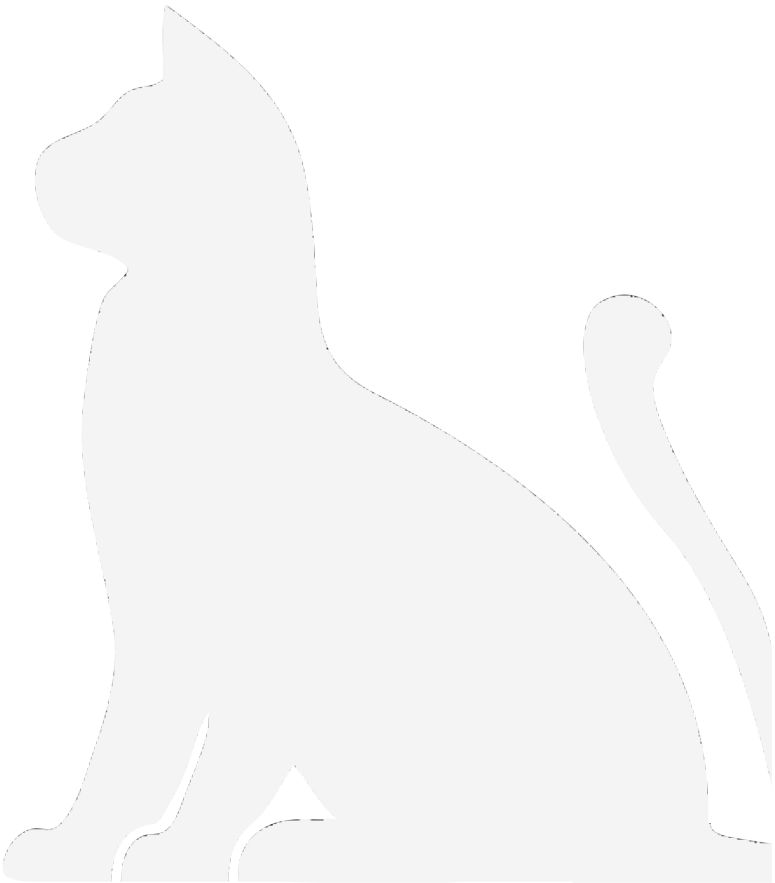
Mineral State

OLIWIER

E-mail: **cat@example.mail**	Test code: **AABBCCNNIW** Date of the test: **2025-03-23**



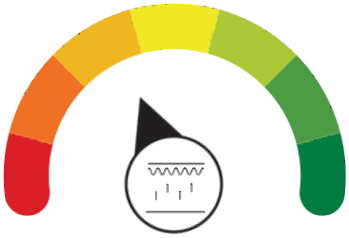
Mineral State

Your cat's health overview

Nutrition is the foundation of a healthy cat to performs to the best of his or her ability. A nutritional assessment allows you to confirm that the current nutrition of your cat is adapted to his/her metabolism and that all required minerals are in the appropriate level.

Disclaimer: The medical expertise of a professional is required to interpret the EHAA results and decide on the protocol to follow to adjust the level of minerals and toxins in the cat body. The reader should be aware that a deficient could be a sign of infections, any other metabolic issues or organ disfunctions. Besides, the reader should be informed that reducing drastically minerals excess could lead to metabolic issues. Do not prescribe supplements to your cat without medical advice as this could lead to excess which could be toxic for your cat. The mineral and toxins balance of a cat should be handled with care and expertise to enable the cat to be on top of his health.

Mineral State



SKIN

40%

The general content of minerals that affect the condition of the skin layers is far from the correct level*

COAT

38%

A clear excess / deficiency of elements responsible for the proper condition of the hair coat*

IMMUNE SYSTEM

37%

The strength of the immune system may not be sufficient to protect the cat's body against harmful factors*

DIGESTIVE SYSTEM

33%

The mineral content of cat hair may indicate a malfunction in the digestive system*

BEHAVIOR

56%

The levels of minerals that contribute to mood and behavior are normal but not optimal*

FERTILITY, PREGNANCY AND LITTER SIZE

56%

Inadequate content of individual minerals may limit the reproductive abilities of an individual*

GROWTH, BONES AND JOINS

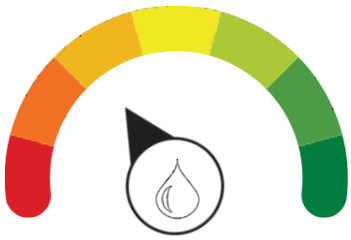
58%

The content of macro and micronutrients necessary for the proper growth rate, structure of joints and bones is close to normal, but not optimal*

URINARY SYSTEM

50%

Mineral content may indicate urinary malfunction*



CIRCULATORY SYSTEM

33%

The level of minerals shown as a result may indicate a disturbance in the functioning of the circulatory system*

*Note: the graph shows the average. A positive average can mean a positive result or a complete absence of one element. A negative average can mean a negative result or just reflect that all elements are in deficit but only at the lower limit of the normal range. So, it is crucial to check the report to obtain further details.

Mineral State

EHAA Test result

minerals present in your cat's body

CONCENTRATION OF NUTRITIONAL ELEMENTS – MACRO-ELEMENTS

Element	**Patient's result (ppm)**	Normal value	**DEFICIT NORM EXCESS**
Sulfur(S)	**49 664,00**	42 830,32 – 44 159,14	
Calcium(Ca)	**541,24**	1 132,60 – 1 259,67	
Phosphorus(P)	**218,05**	306,69 – 323,32	
Sodium(Na)	**2 255,52**	1 377,24 – 1 589,40	
Potassium(K)	**1 334,29**	273,62 – 343,89	
Magnesium(Mg)	**132,41**	226,15 – 251,29	

CONCENTRATION OF NUTRITIONAL ELEMENTS – MICRO-ELEMENTS

Element	**Patient's result (ppm)**	Normal value	**DEFICIT NORM EXCESS**
Silicon(Si)	**171,30**	368,57 – 483,08	
Zinc(Zn)	**148,48**	186,61 – 196,46	
Iron(Fe)	**167,29**	89,01 – 124,26	
Copper(Cu)	**10,95**	8,08 – 8,51	
Manganese(Mn)	**2,92**	2,44 – 3,73	
Selenium(Se)	**1,34**	1,91 – 2,13	
Chrome(Cr)	**0,47**	0,49 – 0,66	
Cobalt(Co)	**0,05**	0,01 – 0,04	

