

SAMPLE PRESENT



ELEMENTAL
HAIR
ANALYSIS
FOR ANIMALS

Meg

Name: Meg

Date of the test: 2021-07-29

Owner:
John

Test code: AABCC11222



office@petsdiag.com

WHAT YOU WILL FIND IN THE RESULT

The result contains information on the proportions and concentrations of nutritional and toxic elements in the body of the dog. Both the levels of individual micro- and macroelements 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 that the elements in the test refer to have been developed for the needs of EHAA by a research team at the University of Agriculture in Kraków and are based on in-depth comparative research. The content of minerals is expressed in ppm.

The EHAA result has a description section prepared based on reports by employees of the University of Agriculture. The information it contains provides a better understanding of the EHAA result and allows you to introduce the right changes to the diet of the dog being tested.

EHAA TEST RESULT











CONCENTRATION OF NUTRITIONAL ELEMENTS – MACRO-ELEMENTS

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Sulfur(S)	46 203,20	51 651,87 – 54 607,86			
Calcium(Ca)	749,88	1 108,34 – 1 316,77			
Phosphorus(P)	334,37	275,90 – 327,48			
Sodium(Na)	7 110,87	570,00 – 856,17			
Potassium(K)	559,98	168,21 – 239,51			
Magnesium(Mg)*	512,78	175,33 – 222,05			






CONCENTRATION OF NUTRITIONAL ELEMENTS – MICRO-ELEMENTS

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Silicon(Si)	91,54	386,60 – 546,39			
Zinc(Zn)	213,99	215,34 – 234,87			
Iron(Fe)	28,83	175,93 – 251,25			
Copper(Cu)	12,81	20,01 – 26,46			
Manganese(Mn)	0,64	11,45 – 15,48			
Selenium(Se)	2,07	1,19 – 1,41			
Chrome(Cr)	0,22	0,82 – 1,16			
Cobalt(Co)	0,02	0,02 – 0,04			

CONCENTRATION OF TOXIC ELEMENTS

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Aluminium(Al)	27,46	269,54	
Arsenic(As)	0,01	0,12	
Barium(Ba)	0,83	4,07	
Germanium(Ge)	0,01	0,34	
Cadmium(Cd)	0,03	0,15	
Lithium(Li)	0,13	0,31	
Nickel(Ni)	0,34	1,23	
Lead(Pb)	1,26	1,55	
Strontium(Sr)	3,88	3,84	
Vanadium(V)	0,09	0,70	

PROPORTION OF NUTRITIONAL ELEMENTS

Proportion	Patient's result	Normal value	TOO LOW	WITHIN NORM	TOO HIGH
Calcium(Ca) Phosphorus(P)	2,24	3,99 – 4,87			
Zinc(Zn) Copper(Cu)	16,70	9,13 – 11,46			
Iron(Fe) Copper(Cu)	2,25	8,10 – 12,17			
Calcium(Ca) Potassium(K)	1,34	5,92 – 7,83			
Sodium(Na) Potassium(K)	12,70	3,37 – 4,84			



TENDENCIES OF THE DOG

Coat

Problems with the coat

No problems with the coat

29%

Joints

Possible problems with the joints

No problems with the joints

33%

Digestive system

Possible disruptions in the functioning of the digestive system

Correct functioning of the digestive system

60%

Learning and temperament

Possible problems with concentration and remembering

Correct learning process

63%

Fertility, pregnancy and litter size

Possible breeding capacity

Correct capacity

50%

Growth

Possible growth impairment

Correct growth

57%

Overall condition

Possible decrease in overall condition

Correct overall condition

40%

Ageing process

Possible accelerated ageing process

Natural ageing process

30%

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

EHAA RESULT – DESCRIPTION

I. APPEARANCE, ACTIVITY AND CONDITION

Coat

The proper condition of the dog's coat depends on the correct level of many minerals. Depigmentation, dullness, as well as hair loss or loss of shine are symptoms that may result from an excess or deficiency of specific nutritional elements.

- **copper** - a clear symptom of a deficiency is a lightening and dullness of the coat in dogs with a dark coat and the appearance of "stains" on the snout and in the corners of the eyes in dogs with a light coat.
- **zinc** - a low level contributes to excessive shedding and depigmentation, disturbs the proper structure of the top coat, its growth and appearance, reduces its strength, increasing brittleness and breakage.
- **calcium, iron, phosphorus and sulphur** - constitute the building material for the coat. A deficiency contributes to overall decline in its appearance and condition.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Sulfur(S)	46 203,20	51 651,87 – 54 607,86			
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Copper(Cu)	12,81	20,01 – 26,46			

*The concentration of magnesium in the coat is usually inversely proportional to its levels in the body. A high level of magnesium in the coat suggests that it's low in the body, while a low level in the coat suggests an excess in the body.

