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## **Multi-talented Zinc**

# **The Food Supplement Zinc-diet from Biofrid and the trusty Homœopathic Remedy from SANUM, ZINKOKEHL**

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## Introduction

For human beings and many mammals Zinc is one of the essential elements, because it is involved in countless metabolic functions in the body, and this makes it immeasurably important for human and animal health. Its name has its origins in a group of foreign words meaning “prong/tooth/jagged peak”, since it solidifies in a jagged form.

## Occurrence of Zinc

Zinc has been known since antiquity, because it is a constituent of the alloy brass. As a metal in its own right, however, it was first discovered in India in the 14th century. It has been mined in Germany since the 17th century (near Kassel). In the Earth's crust, of course, it occurs mainly as ore, in compounds. Globally there are considerable deposits of it in North America, Australia, China and Kazakhstan, with China, Australia and Peru providing the largest quantities of the metal.

Zinc practically never occurs in its pure state, but in compounds as ore. Zinc sulphide ores constitute the largest share, and these are called either Sphalerite or Wurtzite, consisting of about 65% Zinc. Apart from other, rarer forms, Zinc also occurs as a carbonate, when it is known as Zinc Spar (Smithsonite) or Galmei. A high concentration of Zinc in the soil may favour a particular type of vegetation, thus for instance there is the

yellow galmei violet or the purple galmei pansy. Zinc also often occurs in conjunction with deposits of Lead and Manganese. However, Iron and Cadmium are frequently present in ore from which Zinc can be extracted. Elaborate separation processes are often required to extract pure Zinc, so as to eliminate the heavy metals, which in some cases are quite toxic.

## Zinc - the Element

Zinc, Zn, is a bivalent cation. Its atomic mass is 65.38, and its number in the Periodic Table is 30. As a metal, its colour is bluish-white, its melting point is 420°C and its boiling point is 906°C. Zinc is considered one of the base metals. On account of its chemical nature (distribution of electrons) and properties it is very similar to the earth-alkali metals, and is included in the 12th group of the Periodic System, along with Mercury and Cadmium, according to the IUPAC nomenclature. There are 29 isotopes of Zinc, plus a further 10 nuclear isotopes.

It is soluble both in acids and in lyes, thus forming Zinc salts or zincates. Zn has good conductivity and is adequately stable in watery electrolyte solutions. Exposed to open air, pure Zinc forms a weather-proof oxide and carbonate layer. This is why it is used as a protective against corrosion, e.g. for galvanisation of iron and steel. Almost half of the available supply of Zinc is used for this purpose.

Besides this, Zinc is in particu-

lar demand in batteries, because it is an outstanding reducing agent. The building industry has discovered Zinc as a building material (sheet metal), and as well as this, many zinc alloys are used in the manufacture of toys, household goods, sanitary ware and cars. In periods of inflation, Zinc is used for coins. This metal plays an important part in analysis, because it serves as an analytically pure base substance in powder form for titration when adjusting EDTA normal solutions, according to instructions in the pharmacopœia.

Organic chemistry makes use of the element Zinc in very many areas as a powerful reducing agent. Its use facilitates remarkable reactions and conversions of Carbon compounds. In the presence of Zinc, even halogens for instance can be eliminated.

## Zinc as a Biocatalyst

The wide variety of reactions in inorganic and organic chemistry give us an idea of the importance of Zinc within living tissues. And in fact it is essential in the body on account of its chemical and physical properties. After Iron, Zinc is the trace element which occurs most frequently in the human body: in an adult there are 2-3 grams of it. The highest concentrations are found in the hair, gonads, the prostate, islets of Langerhans (pancreas) and bones. Zinc occupies a central role in a multitude of reactions in the intermediate cellular metabolism. For this reason we need to mention metabolic pro-



cesses and metabolites in which Zinc fulfils a particular function:

- Co-factor in enzymes: Zinc is contained in numerous (>200) enzymes and plays an important part both in their synthesis and in their catalytic function, for just the very presence of Zinc can inhibit or accelerate enzymatic processes. The element is of crucial importance in cell division, since construction and breakdown of Nucleic acids are strongly dependent on Zinc, e.g. the enzymes RNA-polymerases for the synthesis of new proteins. DNA synthesis is controlled by Zinc, thus influencing regeneration and ageing of cells. Detoxificatory functions are subject to Zinc's influence; thus, for example, in breaking down alcohols which are created within the body or are introduced into it from without along with the food, zinc-dependent alcohol-dehydrogenase is important, and this is formed in the body under the influence of circadian rhythms. This is why alcohol is tolerated significantly better in the evenings than in the mornings. Carboanhydrase, which inter alia plays a crucial role in controlling the acid-alkaline balance via its activity, is dependent on the presence of Zinc. Carboxy-peptidases require an adequate supply of Zinc in the body for the breakdown of proteins in the digestive tract (small intestine), in the spleen and in the kidneys.
- Neurotransmitter metabolism: The formation and conversion of neurotransmitters is strongly

dependent on Zinc (glutamate, GABA, tryptophan metabolism), among other things.

- Hormone balance: Growth, thyroid and sex hormones, and prostaglandins, plus insulin, require an optimum supply of Zinc.
- Cell growth and cell differentiation: The latest stage at which Zinc's importance here becomes clear is the pre-cancerous or cancerous. It is well-known that cancer patients are generally substantially short of Zinc, which plays an important role in inter-cellular communication.
- Metallothionein: This is a transport protein for metallic ions, and to be effective it needs to bond with Zinc. Only within this bond is the protein body in a position to transport heavy metals. As well as this, metallothionein has a key function in regulating the Zinc level and its absorption from the gut. Because it contains so much cystein and at the same time has a chelating action, this metallothionein is anti-oxidative, just as Zinc in vitro protects SH groups from oxidation, if they are bonded with enzymes/proteins.
- Production and regulation of cellular and humoral immunity: Taking immune defence against, say, rhinoviruses, as an example, the Wörwag company was able to demonstrate that Zinc ions collect on the surface of viruses, thus preventing them from docking on the cell membranes of mucosal cells. There are also

similar statements with regard to herpes viruses. Thus we can refer to this metal having an anti-viral action. Over and beyond this, in this connection Zinc supports the immune defences by activating enzymes that repel infections. Zinc is indispensable for the maturation of the T-lymphocytes in the thymus gland. Without Zinc the hormone thymolin cannot help with the specialisation of the T-cells. In Zinc deficiency the number of T4 helper cells, of lymphocytes and the activity of phagocytosis in the body all sink. When there is a Zinc deficiency less IL2 is secreted by the T-lymphocytes. However, it is IL2 that stimulates the growth of the T-cells and activates both the B-cells and the natural killer cells.

- Protective function against organic poisons, heavy metals, radiation: We know that Lead, Nickel and Cadmium are able to displace Zinc from its positions in enzymes. These metals are then able to have a deleterious effect on cells.
- Anti-oxidant: Zinc is a constituent of peroxide dismutase (POD), which protects cells from free radicals which arise because of purine, amino-acid and fatty acid oxidation.
- Structural element of cell membranes and bones: Zinc guarantees the integrity and functionality of the cell membranes and bones, and is therefore a stabilising and structuring element of the body.



## Human requirement of Zinc

What I have enumerated above will help you to see how important Zinc is. Since this metal cannot be stored in the body, it must be consumed regularly from external sources, so as to ensure important functions within the organism. It is absorbed in the duodenum and jejunum, for which it requires a carrier. The WHO (World Health Organisation) recommends a daily Zinc intake of 15 mg. for women and men alike. Physiological Zinc levels for plasma are set at 13-20 mmol/l., and for

hair at 135-245 mg/g. According to WHO an intake of more than 100 mg. per day is undesirable, and above 200 mg a day it can cause nausea, vomiting and diarrhoea. Signs of acute poisoning occur in humans from an intake of more than 1g. Zinc.

In some animals likewise, immoderate (involuntary) consumption of Zinc can result in poisonings. This is the case with parrots, for instance, whose cages or aviaries are closed in with zinc-covered wire or bars. As these birds hold on with their beaks when climbing up, they

are constantly consuming small quantities of Zinc, which can result in an accumulation and chronic poisoning.

## Occurrence of Zinc in food

Animal products and legumes are the food items that contain the highest proportion of Zinc. Different accounts vary considerably regarding the Zinc content of various foods. The table shown below contains data from the book: "Burgersteins Handbuch der Nährstoffe" (= Burgerstein's Food Handbook), pub. Haug Verlag.