Mineral State

CONCENTRATION OF TOXIC ELEMENTS

Element	**Patient's result (ppm)**	Maximum value	**EXCESS**
Aluminium(Al)	**107,46**	235,18	
Arsenic(As)	**0,01**	0,17	
Barium(Ba)	**1,01**	2,42	
Cadmium(Cd)	**0,07**	0,17	
Lithium(Li)	**0,19**	0,06	
Nickel(Ni)	**0,81**	0,84	
Lead(Pb)	**1,95**	2,99	
Mercury(Hg)	**0,75**	0,12	
Strontium(Sr)	**0,92**	2,52	
Vanadium(V)	**0,01**	0,28	

PROPORTION OF NUTRITIONAL ELEMENTS

Proportion	**Patient's result (ppm)**	Normal value	**TOO LOW**	**WITHIN NORM**	**TOO HIGH**
Calcium(Ca) Phosphorus(P)	**2,48**	1,61 – 2,63			
Zinc(Zn) Copper(Cu)	**13,56**	8,35 – 12,64			
Iron(Fe) Copper(Cu)	**15,28**	110,90 – 290,16			
Calcium(Ca) Potassium(K)	**0,41**	5,17 – 10,72			
Sodium(Na) Potassium(K)	**1,69**	18,68 – 123,34			
Calcium(Ca) Magnesium(Mg)	**4,09**	1,84 – 2,83			

Every organism is exposed to toxic elements that get in from the external environment. The presence of such elements in the body is, therefore, inevitable and, in excess, dangerous to health.

The study is performed using the ICP-OES technique – optical emission spectrometry with excitation in inductively coupled plasma. Analysed on the Avio 200 PerkinElmer spectrometer by the analyst technician, PetsDiag laboratory.

Krystyna Kowalska
Senior Techniker Analytik

The need for specific macro- and microelements (the daily need for an adult cat) is based on the FEDIAF Nutritional Guidelines, 2021.

European Funds
Smart Growth

European Union
European Regional
Development Fund

Mineral State

EHAA report

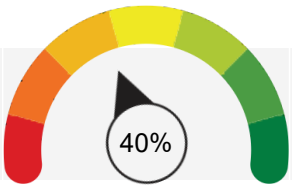
What you will find in this report

- **The result contains information about the proportions and concentrations of nutritional and toxic elements in the body of the test cat.** Both the levels of individual micro and macro elements as well as the degree of the body's load of toxic elements reflect the state of biochemical balance, which is crucial for maintaining health and a good body condition.

- **The reference values to which the elements indicated** in the study refer were developed for the needs of EHAA by a research team from the University of Agriculture in Krakow and based on thorough comparative studies. The content of minerals is expressed in ppm.

- **The EHAA result also includes a descriptive part, based on the reports provided by employees of the University of Agriculture** The information contained in it allows you to better understand the EHAA result and to introduce appropriate modifications to the diet of the patient in question.

Skin



A proper skin condition is very important for our cats. Only a healthy coat ensures its thermoregulation, prevents excessive water loss, and provides effective protection against the harmful effects of external factors. Both an excess and a deficiency of minerals can lead to skin problems in cats. They are manifested, among others, by dandruff, itching, as well as skin lesions, which are particularly often visible in the corners of the cat's mouth.

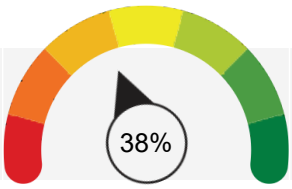
Your cat's EHAA result showed that there are some disturbances in its organism:

- ▲ Excess of Sodium - may make the skin itchy.
- ▼ Deficit of Zinc - contributes to the occurrence of skin changes in the corners of the mouth.
- ▼ Deficit of Silicon - a decrease in the appearance and condition of the skin.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Sodium(Na)	*2 255,52*	1 377,24 – 1 589,40			
Zinc(Zn)	*148,48*	186,61 – 196,46			
Silicon(Si)	*171,30*	368,57 – 483,08			

Mineral State

Coat



Cyclical, seasonal hair exchange is a physiological phenomenon in cats and is not a cause for concern. The problem arises when excessive hair loss is related to disease, nutritional deficiency, or excessive stress. A perfect indicator of our friend's health is the appearance of his/her coat. If it has recently become stiff or dull, it may indicate some nutritional deficiencies, including reduced content of proteins, vitamins, essential fatty acids (EFAs), as well as micro and macro elements. Among the minerals, zinc and copper play the most important role in the context of the condition of the coat. Their deficiency can lead to depigmentation and excessive shedding.

Your cat's EHAA result showed that there are some disturbances in its organism:

- Deficit of Zinc - contributes to excessive shedding and depigmentation of the hair, disturbs the proper structure, growth, and appearance of the cover hair, and increases its brittleness.
- Deficit of Calcium - it is a building material for hair. It lacks causes a decrease in the overall condition and appearance of the coat.
- Deficit of Phosphorus - Phosphorus is a building material for hair. It lacks causes a decrease in the overall condition and appearance of the coat.
- Deficit of Magnesium - Magnesium is the building material of the hair. It lacks causes a decrease in the overall condition and appearance of the coat.
- Deficit of Silicon - Silicon is a hair building material. It lacks causes a decrease in the overall condition and appearance of the coat.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Zinc(Zn)	*148,48*	186,61 – 196,46			
Calcium(Ca)	*541,24*	1 132,60 – 1 259,67			
Phosphorus(P)	*218,05*	306,69 – 323,32			
Magnesium(Mg)	*132,41*	226,15 – 251,29			
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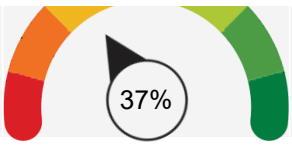
Mineral State

