ZINKOTASE®
Zinc protects against the common cold

• High-dose zinc shortens a common cold by up to three days
• Zinc strengthens the immune system
• For a sufficient zinc supply – ZINKOTASE®
For a sufficient zinc supply – ZINKOTASE®

To be on the safe side, the body’s zinc requirements can be covered by drug products such as zinc aspartate from the pharmacy, for example ZINKOTASE® from biosyn. Our organism incorporates the trace element especially well by coupling it with the body’s own amino acid aspartate. You can purchase ZINKOTASE® without prescription in the pharmacy. A film-coated tablet contains 25 mg zinc.
### The most important answers to zinc and common cold

#### Clinical trial situation: several meta-analyses\(^{[A,B]}\), RCTs\(^{[C–E]}\)

<table>
<thead>
<tr>
<th>Time</th>
<th>At the first evidence of a common cold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosage</td>
<td>– for an acute cold: 75 mg zinc per day(^{[A]}) &lt;br&gt;– preventively: children 10–15 mg,(^{[F]}) adults 25 mg(^{[F,G]})</td>
</tr>
<tr>
<td>Intake period</td>
<td>Over the duration of symptoms, max. 7 days(^{[H]})</td>
</tr>
<tr>
<td>Impact</td>
<td>Helps to shorten duration of the cold(^{[A,H]})</td>
</tr>
<tr>
<td>Mechanism of action</td>
<td>Inhibits the proliferation of rhinoviruses, the most frequent cause of the common cold,(^{[I]}) and is involved in the immune response(^{[B]})</td>
</tr>
<tr>
<td>Side effects</td>
<td>Usually well tolerated(^{[F]})</td>
</tr>
</tbody>
</table>

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\(^{[G]}\) *Summary of product characteristics ZINKOTASE®,* biosyn Arzneimittel GmbH, as of July 2013.


High-dose zinc shortens a common cold by up to three days

Meta-analysis on high-dose zinc

With treatment, a common cold lasts seven days, and without treatment, one week? Numerous meta-analyses show something different: The high-dose intake of zinc (≥ 75 mg per day) can shorten the duration of a cold by up to three days, and both systemic symptoms (e.g. muscle pain) as well as local complaints in the nose-throat region (rhinitis, aching throat, coughing and hoarseness) can be overcome much faster.

Many interventions for preventing and treating the common cold have already been investigated, but the clinical studies have usually been of lower quality and the results contradictory. Reviewing the evidence leaves only a few options. In prevention, these are physical precautionary measures such as careful hand hygiene and “possibly the use of zinc supplements”. In addition to traditional therapies, according to the authors the best evidence is provided by the use of oral zinc supplements for adults, and the administration of honey before bedtime for children older than one year who are coughing.

Zinc is an important component of common cold therapy

Zinc: how much to take and in which form?

According to estimates, about two billion people world-wide are undersupplied with zinc. The reasons are manifold: a diet of cereals containing phytic acid, inadequate supply due to an unfavorable choice of food, disorders of the resorption process in the intestines, increased elimination and missing intake adaptation in times of high need (pregnancy, lactation period, growth phases or when practicing endurance sports).
Since more than 300 enzymes and over 1,000 transcription factors require zinc in order to perform their physiological functions effectively, a zinc deficiency can occur that is only manifested by non-specific symptoms. The deficiency can lead to disturbances in growth and development, restricted fertility, dermatological or ophthalmic disorders, delayed wound healing, and also neurological-psychological problems. Disorders of the immune defense system and an increased susceptibility to infections are often documented.

How should zinc be administered? The German Society for Nutrition currently recommends 10 mg per day for men and 7 mg for women, based on a resorption rate of 30%. If there are no special requirements, this corresponds to the intake. Since the efficacy is derived from the zinc ions, it should be easily soluble and the zinc ions should be rapidly liberated. Organic zinc compounds such as zincbis(hydrogen-DL-aspartate) (ZINKOTASE®) show superior bio-availability over inorganic zinc salts.
Zinc in a meta-analysis:
helps against the common cold

In a meta-analysis, 13 placebo-controlled studies examined zinc supplementation for the common cold.\(^1\) Clinical studies (n = 5) that used less than 75 mg zinc per day showed no effect. However, in heterogeneous studies with $\geq 75$ mg zinc per day, the duration of the cold could be significantly reduced by 32\% (95\% CI 27 – 37\%).