Foods rich in Zinc	Weight, grams/quantity	Milligrams
Liver (pig, calf)	100 g	6-8 mg
Oysters	100 g	> 7 mg
Lentils	100 g	5.0 mg
Dried peas	100 g	4.0 mg
Wholegrain wheat	100 g	4.0 mg
Haricot beans	100 g	3.0 mg
Meat (veal, beef)	100 g	3.0 mg
Wheat bran	25 g	3.0 mg
Maize	100 g	2.0 mg
Wholemeal bread	100 g	2.0 mg
Hen's egg	1	1.5 mg

## Zinc Deficiency

Our daily consumption of Zinc in food would be enough for the human body in a balanced diet, but only 10-30% of the Zinc we consume is actually absorbed. The rest is excreted. Because of the heavy physical and emotional burdens we bear, as well as the foreign, and in some cases toxic, elements in our diet, our bodies use up a great deal

of Zinc, or excrete it. We have already referred to the fact that this metal is not stored in the body, so that we require a constant supply. As well as this, a deficiency can occur if a lot of copper is consumed in food or in drinking water (copper pipes). The same holds true if high levels of iron are consumed in the diet or via medicines. Finally, foods containing high levels of Phytic acid (cereals) can inhibit the intestinal

absorption of Zinc. The list which follows summarises the various reasons for an inadequate supply or an elevated expenditure of Zinc.

### Danger of Zinc Deficiency from:

- rapid growth in youth, during pregnancy and breastfeeding.
- having cancer
- insufficient Zinc supply be-



cause of vegan or partly vegetarian diet

- chronic fasting to reduce weight or because of anorexia
- competitive sports, stress/distress resulting in loss of Zinc via sweat and urine, likewise use of diuretics
- malabsorption and digestive dysfunction on account of disorders of pancreas or gut
- acrodermatitis enteropathica (genetic Zinc deficiency disease)
- strong Calcium supplementation
- heavy dietary consumption of Phosphorus, phytates or roughage
- marked abuse of alcohol
- liver and kidney disease, diabetes
- chronic infections and inflammations
- chronic heavy metal intoxication
- tissue destruction (burns, operations, coronary infarction, rheumatic diseases)
- anæmia

### **Symptoms and consequences of Zinc deficiency**

Zinc deficiency can easily occur as a result of high Zinc demand by the body and possible short-

fall in the diet. Such a deficiency causes a symptom picture on many levels, which can easily lead the therapist astray. Prominent signs that may be caused by a low supply of Zinc present as follows:

- Skin: in the form of dermatitis, callosities, pustules, acne, disorders of wound-healing
- Hair: increased falling of hair, disordered cysteine and methionine metabolism
- Nails: white blemishes, brittleness, disordered nail formation
- Mucosa: functional disorders, especially in the intestinal area, from maldigestion and malabsorption with diarrhoea
- Sensory organs: severe depression of senses of smell and taste. Loss of appetite to the point of anorexia may occur, also loss of night vision is possible, because Zinc transforms retinol into effective retinal.
- Central nervous system: there is often a direct link between a low supply of Zinc and increased occurrence of depression, psychoses, schizophrenia, lethargy, aggressiveness, hyperactivity and learning difficulties.
- Fertility disorders: this concerns both female and male gonads. In the testicles there may be reduced sperm production. Sperm are also dependent on the Zinc-containing secretion of the prostate, without which they are incapable of movement.

• Diabetes mellitus: action and storage of insulin, plus its stability in the face of oxidative processes, depend on Zinc. Variable sugar levels on account of exhaustion of the beta-cells for lack of Zinc, as well as increased urinary Zinc excretion, damage immune function and healing of wounds in diabetics.

• Growth disorders and delayed growth, delayed sexual development, delayed onset of puberty

• Disordered nervous function: irritability, depression, disordered concentration, forgetfulness, learning disorders - all these may be symptoms of a diminished Zinc supply.

• Lowered resistance to environmental toxins and geopathic stress: the body is in no position to detoxify the attacking toxins. One particular form of this disordered detoxification is cryptopyrrolluria (hæmopyrrollactamuria), where there is a lack of both Zinc and Vitamin B6. As a result of this deficiency, throughout their lives patients show symptoms more and more strongly in the area of the nervous system (as described above), and intolerances of environmental toxins, recreational drugs, food additives, smells and chemicals given off by furniture, carpets etc., moulds, chlorine (swimming baths, paper), vaccinations, etc.

• Increased lipid oxidation: Zinc acts as an anti-oxidant.