Tendency of the dog to problems with the coat based on the EHAA result:

Problems with the coat

No problems with the coat

29%

Joints

Both an excess of and deficiency in minerals can lead to joint problems. The result is pain and lameness, and a significant decrease in the comfort of life for your dog.

- **zinc** - a deficiency can lead to disrupted joint cartilage development.
- **selenium** - a low concentration accompanies joint degeneration.
- **calcium** - an excess in puppies can lead to hip dysplasia, while a deficiency in adult dogs can cause arthritis.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Zinc(Zn)	213,99	215,34 – 234,87			
Selenium(Se)	2,07	1,19 – 1,41			
Calcium(Ca)	749,88	1 108,34 – 1 316,77			



Tendency of the dog to joint ailments based on the EHAA result:

Possible problems with the joints

No problems with the joints

33%

Digestive system

Digestive problems, such as poor appetite and diarrhoea, often occur in dogs. They can be caused by incorrect concentrations of nutrients in the body, as well as toxic element poisoning.

- **calcium** - an excess decreases the absorbability of some minerals in food.
- **selenium, calcium and phosphorus** - a phosphorus deficiency and excess of calcium and selenium decrease appetite.
- **selenium** - too much can cause excessive salivation.
- **calcium and magnesium** - a calcium deficiency and excess of magnesium can cause diarrhoea.
- **zinc, magnesium and selenium** - an excess can cause vomiting.
- **zinc** - a deficiency accompanies liver diseases.
- **silicon** - a deficiency may indicate the presence of parasites.
- **arsenic** - long-term exposure to it contributes to decreased appetite.
- **cadmium** - poisoning leads to digestive problems.
- **lithium and vanadium** - poisoning can lead to diarrhoea.

Your dog's EHAA result showed:

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Zinc(Zn)	213,99	215,34 – 234,87			
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*The concentration of magnesium in the coat is usually inversely proportional to its levels in the body. A high level of magnesium in the coat suggests that it's low in the body, while a low level in the coat suggests an excess in the body.

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Arsenic(As)	0,01	0,12	
Lithium(Li)	0,13	0,31	
Cadmium(Cd)	0,03	0,15	
Vanadium(V)	0,09	0,70	

Tendency of the dog to dysfunction of the digestive system based on the EHAA result:

Possible disruptions in the functioning of the digestive system

Correct functioning of the digestive system

60%

Learning and temperament

A dog's diet can also impact its behaviour to a certain extent. Excessive nervousness, anxiety or vice versa – apathy and lethargy – may indicate not only disturbances in the concentration of nutrients, but also the burden placed on the dog's body by toxic elements.

- **magnesium** - a deficiency can lead to hyperactivity.
- **iron** - a deficiency in young dogs makes learning and remembering new commands difficult.
- **selenium and magnesium** - an excess of selenium and deficiency in magnesium can lead to nervousness.
- **selenium and potassium** - a deficiency can cause apathy and lethargy, and lack of desire to play.
- **sodium** - a low level can cause a feeling of anxiety.
- **vanadium** - poisoning can lead to extreme exhaustion.
- **lithium** - poisoning can lead to depression.
- **lead** - poisoning can cause hyperactivity.



Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Magnesium(Mg)*	512,78	175,33 – 222,05			
Selenium(Se)	2,07	1,19 – 1,41			
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Potassium(K)	559,98	168,21 – 239,51			
Iron(Fe)	28,83	175,93 – 251,25			

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Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Vanadium(V)	0,09	0,70	
Lithium(Li)	0,13	0,31	
Lead(Pb)	1,26	1,55	

Tendency of the dog to disruptions in the learning process:



Fertility, pregnancy and litter size

A well-balanced diet is a crucial element during the breeding period of dogs. The correct levels of nutrients reduce the occurrence of fertility problems, and have a positive effect on the size of the litter and the health of the puppies.