Another meta-analysis compared 17 clinical studies with a total number of 2,121 participants.\(^2\) This evaluation also showed a significantly reduced duration of cold symptoms in zinc supplementation, namely by 1.65 days (95\% CI -2.50 to -0.81).

In this meta-analysis, a difference between high-dose and low-dose zinc therapy has been shown. High-dose zinc supplementation reduced the common cold duration by 2.75 days (95\% CI -3.89 to -1.60), while a low-dose zinc therapy only shortened the cold by 0.84 days (95\% CI -1.50 to -0.18) (Fig. 1). The difference was significant (p = 0.005).

The number of patients who still showed common cold complaints after seven days could also only be significantly reduced by high-dose zinc supplementation (relative risk 0.32; 95\% CI 0.12 – 0.87; p = 0.03) (Fig. 2).

The analysis of the side effects in this meta-analysis showed that for oral zinc supplementation, the occurrence of a bad taste in the mouth (relative risk 1.65; 95\% CI 1.27 – 2.16) and nausea (relative risk 1.64; 95\% CI 1.19 – 2.27) increased. These side effects particularly occurred with zinc lozenges.\(^2\)
Significant reduction in the duration of cold symptoms by almost three days only for ≥75mg/day

![Graph showing significant reduction in the duration of cold symptoms.](Image)


Fig. 1

With high-dose zinc supplementation, significantly fewer patients suffer from a common cold after 7 days

![Graph showing relative risk of cold symptoms.](Image)


Fig. 2
Shorter duration of the most frequent symptoms of common cold with high-dose zinc therapy

The meta-analysis by Hemilä et al. concentrated on the effect of zinc on various cold symptoms.\(^3\) They distinguished between systemic complaints and respiratory tract symptoms. For systemic complaints, high-dose zinc supplementation reduced muscle ache by 54\% (Fig. 3). The influence on headache and fever was not significant. For respiratory tract symptoms, the duration of nasal discharge was significant shortened by 34\% (\(p<0.0001\)), and nasal congestion by 37\% (\(p=0.0007\)). Sneezing was insignificantly reduced by 22\% (\(p=0.06\)). In the throat region, particularly the duration of cough was shortened significantly by 46\% (\(p<0.00001\)), however also hoarseness (-43\%; \(p=0.04\)) and scratchy throat (-33\%; \(p=0.01\)). Zinc could not significantly reduce sore throat (-18\%; \(p=0.21\)).

Diverse common cold complaints last for differing lengths of time during the course of the illness. Fever, for example, only lasts for 7\% of the duration of an entire cold. However nasal discharge and coughing occur during 73\% respectively 66\% of the cold duration (Fig. 4). If one compares the effectiveness of high-dose zinc supplementation for individual cold complaints with symptoms that have the longest duration during a cold (>50\%), it can be shown that their duration is most strongly reduced by zinc therapy.
### Zinc shortens the duration of significant common cold symptoms

**Respiratory tract**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percent Reduction</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal discharge</td>
<td>-34 %</td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>Nasal congestion</td>
<td>-37 %</td>
<td>p = 0.0007</td>
</tr>
<tr>
<td>Sneezing</td>
<td>-22 %</td>
<td>p = 0.06</td>
</tr>
<tr>
<td>Scratchy throat</td>
<td>-33 %</td>
<td>p = 0.01</td>
</tr>
<tr>
<td>Sore throat</td>
<td>-18 %</td>
<td>p = 0.21</td>
</tr>
<tr>
<td>Hoarseness</td>
<td>-43 %</td>
<td>p = 0.04</td>
</tr>
<tr>
<td>Cough</td>
<td>-46 %</td>
<td>p &lt; 0.00001</td>
</tr>
</tbody>
</table>

**Systemic complaints**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percent Reduction</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle ache</td>
<td>-54 %</td>
<td>p = 0.003</td>
</tr>
<tr>
<td>Headache</td>
<td>-13 %</td>
<td>p = 0.40</td>
</tr>
<tr>
<td>Fever</td>
<td>-35 %</td>
<td>p = 0.21</td>
</tr>
</tbody>
</table>