Immune system



Frequent, recurring infections in your cat may be the result of lowered immunity. Only the balance of all minerals can make the whole organism function efficiently and make it resistant to harmful factors. To assess the general level of immunity, it is therefore necessary to analyze the number of all elemental disturbances, as well as the degree of their deviation from the norm. What weakens the immune system is also the presence of heavy metals that block the absorption of nutrients.
Conclusion: The individual functions of individual elements are interrelated. The less serious deficiencies and excesses of nutritional elements (especially zinc, selenium, and iron), and the less severe toxic loads, the higher the body's protection against the development of both minor ailments and serious diseases. Check:

Your cat's EHAA result showed abnormalities in **13** of the 14 nutrient elements tested:

- **DEFICIT**:
  Calcium, Phosphorus, Magnesium, Silicon, Zinc, Selenium, Chromium
- **EXCESS**:
  Sulfur, Sodium, Potassium, Iron, Copper, Manganese, Cobalt

Your cat's EHAA result showed disturbances in **2** out of 10 toxic elements tested:

- **EXCESS**:
  Lithium, Mercury

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Sulfur(S)	*49 664,00*	42 830,32 – 44 159,14			
Calcium(Ca)	*541,24*	1 132,60 – 1 259,67			
Phosphorus(P)	*218,05*	306,69 – 323,32			
Sodium(Na)	*2 255,52*	1 377,24 – 1 589,40			
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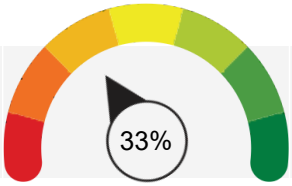
Silicon(Si)	*171,30*	368,57 – 483,08			
Zinc(Zn)	*148,48*	186,61 – 196,46			
Iron(Fe)	*167,29*	89,01 – 124,26			
Copper(Cu)	*10,95*	8,08 – 8,51			
Selenium(Se)	*1,34*	1,91 – 2,13			
Chrome(Cr)	*0,47*	0,49 – 0,66			
Cobalt(Co)	*0,05*	0,01 – 0,04			

Element	Patient's result (ppm)	Maximum value	EXCESS
Lithium(Li)	*0,19*	0,06	
Mercury(Hg)	*0,75*	0,12	

Mineral State

Digestive system



Lack of appetite in cat is especially dangerous. It may be a sign of a serious illness, so if it lasts longer than a day, we should go to the vet with him/her. Diarrhea and vomiting (except for the return of the so-called fluff, i.e., pilobezoars) are not always the result of food poisoning. The occurrence of these symptoms can also be influenced by abnormal levels of minerals, as well as an excessive heavy metal burden in the body.

Your cat's EHAA result showed that there are some disturbances in its organism:

- ▼ Deficit of Calcium - may lower appetite.
- ▼ Deficit of Phosphorus - may lower appetite.
- ▼ Deficit of Zinc - may reduce appetite and cause vomiting.
- ▼ Deficit of Selenium - may lower appetite.
- ▼ Deficit of Magnesium – may lower appetite.
- ▲ Excess of Sodium - may cause constipation.
- ▲ Excess of Iron - reduces appetite.
- ▼ Deficit of Silicon - may indicate the presence of parasites.
- ▲ Excess of Lithium - poisoning can cause diarrhea.
- ▲ Excess of Mercury - poisoning leads to liver dysfunction.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Calcium(Ca)	*541,24*	1 132,60 – 1 259,67			
Phosphorus(P)	*218,05*	306,69 – 323,32			
Zinc(Zn)	*148,48*	186,61 – 196,46			
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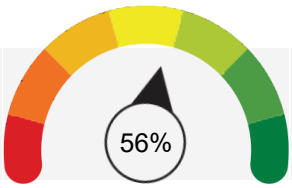
Element	Patient's result (ppm)	Maximum value	EXCESS
Lithium(Li)	*0,19*	0,06	
Mercury(Hg)	*0,75*	0,12	

Behavior



In the case of a cat, the diet should meet certain specific needs to positively affect not only his/her health, but also his/her mental stability. What is important is the palatability and digestibility of meals, the way and place of serving them (including satisfying the hunter's instinct), as well as adjusting the portion size to the level of activity of our friend. Failure to meet these conditions can make your cat irritable and even aggressive. Feeding the right way can therefore reduce certain undesirable behaviors. However, if a cat develops additional excess or deficiencies of minerals, simply changing the place of the meal or even behavioral therapy may not be enough. Disturbing behavioral changes that may be related to mineral imbalance include, but are not limited to, apathy, lethargy, as well as restlessness and nervousness.

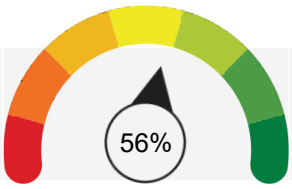
Your cat's EHAA result showed that there are some disturbances in its organism:

- ▼ Deficit of Magnesium - may cause nervousness.
- ▼ Deficit of Phosphorus - can cause apathy and lethargy, lack of desire to play.
- ▲ Excess of Lithium - poisoning can lead to depression.
- ▲ Excess of Mercury - poisoning is manifested by apathy and reluctance to be active.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Magnesium(Mg)	*132,41*	226,15 – 251,29			
Phosphorus(P)	*218,05*	306,69 – 323,32			

Element	Patient's result (ppm)	Maximum value	EXCESS
Lithium(Li)	*0,19*	0,06	
Mercury(Hg)	*0,75*	0,12	

Fertility, pregnancy, and litter size



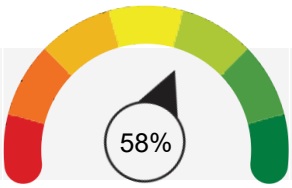
When preparing a cat for breeding, it is necessary to provide her with not only proper veterinary care, but also a properly balanced diet. Maintaining the mineral balance is essential at every stage: before the planned mating, during pregnancy and during lactation. By taking care of the appropriate concentration of nutrients in the body, we can reduce the risk of reduced fertility, silent heat, premature birth, or miscarriage.