- **zinc and selenium** - a deficiency reduces sperm quality: it reduces the concentration and sperm motility, and increases the risk of sperm defects.
- **phosphorus** - low levels increase the risk of silent heat and can decrease the fertilisation rate by up to 50%.
- **chromium and copper** - a lack can lead to embryonic death.
- **manganese** - a deficiency contributes to delayed heat, and can cause miscarriage or premature birth.
- **cadmium and lead** - poisoning with these elements leads to reproductive disorders.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Zinc(Zn)	213,99	215,34 – 234,87			
Selenium(Se)	2,07	1,19 – 1,41			
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Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Cadmium(Cd)	0,03	0,15	
Lead(Pb)	1,26	1,55	

Tendency of the dog to reproductive disorders based on the EHAA result:

Possible breeding capacity

Correct capacity





50%




Growth and puppy years

The first months of a dog's life are a period of intensive growth and development. During this stage, nutrition plays a key role in the formation of the young body. Any nutrient deficiencies inhibit correct growth and development in puppies.

- **manganese** - a deficiency in puppies in the foetal stage results in low birth weight.
- **calcium** - a deficiency in puppies interferes with the ossification process, and at the same time an excess can delay growth and lead to serious bone and cartilage diseases.
- **phosphorus** - a deficiency disrupts growth and the building of the skeleton.
- **zinc** - a deficiency may interfere with correct weight gain.
- **cadmium, nickel and vanadium** - poisoning leads to weak growth.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Manganese(Mn)	0,64	11,45 – 15,48			
Calcium(Ca)	749,88	1 108,34 – 1 316,77			
Phosphorus(P)	334,37	275,90 – 327,48			
Zinc(Zn)	213,99	215,34 – 234,87			

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Cadmium(Cd)	0,03	0,15	
Nickel(Ni)	0,34	1,23	
Vanadium(V)	0,09	0,70	

Tendency of the dog to disrupted growth based on EHAA result

Possible growth impairment

Correct growth

57%

Adulthood

The role of elements does not diminish as dogs enter adulthood. Maintaining the correct levels of minerals in the body reduces the risk of many diseases. Thanks to this, dogs can enjoy good health and form for a long time.

- **calcium, iron, phosphorus and sulphur** - constitute the building material for bones, teeth, the skin and the coat. A deficiency contributes to an overall decline in their condition.
- **iron, cobalt, potassium, zinc, manganese** - a deficiency inhibits the production and activation of compounds essential for the functioning of the body (haemoglobin, myoglobin, vitamin B12, high-energy compounds and enzymes).
- **sodium, potassium** - a lack disturbs the proper water and electrolyte balance, acid-base balance and neuromuscular activity.

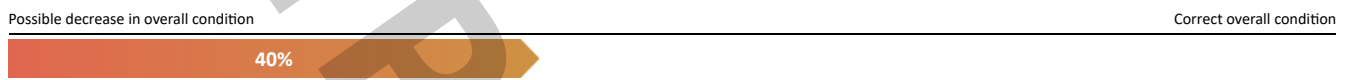


Your dog's EHA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Sulfur(S)	46 203,20	51 651,87 – 54 607,86			
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Iron(Fe)	28,83	175,93 – 251,25			
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Magnesium(Mg)*	512,78	175,33 – 222,05			
Cobalt(Co)	0,02	0,02 – 0,04			

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Tendencies of the dog to decreased general condition:










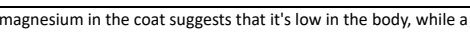


Old age

A way to improve the quality of life for older dogs can be a well-balanced diet and the addition of appropriate minerals. They help delay ageing processes and support treatment of diseases that often affect older dogs.

- **selenium** - a low level decreases cognitive ability in older dogs, which is not recommended especially in cardiovascular diseases.
- **zinc** - a deficiency causes hair loss, accelerates skin ageing and results in excessive keratosis.
- **sodium and phosphorus** - an excess can contribute to chronic renal failure, which is common in senior dogs.
- **calcium, phosphorus and potassium** - a deficiency increases bone brittleness.
- **magnesium** - a deficiency causes a feeling of tiredness.
- **copper, iron and manganese** - a low level in senior dogs causes overall accelerated ageing processes.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Calcium(Ca)	749,88	1 108,34 – 1 316,77			
Phosphorus(P)	334,37	275,90 – 327,48			
Sodium(Na)	7 110,87	570,00 – 856,17			
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Selenium(Se)	2,07	1,19 – 1,41			
Copper(Cu)	12,81	20,01 – 26,46			
Magnesium(Mg)*	512,78	175,33 – 222,05			

*The concentration of magnesium in the coat is usually inversely proportional to its levels in the body. A high level of magnesium in the coat suggests that it's low in the body, while a low level in the coat suggests an excess in the body.