• Susceptibility to infections:



When the immune system is weakened by Zinc deficiency, the result is that it is easier to catch infections again and again.

- Blood formation: Zinc deficiency causes chronic anaemia and clotting disorders.
- Disordered acid-alkaline balance: Zinc is a constituent of carboanhydrase, which facilitates excretion of excess acids via the kidneys.
- Allergic and pseudo-allergic manifestations as a result of particularly severe histamine release from the mast cells.
- Displacement of electrolytes: according to Wenzel, Zinc deficiency results in increased loss of Sodium, Potassium and Magnesium (effects e.g. on the heart muscle, formation of Hydrochloric acid in the stomach).
- Acrodermatitis enteropathica: this inherited Zinc deficiency disease often exhibits a markedly altered tryptophan metabolism. Alongside this all the symptoms of Zinc deficiency occur.

### **Zinc in Homœopathy**

In the provings of *Zincum metallicum* a picture emerges of cerebral exhaustion, with this lassitude generally being found upstage, reflecting a large part of Zinc's action. Nervous symptoms and a lack of vitality are characteristic. Initially over-excitement may be observed, and then a transition to dullness of mind, senses and motor

system, often accompanied by emaciation, anaemia and possibly skin eruptions. An improvement ensues, when the body has an opportunity of excretion and elimination (e.g. menses). The situation is made worse by wine, stimulants, noise and conversation.

According to Voisin, the most common manifestations are twitching of the extremities and muscles, restlessness of the legs, and especially at night, with a constant urge to keep moving. Typical are muscle spasms in the eyes, the oesophagus and pharynx, the left ovary, the bladder and the intestines, mostly in the umbilical area. Urine can only be passed when sitting or in peculiar positions, often with the back having to be arched backwards or leaning against something.

Boericke and Voisin agree regarding starting up fearfully in sleep and various kinds of headache. Painfulness and burning in the spinal area are likewise mentioned by both of them. Also typical of *Zincum metallicum* are skin eruptions and in some cases discharges of pus from the ears.

### **Treatment with Zinc**

Both Zinc compounds in material form and homoeopathic preparations of Zinc may be used to avoid Zinc deficiency, or to treat diseases that can be traced back to an elevated need of this metal. If we are to guarantee absorption and use of

Zinc by the body, Zinc should form organic compounds. The following compounds are particularly suited to this purpose: Zinc gluconate, Zinc aspartate, Zinc orotate, Zinc histidinate.

The medicine ZINKOKEHL from the SANUM company's range contains Zinc gluconate as an active ingredient; it guarantees the concurrent homoeopathic treatment of Zinc deficiencies and has proved its worth over decades. Drops are available as ZINKOKEHL 3X (D3), and in acute states 5 drops may be prescribed every 30-60 minutes, whilst, in chronic states, the dosage is 5 drops 1-3 times a day. ZINKOKEHL 4X (D4) ampoules are also available. One ampoule of 2 ml. is injected once a day i.m., i.v., s.c. or i.c. In this way it is possible to provide a purposeful accompanying treatment, in spite of the intestinal flora having been destroyed and the absorption of Zinc being inadequate.

Often, of course, this treatment is insufficient, because the deficiencies are too severe and the external supply via the diet is unreliable. Because of this, the food supplement ZINK-diet is being marketed: it is produced by the SANUM sister company BIOFRID. This preparation is in the form of Zinc gluconate, for supplemental use. One capsule contains 54 mg Zinc gluconate, corresponding to 7.5 mg. of Zinc. The recommended daily amount for adults is 1 capsule twice a day. It is generally true that orga-



nic Zinc compounds should be taken at a suitable distance from meal-times - preferably on an empty stomach an hour before, or in the evening before retiring to bed for the night. This is based on the reciprocal action of Zinc with Iron, Copper, Calcium and Magnesium. If it is taken along with food, disruption is caused by the influence of intestinal absorption.

However, if the gastric mucosa is particularly sensitive, then the food supplement Zinc-diet should be taken with food. This, of course, is particularly the case where the acid-alkaline balance is disordered on account of Zinc deficiency.

### **Contra-indications for Zinc Supplementation**

We should distance ourselves from Zinc supplementation where there are auto-immune processes at work, particularly immune encephalitis, acute kidney failure and severe renal parenchymal damage. With dosages of over 30 mg. a day over a lengthy period of time, we must look out for interactions with Copper, Iron, Manganese and Calcium.

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