Your cat's EHAA result showed that there are some disturbances in its organism:

- Deficit of Calcium - in reproductive kittens, it may cause tetanus spasms.
- Deficit of Zinc - reduces the quality of sperm reduces its concentration and mobility and increases the risk of sperm defects.
- Deficit of Selenium - reduces the quality of sperm reduces its concentration and mobility and increases the risk of sperm defects.
- Deficit of Chromium - leads to the death of the embryos.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Calcium(Ca)	*541,24*	1 132,60 – 1 259,67			
Zinc(Zn)	*148,48*	186,61 – 196,46			
Selenium(Se)	*1,34*	1,91 – 2,13			
Chrome(Cr)	*0,47*	0,49 – 0,66			

Growth, bones and joins



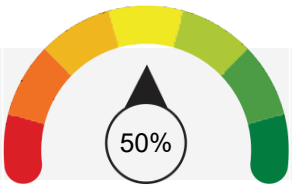
During the first few months, the kittens' skeletal system develops intensively. The caregivers are then very responsible. Stage-type nutrition plays a key role in the formation of any young organism. Therefore, care should be taken to ensure that all necessary minerals are provided to growing cats in adequate amounts. This is of course also important in adult cats, because the right number of elements responsible for the proper condition of bones, cartilage and joints is essential for cats throughout their lives.

Your cat's EHAA result showed that there are some disturbances in its organism:

- Deficit of Magnesium - may lead to stunted growth.
- Deficit of Phosphorus - causes disturbances in skeletal mineralization and reduces its strength.
- Deficit of Calcium - leads to lameness, stiff gait, as well as tooth weakness or spontaneous bone fractures.
- Deficit of Zinc - can manifest as slow growth.
- Deficit of Silicon - reduces the elasticity of connective tissue, cartilage, and tendons, reduces immunity, hinders bone regeneration and joint function.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Magnesium(Mg)	*132,41*	226,15 – 251,29			
Phosphorus(P)	*218,05*	306,69 – 323,32			
Calcium(Ca)	*541,24*	1 132,60 – 1 259,67			
Zinc(Zn)	*148,48*	186,61 – 196,46			
Silicon(Si)	*171,30*	368,57 – 483,08			

Urinary system



Any disturbance in urination or a change in its color should worry the cat owner. Urinary tract disease is a very common problem in these animals. Diagnosing them at an early stage allows you to introduce an appropriate diet and treatment faster. Among the minerals, phosphorus, calcium, and magnesium play a special role here. Their abnormal levels in the body can be recognized in a cat as the beginning of the development of chronic kidney disease or urolithiasis.

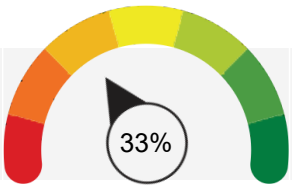
Your cat's EHAA result showed that there are some disturbances in its organism:

- ▼ Deficit of Selenium - may cause kidney mineralization.
- ▲ Excess of Sodium - causes increased thirst.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Selenium(Se)	*1,34*	1,91 – 2,13			
Sodium(Na)	*2 255,52*	1 377,24 – 1 589,40			

Element	Patient's result (ppm)	Maximum value	EXCESS
Mercury(Hg)	*0,75*	0,12	

Circulatory system



Cardiovascular diseases can occur in a cat at any stage of his/her life, which means that both senior cats and kittens can become cardiac patients. Mineral imbalance can lead to hypertension, anemia, intensify the side effects of cardiac drugs, and in extreme cases lead to cardiac arrest. Severe deficiencies and excesses of sodium, potassium, iron, copper, and magnesium are disturbing for the cat's circulatory system.

Your cat's EHAA result showed that there are some disturbances in its organism:

- ▲ Excess of Potassium - may lead to a slowdown of the heart rate (cardiotoxic bradycardia), and in extreme cases to cardiac arrest.
- ▲ Excess of Sodium - chronic excess can lead to high blood pressure.
- ▲ Excess of Iron - leads to a decrease in blood proteins and the accumulation of excess iron in the tissues, which can lead to damage to organs including the heart, pancreas, and liver.
- ▼ Deficit of Magnesium - most often manifested by heart rhythm disturbances, it can also intensify the side effects of cardiac drugs.

Element	Patient's result (ppm)	Normal value	DEFICIT	NORM	EXCESS
Potassium(K)	*1 334,29*	273,62 – 343,89			
Sodium(Na)	*2 255,52*	1 377,24 – 1 589,40			
Iron(Fe)	*167,29*	89,01 – 124,26			
Magnesium(Mg)	*132,41*	226,15 – 251,29			

Mineral State

EHAA Additional information about your cat – assessment of biochemical needs and threats

Macroelements

20 Ca | 15 P Calcium and Phosphorus

Calcium and Phosphorus are two of the most important macronutrients. They are responsible for the proper growth and development of kittens, participate in blood clotting, and take care of the proper functioning of the muscles and nervous system. Their mutual proportion is also important. An abnormal calcium level in a cat's body is usually the result of a poorly balanced meal. The most common nutritional mistakes include serving only meat without proper supplementation, sharing table scraps, feeding "by eye", as well as excessive supplementation. All this leads to a disturbance of the calcium-phosphorus ratio and is the cause of many diseases.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Calcium(Ca)	DEFICIT	• building blocks of bones, teeth, and hair • it determines the efficient functioning of the nervous, urinary, digestive, and reproductive systems • ensures proper muscle contractions and blood clotting	Beginnings of the shortage: • lameness • stiff gait • deterioration of the condition and appearance of the coat Chronic Deficiency: • lack of appetite • dehydration • loss of teeth • spontaneous fractures Acute deficiency: • tetanus cramps	• excess calcium causes skeletal development disorders • reduces the absorption of phosphorus, zinc, iron, and copper • retards growth • inhibits the functions of the thyroid gland • causes soft tissue calcification • it causes the formation of kidney stones (oxalates)	• egg shell meal • calcium citrate • calcium from algae • calcium carbonate Note: Dairy products, including milk, are a common cause of diarrhea in cats and are not a good source of calcium for them	min. 0,4 g/100 g dry matter While maintaining the ratio of calcium to Phosphorus: 1-2: 1
Phosphorus(P)	DEFICIT	• building blocks of bones, teeth, and hair • it determines the efficient functioning of the nervous, urinary, and digestive systems • building block of nucleic acids, ATP, NADP and NADPH	The symptoms of Phosphorus deficiency are like those of calcium deficiency • decreased appetite • deterioration of the quality of the hair • disturbances in bone mineralization and their reduced strength • apathy and lethargy	• excess phosphorus hinders the absorption and metabolism of calcium • causes kidney damage • bone loss • formation of kidney stones (struvites)	• meat • eggs • fishes • offal	min. 0,26 g/100 g dry matter