---


*Fig. 3*
Zinc shortens the duration of main common cold symptoms
### Duration of the symptom as a proportion of total common cold duration

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Proportional duration [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory tract</strong></td>
<td></td>
</tr>
<tr>
<td>Nasal discharge</td>
<td>73%</td>
</tr>
<tr>
<td>Nasal congestion</td>
<td>54%</td>
</tr>
<tr>
<td>Sneezing</td>
<td>46%</td>
</tr>
<tr>
<td>Scratchy throat</td>
<td>37%</td>
</tr>
<tr>
<td>Sore throat</td>
<td>38%</td>
</tr>
<tr>
<td>Hoarseness</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Systemic complaints</strong></td>
<td></td>
</tr>
<tr>
<td>Muscle ache</td>
<td>24%</td>
</tr>
<tr>
<td>Headache</td>
<td>27%</td>
</tr>
<tr>
<td>Fever</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Modified according to:** Hemilä H, Chalker E. BMC Family Practice 16: 24 (2015). *The effectiveness of high dose zinc acetate lozenges on various common cold symptoms: a meta-analysis.*

*Fig. 4*
Zinc can prevent a cold

Moreover, clinical trials examined whether long-term zinc intake can protect from a common cold.\[4\] The corresponding studies were carried out with children less than 10 years of age (n=400). The duration of the daily zinc intake was between 5 and 7 months. The dosage of zinc was 10–15 mg. The evaluation of the studies showed that zinc supplementation for several months significantly reduced the probability of a common cold by 36% (relative risk 0.64, 95% CI 0.47–0.88; p = 0.0058). This corresponds to 0.5–1.4 fewer colds over the 5–7 winter months.

How does zinc act on a common cold?

Infections activate NFκB, thereby increasing the formation of inflammatory cytokines and adhesion molecules. Inflammatory cytokines generate a great quantity of free oxygen radicals (ROS). As a co-factor of antioxidative proteins zinc scavenges ROS (Fig. 5). Zinc furthermore induces the zinc-dependent transcription factor A20 which inhibits NFκB activation by NFκB inducing kinase (NIK).\[10\] Hence zinc inhibits the activation of NFκB across several signal paths and thereby reduces the extent of the inflammation.

A viral infection activates NFκB, which increases the formation of adhesion molecules, ICAM-1 among others. Human rhinoviruses, which most frequently cause the common cold, bind with ICAM-1 to the surface of somatic cells.\[10\] Zinc reduces the ICAM-1 level and thereby prevents the binding of the rhinoviruses to cells.\[10\] By this, zinc acts as an antiviral active ingredient. Already in 1974, a publication in “Nature” could show that zinc reduces the proliferation of rhinoviruses.\[11\]

Zinc reduces the proliferation of rhinoviruses

In another trial, the use of zinc in children significantly reduced the use of antibiotics and were beneficial in treating common cold.\[8, 9\] In the trial conducted by Kurugöl et al, children in the zinc-supplemented group were only given antibiotics for 5 days, whereas for 18 days in the placebo group (p = 0.009).\[8\] In another study, use of antibiotics was reduced from 47 to 20 days (p < 0.001).\[9\] The number of days of absence, for example from school, due to a cold was also significantly reduced by 0.4 days (p = 0.04)\[8\] or 0.8 days (p < 0.001).\[9\] Even though the prevention studies were carried out with children, the authors assume that these results are transferable to adults.\[4\]
Zinc acts anti-inflammatory and antioxidant


Fig. 5
Is a high-dose zinc therapy safe?

The safety of high-dose zinc supplementation was also evaluated in the meta-analysis by Hemilä et al.\(^1\) In several clinical studies, patients were treated with 150 mg zinc per day over months or years. In two of these clinical studies, a copper deficiency developed as a consequence of the high-dose zinc therapy.\(^1\)

To check these results, a six-week double-blind study with 47 healthy participants was conducted that among other things examined the effect of 150 mg zinc per day on the plasma copper level.\(^2\) While the plasma concentration of zinc significantly increased, the plasma level of copper did not noticeably change (Table 1). The evaluation of the side effects was also interesting. While side effects such as headache, stomach cramps, nausea, loss of appetite and vomiting appeared in only 18 % of the men, 84 % of the women reported these symptoms.

