CALCIVITASE®
for the preservation of normal and healthy bone

with calcium, inulin and vitamins D3 and K
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CALCIVITASE® is especially well tolerable and vegetarian

**Nutritional supplements**

**CALCIVITASE®, 100 tablets**

**Ingredients:** Calcium carbonate; inulin; rapeseed oil, hardened; maize starch; filler: cross-linked carboxy methyl cellulose; coating: hydroxypropyl methylcellulose; vitamin D₃ (colecalciferol); vitamin K (phyllquinone).

12/2012

**CALCIVITASE® at a glance**

- Gluten-free
- Lactose-free
- Contains no yeast and gelatine
- Vegetarian
The sunshine vitamin – vitamin D₃

Vitamin D₃ has a key function for health. It is involved in thousands of regulatory processes in the human body. A vitamin D₃ deficiency can therefore very considerably increase the risk of a medical disorder, primarily in the winter. Because the UV radiation from the sun plays an important role in the formation of vitamin D₃.

About 90 percent of vitamin D₃ is created in the skin. Since the body itself forms vitamin D₃ with the aid of UV radiation from the sun, one would suppose that vitamin D₃ deficiency presents no problem in Germany, at least in the summer.

Vitamin D₃ deficiency is widely distributed and seasonal

A vitamin D₃ deficiency is in Germany is defined at <20 μg/l 25-hydroxy vitamin D₃, the active form of vitamin D₃, in the blood of. Even in summer, the vitamin D₃ concentration lies below this value in 50 % of women. In winter this problem gets worse: from October to March the intensity of solar radiation in Germany is too low to produce sufficient amounts of the vitamin.

The ability to form vitamin D₃ in the skin declines significantly with age. In severe cases, a vitamin D₃ deficiency in adults leads to osteomalacia (bone softening). Typical symptoms of a vitamin D₃ deficiency are loss of muscular strength and bone pain. Furthermore, a deficiency increases the risk of osteoporosis.

What is the optimal vitamin D₃ level in the body?

In order to determine the vitamin D₃ status, the concentration of 25-hydroxy vitamin D in the blood is measured. A 25-hydroxy vitamin D concentration below 20 ng/mL indicates a vitamin D₃ deficiency, which significantly increases the risk of diverse disorders. A value between 20 and 30 ng/mL is considered to be a restricted vitamin D₃ supply. Nowadays the range between 40 and 80 ng/mL is regarded as the optimal vitamin D₃ level. Particularly for people over 60 years of age, the 25-hydroxy vitamin D concentration in the blood should lie above 30 ng/mL.
Synthesis and functions of vitamin D₃

Skin → Pre-vitamin D → Pre-vitamin D₃ → Vitamin D₃

- 80–90% from UVB (297–300nm)
- 10–20% from heat

Liver
- 25-hydroxy Vitamin D₃

Intestine
- Vitamin D₂/₃

Kidney
- 1,25-dihydroxy Vitamin D₃
  - Autocrine effect
  - Endocrine effect

Blood
- 10–20% from food

Immune response
- Autoimmune processes
- Cell proliferation & differentiation
- Immune response
- Vascular vessel
- Sugar utilization
- Blood pressure
- Calcium balance
- Absorption in intestine
- Reabsorption kidney

Fig. 1
Calcium and vitamin D$_3$ prevent osteoporosis

What is osteoporosis?

The medical disorder osteoporosis is characterized by reduced bone mass and porous bone structure. Both allow the bone to break more easily. Typical fracture sites are the backbone, hip, or wrist. The disorder can also lead to fractures that occur without any visible external influences. Osteoporosis is the most frequent bone disorder with increasing age. Eighty percent of all cases of osteoporosis affect post-menopausal women.

Causes

The bone mass is built up within the first 30 years of human life, then reaches a high point and slowly declines again in the later period of life. The hormone and calcium metabolism play a large role in bone mass. Inadequate bone formation in younger years is also a risk factor for the later development of osteoporosis.