11 Na 19 K Sodium and Potassium

Sodium and Potassium are electrolytes, i.e., elements responsible for several extremely important processes in the cat's body, including maintaining acid-base balance, improving water flow in the body, proper functioning of the nervous system and muscles. In healthy cats, Sodium and Potassium are excreted with the urine, therefore they should be supplemented in an appropriate food ration and animals should be provided with constant access to clean water. Sodium and potassium deficiency is especially dangerous for young cats, as it slows growth and reduces weight gain. Their absence also accelerates the heart rate and causes general weakness.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Sodium(Na)	**EXCESS**	• ensures proper growth and reproduction • efficient functioning of the nervous, digestive, urinary and blood systems • regulates the osmotic pressure and water and electrolyte balance	• disturbances in the amount of urine excreted • "salt starvation" • distorted appetite (eating non-food products) • weight loss • inhibition of lactation • slowdown in growth • feeling anxious	Chronic Excess: • it may appear, among others in diseases of the heart and kidneys, causing hypertension Poisoning: • strong thirst • itchy skin • constipation • lack of appetite • convulsions • in extreme cases, death • In healthy cats, excess sodium is excreted in the urine	• meat • fishes • eggs	min. 0,08 g/100 g dry matter
Potassium(K)	**EXCESS**	• takes care of the acid-base and water-electrolyte balance • stimulates nerve receptors • supports the work of muscles and heart • is involved in the proper functioning of the digestive system	• lack of appetite • muscle weakness and loss of tension (head drooping) • apathy • indigestion • paralysis (affecting first the forelimbs, then the rear limbs)	• slow heart rate (cardiotoxic bradycardia) • cardiac arrest In healthy cats, excess potassium is excreted in the urine	• meat • fishes • brewer's yeast • egg white • parsley • celery • bananas	min. 0,6 g/100 g dry matter

16
S

Sulfur

Sulfur deficiency is rare, and if detected, it is the result of dietary errors - incorrect amount of protein in the ration, feeding table scraps, and a diet low in animal-based foods. Sulfur occurs primarily in sulfur amino acids; for cats, sources are meat, offal, fish, and eggs.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Sulfur(S)	EXCESS	• building material for skin, hair, and claws (as a component of keratin) • component of enzymes • building block of sulfur amino acids (cystine and methionine) • creates the structure of proteins (so-called sulfide bridges)	• sulfur deficiency is rare (amino acids methionine and cystine contain it in large amounts • sulfur deficiency causes discoloration, brittleness, and dullness of the coat • claw brittleness • dandruff • skin diseases (eczema, allergies, inflammations)	• hinders the absorption of selenium	• products of animal origin	Lack of generalised data, it can differ

12
Mg

Magnesium

Magnesium, like calcium and phosphorus, is part of the bone tissue. However, its main task is to participate in the conduction of nerve impulses and muscle contractions, including the heart muscle. Therefore, the correct level of this element is especially important in cardiac patients. Too low a concentration leads to decreased contractility of the heart and arrhythmia. It can also cause loss of appetite, muscle weakness, seizures, decreased bone mineralization, and increase the side effects of heart medications. Vitamin B6 influences the proper absorption of magnesium.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Magnesium(Mg)	DEFICIT	• the building blocks of hair, teeth, bones, and muscles • component of enzymes • ensures proper muscle contractions • functioning of the digestive, urinary, and nervous systems • participates in cellular respiration	• causes calcification of soft tissues • neuromuscular disorders • growth inhibition • hypersensitivity to pain stimuli (hyperalgesia) • nervousness • convulsions • damage to the cardiovascular system • deterioration of the condition and appearance of the coat	Chronic excess • causes the formation of kidney stones (struvites) Poisoning • diarrhea	• meat • eggs • fish (mackerel, cod) • seafood • magnesium oxide • brewer's yeast (vitamin B6 contained in yeast increases the absorption of magnesium)	min. 0,04 g/100 g dry matter

Microelements

26 Fe Iron

Iron is one of the most important micronutrients. Participates in the transport of oxygen in the blood and muscles. Its deficiency may lead to the development of anemia. Meat and offal are a rich source of this element in the nutrition of cats. Iron is stored in the liver, spleen, and bone marrow in the form of ferritin and haemosiderin.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Iron(Fe)	**EXCESS**	• ensures the proper functioning of the blood system (formation of blood components: erythrocytes and leukocytes) • participation in the transport of oxygen (as a component of hemoglobin and myoglobin) • electron transfer (as a component of the cytochrome) • proper functioning of the digestive system • hair building material	• anemia • disorders of the structure and shape of red blood cells (erythrocytes) • accelerated fatigue, weakness, and apathy • tarry stools • deterioration of the condition and appearance of the coat	• lack of appetite • weight loss • drop in protein levels in the blood (hypoalbuminaemia) • excess iron build-up in tissues, which can damage organs including the heart, pancreas, and liver (hemochromatosis) • reduced use of phosphorus, copper, manganese, and zinc	• meat • offal (liver, spleen) • fishes • egg yolk • hemoglobin	8 – 68,18 mg/100 g dry matter