The authors of the study presumed that the gastrointestinal complaints are above all associated with body weight, since the side effects were reported by the participants with a low body weight (Table 2). The authors therefore recommend a dosage of less than 0.8 mg/kg body weight or intake with the principal meal.\(^1\)
High-dose zinc does not influence the plasma copper status*

<table>
<thead>
<tr>
<th></th>
<th>Quantity</th>
<th>Before zinc supplementation</th>
<th>After zinc supplementation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plasma zinc concentration [µmol/l]</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>21</td>
<td>15.1±2.5</td>
<td>20.6±4.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Women</td>
<td>20</td>
<td>14.8±2.5</td>
<td>23.2±6.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Plasma copper concentration [µmol/l]</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>21</td>
<td>12.0±1.9</td>
<td>11.7±2.0</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Women</td>
<td>20</td>
<td>14.0±3.0</td>
<td>13.4±3.0</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

*Application over 6 weeks


Table 1

Side effects of zinc depending on body weight*

<table>
<thead>
<tr>
<th>Group</th>
<th>Zinc dosage/d (Zn/d) [mg/kg]</th>
<th>Number of participants</th>
<th>Number of complaints</th>
<th>Complaints [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>21 Men</td>
<td>1</td>
<td>6.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 Women</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.4≤Zn/d&lt;0.6</td>
<td>3 Men</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>3</td>
<td>0.6≤Zn/d&lt;0.8</td>
<td>17 Men</td>
<td>2</td>
<td>25.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 Women</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.8≤Zn/d&lt;1.0</td>
<td>2 Men</td>
<td>1</td>
<td>66.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 Women</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1.0≤Zn/d&lt;1.2</td>
<td>2 Women</td>
<td>2</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Application over 6 weeks


Table 2
Zinc strengthens the immune system

The fundamental precondition for a functioning defense system is a continuously sufficient supply of vitamins and trace elements.

The reason is that new specialized immune cells are formed to combat every new microbe detrimental to health. Gradually, the body builds up a comprehensive arsenal of antibodies and, with its progressively maturing immune memory, performs better and is more resistant against attack. The process of antibody formation is connected with many cell divisions and requires the optimal supply of cells with micronutrients, vitamins, minerals and trace elements.

The body cannot form white blood cells without zinc. Zinc can thus prevent colds or alleviate corresponding infections and shorten the course of the disease, as was demonstrated in a current meta-analysis.

Zinc is an essential trace element

However, zinc not only protects the body against infections. It is involved in many vital functions. It is a component of more than 100 enzymes that are involved in the metabolism of fats, proteins and carbohydrates. It furthermore influences the structure of genetic material as well as cell growth.

Specialists assume that a third of the population is not sufficiently supplied with zinc. Zinc is an essential trace element that is sufficiently taken up with our nutriments. But because of changed dietetic habits, increased consumption of fast food and preprepared meals, but also due to some voluntary diets such as vegan, people are increasingly consuming insufficient amounts of zinc with their diet. Also medical interventions (e.g. shortened passage after partial intestinal resection) can contribute to this problem.
**Interactions with medications**

Zinc reduces the absorption of certain antibiotics, especially tetracycline and quinolone (ofloxacin, norfloxacin, ciprofloxacin), and can possibly reduce their effectiveness. A zinc supplementation should be separated at least by four-hour intervals from intake of these antibiotics in order to prevent interactions.\(^\text{[13]}\)

However, chelators (metal-binding compounds) such as penicillamine (which is used to decompose surplus copper with Morbus Wilson) and diethylentriamine-penta acetate (DTPA to treat an iron surplus) can lead to zinc deficiency.\(^\text{[14]}\)

Antiepileptics, especially sodium valproate, can likewise cause a zinc deficit. Prolonged use of diuretics may increase urinary excretion of zinc. This can lead to an increased loss of zinc.\(^\text{[15]}\)

**Possible symptoms of a zinc deficiency**

Food with a high phytin content also decreases zinc uptake. Such foods particularly include whole-grain cereals, beans, nuts, whole-grain rice and corn. These foods should therefore not be consumed in conjunction with the zinc preparations or after intake of zinc products.

