

# Description of effects of individual ingredients

In addition to chlorophyll, nettle also contains a large amount of orthosilicic acid which is an important source of biologically well available silicon. Silicon is of huge importance for the function of the human body, as it is part of a whole range of enzymes and it is much involved in the formation and restoration of collagen and elastin fibres which form part of any connective tissue (bones, cartilages, skin), and it safeguards their elasticity and strength. The presence of silicon is absolutely essential particularly for the production of collagen in joint cartilages. This element also speeds up the healing of fractures and is involved in sustaining bone density as it supports the deposition of calcium in bones. Thus it helps to prevent osteoporosis and it is an important factor in the development of the musculoskeletal system in childhood. Furthermore, it pronouncedly improves the quality and elasticity of blood vessels and skin; it prevents the formation of wrinkles and has anti-inflammatory effects. Nettle is also a rich source of minerals, particularly calcium (Ca), iron (Fe), magnesium (Mg) and phosphorus (P) and a number of vitamins – B<sub>2</sub>, B<sub>6</sub>, K, E, C.

## FRUCTUS CYNOSBATI

**Czech name:** růže šípková

**English name:** Wild Rose

**Latin name:** Rosa canina L.

The wild rose is a thorny shrub which can be as much as 3 meters high; it is abundant on dry and sunny

hillsides. This plant blossoms in June and July and in autumn its red accessory fruit full of hairy achenes called hips (fructus cynosbati) ripen. In Ancient Greece and Rome, rose was popular not only as a medicinal plant, but it was the symbol of beauty, youth, love, and silence and it was dedicated to the goddess Aphrodite. Rose blossoms were part of magic mixtures to attract love; juice from petals was added to baths for the same reason. It is likely that people picked hips as early as in prehistoric times. This has been evidenced e.g. by a finding of a stock of hips at a Neolithic settlement in Great Britain (circa 2000 years old). The Latin name of the wild rose species (canina) probably echoes the ancient belief of man that the roots of wild rose may cure a bite of a rabid dog.

Hips contain large amounts of substances essential for the human body. These are, in particular, vitamins C, A, K, B<sub>1</sub>, B<sub>2</sub>, E and organic acids (nicotinic, apple and citric). The yellow seeds contain a mixture of bioflavonoids (campherol, quercetin and catechins), which have antioxidative effects and increase urine production, which helps quicker elimination of metabolic waste products. Hips primarily range among the richest sources of vitamin C (ascorbic acid). Unlike most animals, man cannot produce this essential vitamin in the body, and hence depends on its supply from food. As vitamin C is soluble in water, the human body cannot make its reserves, and it is therefore important for its supply to be regular. The effects and applicability of vitamin C

from hips are much supported by the presence of the flavonoid complex, which prevents its oxidation and degradation. The range of vitamin C effects is very broad, but one of its major tasks is involvement in the production of new collagen as it is part of the enzyme hydroxylase which participates in the synthesis of collagen. The lack of vitamin C and also lack of certain flavonoids results in impaired collagen structures and hence also worsened condition of any connective tissue – bones, cartilages, muscles, sinews, ligaments and skin. Vitamin C is therefore absolutely essential for the restoration, healing and regeneration of not only bones and joints, but also skin and muscles. Its anti-fatigue and primarily analgesic effect, which is caused by vitamin C chemically breaking down substances which act as pain perception carriers, is important not only in respect of the musculoskeletal system. Vitamin C also enhances immunity, prevents infections and is involved in the elimination of heavy metals from the body and for this reason it is necessary in the treatment of rheumatic conditions.

**Vitamin K**, which is also contained in hips, is not only an important factor for correct blood clotting, but it is also directly involved in the formation of bones and acts preventatively against osteoporosis.

**Vitamin E** has potent antioxidative properties which are, furthermore, supported by the co-presence of vitamin C. The antioxidative effect of vitamin E

consists of the elimination of free radicals from the body, which cleanses the organism, it enhances vitality, protects cells from ageing and damage, and improves regeneration and healing of tissues.

### **SOYBEAN OIL**

It is part of Skeletin as the carrier of active substances, yet its own activity in respect of the musculoskeletal system is also substantial. Soybean oil is a very rich source of vitamin E. This antioxidant, soluble in fat, has proven anti-inflammatory effects; it enhances connective tissue growth and is necessary for the healing of all wounds. Its deficit is associated with the risk of rheumatoid arthritis. Moreover, vitamin E is also generally known to slow down the ageing process of the organism. Furthermore, soybean oil contains natural substances of steroid nature (phytoestrogens) – sitosterol, stigmasterol and campesterol, which have been evidenced to have preventive effects on the development of osteoporosis, particularly in menopausal women.



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