29
Cu

Copper

Copper is part of many metalloproteins, or proteins that need copper to fulfill their biological functions. The main tasks of copper include transporting iron to the bone marrow and incorporating it into hemoglobin, as well as participating in the maturation of erythrocytes. Therefore, its deficiency may manifest itself as anemia. Other consequences of a copper deficiency may vary. From the harmless lightening of the cat's coat to a serious risk of dying off the embryos.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Copper(Cu)	**EXCESS**	• supports proper growth and reproductive functions • ensures proper pigmentation of the skin and hair • accelerates wound healing • building block of enzymes • participation in the formation of hemoglobin, absorption, and transport of iron • fatty acid metabolism	• anemia • bone growth and bone structure disorders • limb deformity in newborn kittens • miscarriages in cats • neuromuscular disorders • distorted appetite (eating non-food products) • decrease in the condition and appearance of the coat (dullness and lightening)	• reduces the absorption of zinc • causes weight loss • liver degeneration	• crustaceans • offal (liver, heart, kidneys) • meat • eggs	0,5 – 2,8 mg/ 100 g dry matter

30
Zn

Zinc

Zinc is responsible for the proper condition of the cat's skin, coat, and claws. It also plays an important role in the reproductive period, positively influencing the concentration and mobility of sperm. Both increased and decreased levels of this element in the hair coat may indicate its deficiency in the body. Therefore, it is recommended to supplement it in both situations. The most important symptoms of zinc deficiency include parakeratosis, i.e., damage to the skin and epidermis (in cats mainly around the mouth), excessive shedding, problems with wound healing and deterioration of sperm quality. Proper absorption of zinc is difficult in the case of vitamin E deficiency, as well as excess calcium, magnesium, iron and phytic acid.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Zinc(Zn)	DEFICIT	• affects the condition of the skin, hair, and mucous membranes • has an immunostimulating effect • ensures the correct growth rate • necessary for the proper functioning of the digestive system • is involved in the synthesis of proteins, sperm, and insulin • component of enzymes	• slowdown in growth • reproductive disorders • skin changes • loss of hair pigmentation • vomiting • lack of appetite • weight loss	• excess zinc is rare • can cause calcium and copper deficiency • acute gastritis	• red meat (e.g., beef) • egg yolk • liver • ready-made preparations	7,5 – 22,7 mg/100 g dry matter

34 Se Selenium

Selenium slows down the aging process and can cleanse the body of mercury. It is also extremely important for reproductive functions. Its deficiency reduces the concentration and motility of sperm, increasing the risk of their defects. Selenium also plays an important role in the proper functioning of the thyroid gland. Unfortunately, its amount in products is significantly reduced due to thermal treatment. Therefore, its level should be monitored and, if necessary, its level supplemented in the cat's daily diet. Selenium works together with vitamin E, which enhances its antioxidant effect. Conversely, too little vitamin E multiplies the effects of selenium deficiency.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Selenium(Se)	DEFICIT	• antioxidant • supports reproductive functions • affects the condition of the skin • takes care of immunity • has anti-inflammatory, antibacterial, and antiviral properties • is involved in the proper functioning of the urinary, digestive, nervous, and endocrine systems	• muscular dystrophy • reproductive disorders • decrease in appetite • subcutaneous swelling • kidney mineralization • disorders of the structure and function of the heart (cardiomyopathy) occurring with vitamin E deficiency	• nervousness • lack of appetite • vomiting • muscle weakness • shortness of breath • pulmonary oedema • death in acute poisoning	• liver • kidneys • meat • fishes	Dry food: 21 – 56,8 µg/ 100 g dry matter Wet food: 26 – 56,8 µg/ 100 g dry matter

14 Si Silicon

Silicon is a very important trace element. It is primarily responsible for the proper functioning of connective tissues, especially bones and cartilage. It provides them with adequate flexibility and resistance. In addition, silicon is involved in the synthesis of collagen. Supports the work of the joints and accelerates the regeneration of the epidermis.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Silicon(Si)	DEFICIT	• ensures proper metabolism in connective tissues • bone regeneration • takes part in the synthesis of collagen • maintains the proper condition of the skin and hair • reduces the risk of parasitic infestations	• problems with the osteoarticular system • deterioration of the condition of the hair and skin • reduced protection against parasites	• no confirmed symptoms of excess (hence it can be detected only with the use of appropriate diagnostics)	• vegetables • ready-made preparations	Lack of generalised data, it can differ

25 Mn Manganese

Manganese responds, inter alia, for the activation of enzymes involved in the transformation of fats and carbohydrates, is involved in the synthesis of proteins and nucleic acids. It plays a key role in feeding kittens during the breeding period. Its correct level reduces the risk of delayed estrus, miscarriages, and premature births.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Manganese(Mn)	NORM	• is involved in the transformation of fats, proteins, and carbohydrates • in ossification processes • the formation of red blood cells • supports the proper functioning of the brain and pancreas • proper metabolism • increases the breeding ability	• slowing down the growth rate • stiff gait • deformities of bones and joints • reproductive disorders • miscarriages	• partial albinism • decline in fertility	• meat • fishes	0,5 – 17 mg/100 g dry matter

24 Cr Chromium

Chromium is involved in metabolic processes and supports the action of insulin. In addition, the correct level of chromium in the cat's body reduces the risk of embryo dieback.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Chrome(Cr)	DEFICIT	• supports reproductive functions • is involved in the metabolism of fats and carbohydrates • supports the action of insulin • regulates the level of glucose	• impaired glucose tolerance • increased levels of serum triglycerides and cholesterol • reproductive problems	• skin inflammation • irritation of the respiratory tract • lung cancer	• ready-made preparations	Lack of generalised data, it can differ

27 Co Cobalt

Cobalt is part of vitamin B12 (cobalamin), extremely important for the proper functioning of the body. It takes part in the synthesis of erythrocytes, nucleic acids, and the myelin sheath of nerve cells.

	THE EHAA RESULT	ROLE	DEFICIT	EXCESS	SOURCE	DAILY DEMAND adult cat (FEDIAF 2021)
Cobalt(Co)	EXCESS	• participation in the production of vitamin B12	• lack of appetite • weight loss • agitation • you may develop anemia related to a lack of vitamin B12	• no confirmed symptoms of excess (detectable only with the help of appropriate diagnostics)	• liver • kidneys • meat • fishes • egg yolk	Lack of generalised data, it can differ

TOXIC ELEMENTS

Sources of heavy metals

The main threat posed by toxic elements is their antagonistic relationship to micro and macro elements. This means that if your cat is loaded with heavy metals, they block the absorption of essential nutrients and, as a consequence, can cause serious illnesses.