**Zinc deficiency**

The zinc requirements or the absorbing capacity of the body can change depending on one’s personal life situations and habits: for instance, professional athletes as well as pregnant and nursing women have higher requirements.\(^\text{[6]}\)

This also applies to people with a chronic intestinal disorder, diabetes mellitus and rheumatism.\(^\text{[6]}\) While requiring more zinc, older people can often take up zinc less easily.

**Possible symptoms of a zinc deficiency**

Zinc deficiency has to be diagnosed by blood analysis. However there are a series of symptoms which, apart from the increased susceptibility for infections, indicate a zinc deficiency:\(^\text{[5,6]}\)

- Tiredness and lack of energy
- Reduced physical capacity
- Enduring fatigue states
- Depressive mood
- Brittle nails
- Dry, scaly skin
- Wound healing disorders

Zinc deficiency can also lead to a lack of gonad function, growth disorders, and anaemia.
Possible symptoms of a zinc deficiency

- **Hair**
  - thinning hair
  - hair loss

- **Brain**
  - low drive
  - concentration disorders
  - learning disability
  - depression

- **Sense organs**
  - impairment of sensory perception, e.g. night blindness, taste and smell disorders

- **Lung**
  - increased susceptibility to infections
  - thymus involution

- **Organism**
  - weight loss

- **Sexual organs**
  - impaired sexual development
  - pregnancy complications

- **Bones**
  - growth delays

- **Skin**
  - inflammatory skin reactions
  - skin changes
  - delayed wound healing

- **Nails**
  - brittle, white-spotted nails

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*Fig. 6*
Bibliography


Active substance: zincbis(hydrogen-DL-aspartate). 25 mg zinc per film-coated tablet. Indications: Zinc deficiency that cannot be corrected by diet and during treatment with penicillamine. Composition: 1 film-coated tablet contains 128.97 mg zincbis(hydrogen-DL-aspartate), corresponding to 25 mg zinc. Excipients: sodium starch glycolate (Type A) (Ph. Eur.), microcrystalline cellulose, cellulose powder, povidone K25, magnesium stearate (Ph. Eur.), polybutylmethacrylate-co-(2-dimethylaminoethyl)methacrylate-co-methylmethacrylate (1:2:1), refined castor oil, talcum, titanium dioxide. Interactions: Impairment of resorption of tetracyclines as well as ofloxacin and other quinolones. Zinc resorption may be reduced by foods with high phytate content as well as iron, copper or calcium salts. The administration of chelating agents such as D-penicillamine, dimercaptopropane sulfonic acid (DMPS), or edetic acid (EDTA) may reduce the absorption of zinc or increase its excretion. Form of administration, size of packages: 50 film-coated tablets. Subject to sale in pharmacies.
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• Selenium

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You can also find us on coliquio, the free medical network, with our Infocenter Selenium: www.coliquio.de

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The biosyn service laboratory offers you the possibility to have your zinc level tested. You can find additional information at: www.biosyn.de/service/servicelabor/
biosyn Arzneimittel GmbH

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biosyn Arzneimittel GmbH is a pharmaceutical and biotech company based in Fellbach, Germany. It specializes in trace elements, is a world market leader for high-dose selenium injections, developer and operator of two unique GMP manufacturing operations for producing active ingredients, and in the biotech sector, is actively involved in the production of glycoprotein isolated from the Megathura crenulata, a sea snail found in California. 70 percent of our sales turnover is realized outside of Germany – in 26 countries all around the world.

With products geared to the areas of intensive care, oncology and endocrinology, biosyn is a partner to hospitals and physicians in private practice, as well as to naturopathic physicians and holistic health practitioners. We pursue research and development and evaluate the current medical-scientific literature as well as engage in modern online marketing. Our mid-sized family enterprise places great value on an open, engaged and customer-oriented corporate culture.
ZINKOTASE®

Zinc protects against the common cold

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