Osteoporosis is also influenced by other factors, such as the intake of certain medications, some organ dysfunctions (thyroid gland, intestinal etc.) or nutritional deficiencies, anorexia and inadequate exercise. Osteoporosis can furthermore be favored by chronic inflammatory diseases such as chronic polyarthritis, Morbus Crohn, etc.

Exercise, calcium and vitamin D$_3$ act against osteoporosis

Exercise strengthens and trains not only the musculature, but also the bone structure. A supply of calcium to the body and vitamin D$_3$ as well as regular bodily activity have an important preventive function.

Exercise can also help to reduce bone loss in the case of already existing osteoporosis. Calcium taken up from foods can only be incorporated in the bone when coupled with sufficient exercise and an adequate supply of vitamin D$_3.$
Preventing Osteoporosis in all Women

Calcium
Vitamin D
Medication
Reduce Alkohol
Stop Smoking
Weight-bearing exercise
Prevention

Check your risk factors

Fig. 2

Osteoporosis and aging

Total amount of calcium in skeleton (g)

Male

Female

1 Peak of bone mass
2 Loss of bone mass during menopause
3 Loss of bone mass by ageing

Fig. 3
Calcium contributes to the normal functionality of digestive enzymes and supports the preservation of bone and teeth.
How much calcium does the body require?

The German Society for Nutrition (DGE) has compiled the daily requirements of a healthy person in the following reference value table.

<table>
<thead>
<tr>
<th>Age</th>
<th>Calcium (mg/day)</th>
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</thead>
<tbody>
<tr>
<td><strong>Infants</strong></td>
<td></td>
</tr>
<tr>
<td>0 to under 4 months</td>
<td>220</td>
</tr>
<tr>
<td>4 to under 12 months</td>
<td>330</td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td></td>
</tr>
<tr>
<td>1 to under 4 years[a]</td>
<td>600</td>
</tr>
<tr>
<td>4 to under 7 years[b]</td>
<td>750</td>
</tr>
<tr>
<td>7 to under 10 years</td>
<td>900</td>
</tr>
<tr>
<td>10 to under 13 years</td>
<td>1.100</td>
</tr>
<tr>
<td>13 to under 15 years</td>
<td>1.200</td>
</tr>
<tr>
<td><strong>Adolescents and adults</strong></td>
<td></td>
</tr>
<tr>
<td>15 to under 19 years</td>
<td>1.200</td>
</tr>
<tr>
<td>19 to under 25 years</td>
<td>1.000</td>
</tr>
<tr>
<td>25 to under 51 years</td>
<td>1.000</td>
</tr>
<tr>
<td>51 to under 65 years</td>
<td>1.000</td>
</tr>
<tr>
<td>65 years and older</td>
<td>1.000</td>
</tr>
<tr>
<td>Pregnant women[c]</td>
<td>1.000</td>
</tr>
<tr>
<td>Nursing women[d]</td>
<td>1.000</td>
</tr>
</tbody>
</table>

[a] These are estimated values for nursed infants  
[b] These are estimated values for the calcium intake via mother’s milk and supplementary food  
[c] Pregnant women < 19 years 1200 mg  
[d] Nursing women < 19 years 1200 mg
Inulin

Inulin is prebiotic, soluble roughage contained in numerous varieties of vegetables and fruits (e.g. bulbous plants, artichokes, topinambur, salsify, asparagus, wheat, oats, bananas, chicory) and therefore has already always been a component of our diet.

Inulin is not broken down by digestive enzymes and reaches the large intestines intact. Only there is inulin fermented by bifido bacteria of the intestinal flora. Inulin therefore acts as soluble roughage and ensures a regulated digestion. Furthermore, inulin has a prebiotic effect which ensures healthy intestinal flora. Inulin is suitable for diabetics since it does not lead to increased sugar resorption.

Improvement of the calcium intake and bone mineralization

On an average, only about a third of the calcium taken up with the diet is reabsorbed. The remaining two thirds is once again eliminated without being used. Apart from a sufficient calcium intake, an effective availability is therefore important.