Most heavy metals occur in nature in trace amounts. Their presence is related to processes such as volcanic eruption, ocean evaporation, bushfires, and rock weathering. They don't usually have a negative effect on the natural environment. However, progressing urbanisation and significant industrialisation have contributed to the increase of the concentration of heavy metals in nature. Sources that pollute the ecosystem with toxic elements include heat and power plants, power plants, ironworks, combustion engines, the chemical industry, coal stoves in homes, incineration of waste, and incorrect storage of animal manure on farms. In this way, heavy metals reach the atmosphere, water, soil, settle on the aboveground plant structures, and are taken up by plant root systems.

Household chemicals, and above all food, such as tuna and salmon, popular in cat nutrition, can also be the source of heavy metals. In addition, serving food in metal bowls, storing products in aluminum foil, commercial canned food and many other factors expose the cat's body to mercury, cadmium, lead, arsenic, and aluminum. Clinical symptoms depend on age, amount ingested and duration of exposure as metals may accumulate in tissues. Acute poisoning is often associated with symptoms related to the nervous system, and slight or chronic exposure to the digestive system.

Detoxification

Heavy metals are stored by the body in the liver and the spleen, as well as the bones and the coat. The amount of toxic elements in the blood is maintained at a relatively constant level that enables detoxification through the liver or kidneys. After the elimination of heavy metals from the blood, the blood receives subsequent portions that were stored in the body. That's why detoxification is a very slow process.

The best way to reduce the risk of heavy metal poisoning is to locate and eliminate its source. You should also provide a properly balanced diet. A malnourished organism is more susceptible to the action of toxic elements. A deficiency in some microelements increases the absorption of heavy metals, e.g., calcium deficiency increases the absorption of cadmium and lead. Maintaining a proper level of iron in the body reduces the absorption of heavy metals and the toxic effect of lead on the circulatory system. Zinc has a positive effect on the excretion of arsenic from the body and decreases the absorption of lead. On the other hand, antioxidants such as selenium, vitamin C and vitamin E minimise the oxidative damage caused by heavy metals.

13 Al Aluminium

Aluminium (Al) is one of the most abundant elements on Earth. It's found mainly in soil and plants. In small amounts, it doesn't pose a danger to cats. However, an excess of this element can lead to liver damage. Aluminum can combine with calcium, making it difficult to absorb. Hence, loading the body with this element is particularly dangerous during the period of growth, when the cat needs an adequate amount of calcium for bone development. It's also worth remembering that metal bowls for cats can increase the level of aluminium in your cat. It's recommended you use ceramic bowls.

Element	The EHAA result showed
Aluminium(Al)	SAFE LEVEL

33 As Arsenic

Arsenic is naturally present in the water, soil, and air. It gets into the body through the lungs, skin and digestive system with contaminated food and water. Arsenic poisoning usually occurs through the accidental ingestion of insecticides containing arsenic. Cats are more sensitive to the toxic effects of arsenic than other animals. Acute poisoning may manifest as severe abdominal pain, diarrhea, vomiting, drop in blood pressure, ataxia (decreased motor coordination) and hepatitis. Long-term exposure to this element can lead to weight loss due to decreased appetite.

Element	The EHAA result showed
Arsenic(As)	SAFE LEVEL

56 Ba Barium

As with other toxic elements, the presence of barium in the body is also undesirable. Its excess may interfere with the absorption of macro and micronutrients, which in turn reduces the body's immunity and increases the risk of developing diseases.

Element	The EHAA result showed
Barium(Ba)	SAFE LEVEL

48 Cd Cadmium

Cadmium is an element that occurs naturally in small amounts in soil, rocks, and ocean waters. It is concentrated in plants that take it from the soil. It is used, among others in the production of batteries and anti-corrosion coatings. Significant amounts of this element are found in sewage sludge from sewage treatment plants. Cadmium is poorly excreted by the body, and that's why it's important to avoid sources of it. Cadmium poisoning leads to kidney damage, digestive problems, reproductive problems, osteomalacia (a metabolic bone disease) and poor growth.

Element	The EHAA result showed
Cadmium(Cd)	SAFE LEVEL

3 Li Lithium

Lithium is an element that occurs in the environment in small amounts. Cats are very rarely exposed to an excess of this metal. Symptoms of poisoning are depression, diarrhoea, and ataxia (impaired body coordination).

Element	The EHAA result showed
Lithium(Li)	EXCESS

28 Ni Nickel

Nickel is present in cat food in very small amounts. Its absorption from the gastrointestinal tract is very low, and so it's described as a low-toxicity element. An excess of nickel can lead to kidney damage, hyperglycaemia, respiratory disorders, and poor growth.

Element	The EHAA result showed
Nickel(Ni)	SAFE LEVEL

82 Pb Lead

Lead poisoning is one of the most reported types of poisoning in animals. Although cats rarely try to eat inedible items, such as lead soldiers, it may be risky for them to stay, for example, during renovation in old buildings. The residues of lead paint that then settle on the cat's hair can be licked off during the daily toilet. The effects of long-term contact with lead are neurological problems, reproductive issues, kidney damage, osteoporosis and vision impairment. In the event of acute poisoning, e.g., as a result of the ingestion of a lead element, excessive salivation, blindness, hyperactivity and convulsions may occur.

Element	The EHAA result showed
Lead(Pb)	SAFE LEVEL

80 Hg Mercury

Mercury is a heavy metal that occurs in nature in small, non-toxic amounts. However, due to human activity, its concentration in the environment is constantly increasing, creating the risk of poisoning. A source of mercury that is dangerous for a cat may include alkaline batteries, fluorescent lamps, mercury thermometers, pesticides, and fertilizers, as well as fish and seafood, as Mercury is one of the heavy metals that pollute surface waters. The highest mercury content is found in tuna, swordfish, pike, salmon, and cod. This element is absorbed in the digestive tract and then accumulated in the liver and muscles. Poisoning with mercury leads to the appearance of neurological symptoms in cats, disturbances in the functioning of the liver and kidneys.

Element	The EHAA result showed
Mercury(Hg)	EXCESS

38 Sr Strontium

As with other toxic elements, the presence of strontium in the body is also undesirable. Its excess may interfere with the absorption of macro and micronutrients, which in turn reduces the body's immunity and increases the risk of developing diseases.

Element	The EHAA result showed
Strontium(Sr)	SAFE LEVEL

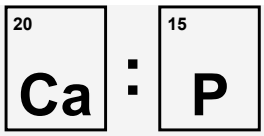
23 V Vanadium

Vanadium is a highly toxic heavy metal. Poisoning with this element leads to decreased growth, diarrhea, dehydration, extreme exhaustion, and hemorrhages.

Element	The EHAA result showed
Vanadium(V)	SAFE LEVEL

Proportions of elements

In the assessment of biochemical balance, the proportions between the elements are as important as the levels of the elements themselves. This is due to the antagonism and synergy between the macro- and microelements. The relationships between elements directly affect the proper absorption of nutrients by the body, as well as on blocking their absorption.



One of the important proportions for the body is the relationship of calcium to phosphorus. An excess of phosphorus limits calcium absorption and thus contributes to a deficiency in this element in the body. An incorrect ratio between these two macroelements leads to a disturbance of calcium and phosphorus metabolism, and results in the development of diseases of the skeletal system. A decreased Ca:P relationship in the coat can indicate a fast metabolism. What does it mean? If the proportion of these elements is understated, it is very possible that your cat has recently lost weight or is generally lean. It can also be seen in his/her behavior, showing high activity and even hyperactivity.

Your cat's EHAA result showed:

Norm for Calcium(Ca)/Phosphorus(P)	**1,61 - 2,63**
Patient's result	**2,48**
Proportion	**WITHIN NORM**
Check what are the trends for your Ca:P ratio	
TOO LOW	Limited calcium absorption. Increased risk of bone fragility.
TOO HIGH	Excess calcium – excessive bone mineralization.

20 Ca : 12 Mg

Another important proportion is the ratio of calcium to magnesium. These are two elements that act antagonistically. Calcium is involved in the process of muscle contraction, while magnesium is involved in the diastolic and relaxing effect. Disturbance of their proportions leads to problems with relaxation of tense muscles and, as a result, their soreness, tremors, and cramps.

Your cat's EHAA result showed:

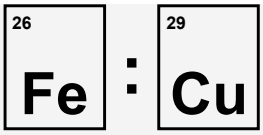
Norm for Calcium(Ca)/Magnesium(Mg)	**1,84 - 2,83**
Patient's result	**4,09**
Proportion	**TOO HIGH**
Limit intake of:	**calcium**
Increase intake of:	**magnesium**
Check what are the trends for your Ca:Mg ratio	
TOO LOW	Impaired calcium absorption - diarrhea.
TOO HIGH	Malabsorption of magnesium - cramps, muscle tremors.

30 Zn : 29 Cu

Zinc and copper are components or activators of many enzymes. They contribute to the development of bone tissue and maturation of articular cartilage, and they also strengthen the body's immunity. Long-term excess of one of these elements leads to limited absorption of the other.

Your cat's EHAA result showed:

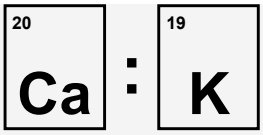
Norm for Zinc(Zn)/Copper(Cu)	**8,35 - 12,64**
Patient's result	**13,56**
Proportion	**TOO HIGH**
Limit intake of:	**zinc**
Increase intake of:	**copper**
Check what are the trends for your Zn:Cu ratio	
TOO LOW	Limited zinc absorption. Liver damage.
TOO HIGH	Limited copper absorption. Weakened skeletal system.



Copper is a very important element in a cat's diet; however, an excess can have a negative impact on the absorption of iron, thus leading to iron deficiency. An overly low level of iron in the body can result in anaemia, decreased endurance and low immunity.

Your cat's EHAA result showed:

Norm for Iron(Fe)/Copper(Cu)	**110,90 - 290,16**
Patient's result	**15,28**
Proportion	**TOO LOW**
Limit intake of:	**copper**
Increase intake of:	**iron**
Check what are the trends for your Fe:Cu ratio	
TOO LOW	An excess of copper limits iron absorption – anaemia. Decreased immunity.
TOO HIGH	An excess of iron limits the use of copper – depigmentation. Decline in the growth rate.

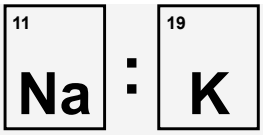


The next proportion that's worth noting is the relationship of calcium to potassium. Both elements impact the proper functioning of the thyroid. That's why an incorrect proportion can indicate problems with this gland's activity.

Your cat's EHAA result showed:

Norm for Calcium(Ca)/Potassium(K)	**5,17 - 10,72**
Patient's result	**0,41**
Proportion	**TOO LOW**
Limit intake of:	**potassium**
Increase intake of:	**calcium**
Check what are the trends for your Ca:K ratio	
TOO LOW	Can indicate hypothyroidism.
TOO HIGH	Can indicate hyperthyroidism.

Mineral State



Electrolyte concentration has a significant influence on the regulation of the homeostasis of body fluids. A disturbance in this balance can lead to many different diseases. That's why it's important to supplement electrolyte deficiencies so that their concentration is adequate. An excess of K and Na is excreted with urine, and that's why a deficiency is a much bigger problem. However, excessive amounts of Na in the feed ration can have a negative impact on K content in the urine. This means that excess sodium limits the absorption of potassium.

Your cat's EHAA result showed:

Norm for Sodium(Na)/Potassium(K)	**18,68 - 123,34**
Patient's result	**1,69**
Proportion	**TOO LOW**
Limit intake of:	**potassium**
Increase intake of:	**sodium**

Check what are the trends for your Na:K ratio

TOO LOW	Sodium deficiency – decreased appetite. Deterioration of form.
TOO HIGH	Excess sodium limits the absorption of potassium. Muscle and heart disorders. Decreased appetite.