Aside from the active intake by the small intestine, calcium can also be taken up in the large intestines by passive diffusion. Calcium is predominantly found in an undissolved form in the large intestines. The fermentation of inulin produces short-chained fatty acids and lactic acid, which reduce the pH value in the large intestines. This shift of the pH value increases the solubility of the calcium and thus favors its intake by the mucous membranes of the large intestines. Several intervention studies have been able to demonstrate improved calcium absorption by inulin.[1]

Positive Effects of inulin

Inulin

- Healthy intestinal flora
- Regulated digestion
- Improved calcium absorption

Fig. 4
Wrongly an outsider – vitamin K

Not very many people know about vitamin K and realize how important it actually is for their body. Vitamin K controls not only the blood coagulation, it also activates bone formation.

Three micronutrients are involved in the formation of bone structures (hydroxylapaitite): calcium, vitamin D₃ and vitamin K. An important component of the bone is osteocalcin. The synthesis of these proteins is regulated by vitamin D₃. Vitamin K activates osteocalcin. Osteocalcin can bond to calcium and form hyroxylapatite structures in the bone only after this activation.

Vitamin K hinders calcium in the blood from settling as lethal deposits in the arteries, and thus keeps blood vessels clean. Calcivitase therefore contains a combination of calcium and vitamin K.
Role of vitamin K in bone

![Diagram showing the role of vitamin K in bone]

Fig. 5

Role of vitamin K in blood vessels

![Diagram showing the role of vitamin K in blood vessels]

Fig. 6
Constituents

<table>
<thead>
<tr>
<th></th>
<th>Average content per tablet</th>
<th>Average content per daily intake (3 tablets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>250 mg (31%)*</td>
<td>750 mg (94%)*</td>
</tr>
<tr>
<td>Vitamin D₃</td>
<td>80 I.E. / 2.0 μg (40%)*</td>
<td>240 I.E. / 6.0 μg (120%)*</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>20 μg (27%)*</td>
<td>60 μg (80%)*</td>
</tr>
<tr>
<td>Inulin</td>
<td>100 mg</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

* Reference quantities for the daily intake of vitamins and minerals – nutrient reference values (NRV)

Calcium contributes to

- a normal process of blood coagulation, energy metabolism, muscle functionality, signal transmission between the nerve cells, and to the normal functionality of digestive enzymes
- the functionality of cell division and specialization
- the preservation of bone and teeth

Vitamin D₃ contributes to

- the preservation of bone mass
- a normal intake/utilization of calcium and phosphorus
- a satisfactory calcium level in the blood
- the preservation of muscle functionality and teeth
- the support of the immune defense system and cell division

Vitamin K contributes to

- the preservation of bone mass
- normal blood coagulation

Inulin contributes to

- an orderly digestion
- healthy intestinal flora
- improved intake of calcium via the mucous membranes of the large intestines

Recommended intake

Adults take one tablet of CALCIVITASE® three times daily at meals with enough liquid. A long-term sufficient calcium and vitamin D₃ intake is also especially recommended for women after the age of 50.

A diversified and balanced diet and a healthy lifestyle are important.
CALCIVITASE® is especially well tolerable and vegetarian

Nutritional supplements

CALCIVITASE®, 100 tablets

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Contact and information

Further information is available at:
www.biosyn.de

If you would like to receive a patient folder, please get in touch with us. We will also gladly send you a sample, and are at your disposal for further inquiries and additional information.

Are you interested in our Online Newsletter?
Simply send an e-mail with the code word CACIVITASE® to:
information@biosyn.de

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CALCIVITASE®
for the preservation of normal and healthy bone

biosyn Arzneimittel GmbH
Schorndorfer Str. 32
70734 Fellbach
Germany

information@biosyn.de
www.biosyn.de
www.biosyncorp.com

Managing Directors: Dr. Thomas Stiefel and Ortwin Kortwitz
Commercial Register: County Court Stuttgart HRB 262712
Place of performance: Fellbach, Legal Venue Stuttgart