Tendency of the dog to accelerated ageing processes:

Possible accelerated ageing process

Natural ageing process





II. ASSESSMENT OF BIOCHEMICAL NEEDS

MACROELEMENTS

Calcium and phosphorus

Calcium (Ca) and phosphorus (P) are two of the most important macroelements. In addition to its building function, these elements participate in blood clotting, transmission of nerve stimuli and energy changes in muscles. Disrupted calcium levels in the dog's body are usually the result of an improperly composed (monotonous) feed ration, a diet of only meat or foods based only on vegetables or cereals, the giving of table scraps or an imbalanced diet – an inadequate dose of phosphorus and vitamin D. In addition, excessive consumption of protein, fat or phosphorus can cause reduced absorption of calcium in the body. All this leads to a disturbance of the calcium-phosphorus ratio and is the cause of many diseases.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Calcium(Ca)	749,88	1 108,34 – 1 316,77			
Phosphorus(P)	334,37	275,90 – 327,48			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Calcium(Ca)	<ul style="list-style-type: none"> proper functioning of the skeletal and nervous system energy metabolism in muscles blood clotting 	<p><u>Growing dogs:</u></p> <ul style="list-style-type: none"> rickets <p><u>Adult dogs:</u></p> <ul style="list-style-type: none"> lameness, stiff gait osteomalacia <p><u>Chronic deficiency:</u></p> <ul style="list-style-type: none"> lack of appetite dehydration tooth loss <p><u>Acute deficiency:</u></p> <ul style="list-style-type: none"> tetanic contractions 	<ul style="list-style-type: none"> developmental disorders of the skeleton deficiencies of P, Zn, Fe and Cu delayed growth inhibition of thyroid function soft tissue calcification 	<ul style="list-style-type: none"> bone meal egg shell meal calcium citrate algae calcium 	0,5 – 2,5 g/100g dry matter Important ratio Ca:P 1-2:1
Phosphorus(P)	<ul style="list-style-type: none"> bone component ATP and nucleic acid synthesis 	<ul style="list-style-type: none"> symptoms similar to calcium deficiency decreased appetite deterioration of the quality of the coat 	<ul style="list-style-type: none"> disruption of calcium absorption and metabolism kidney damage bone mass loss 	<ul style="list-style-type: none"> meat eggs bone meal 	0,4 – 1,6 g/100 g dry matter



Sodium and potassium

Electrolytes, which include sodium (Na) and potassium (K), also play an important role in the nutrition of dogs. These elements are responsible for a range of processes, such as maintaining the acid-base balance, regulation of osmotic pressure, and membrane transport. An excess of them is secreted with urine.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Sodium(Na)	7 110,87	570,00 – 856,17			
Potassium(K)	559,98	168,21 – 239,51			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Sodium(Na)	<ul style="list-style-type: none"> proper functioning of the nervous system regulation of osmotic pressure and body fluids 	<ul style="list-style-type: none"> increased thirst <p><u>In growing dogs:</u></p> <ul style="list-style-type: none"> weakness reduced weight gain increased heart rate 	<ul style="list-style-type: none"> increased thirst increased urination <p><u>In dogs with circulatory failure:</u></p> <ul style="list-style-type: none"> worsening of disease symptoms 	<ul style="list-style-type: none"> meat fish eggs 	0,1 g/100 g dry matter
Potassium(K)	<ul style="list-style-type: none"> correct muscle and heart function acid-base balance stimulation of nerve receptors 	<p><u>Chronic deficiency:</u></p> <ul style="list-style-type: none"> decreased blood pressure decrease in blood flow through the kidneys <p><u>In young dogs:</u></p> <ul style="list-style-type: none"> hypopotassemia: poor growth, weakness, ataxia, paralysis of the muscles of the pelvic limbs 	<p><u>In healthy dogs:</u></p> <ul style="list-style-type: none"> excreted in urine with adequate water intake <p><u>In dogs with renal insufficiency:</u></p> <ul style="list-style-type: none"> heart failure 	<ul style="list-style-type: none"> meat brewer's yeast parsley celery bananas 	0,5 g/100 g dry matter

Sulphur

Sulphur occurs in various forms in the body and its metabolism is complicated. This element is contained mainly in sulphur amino acids. A deficiency doesn't really occur, and if it is detected, the cause is the wrong amino acid composition of the feed ration.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Sulfur(S)	46 203,20	51 651,87 – 54 607,86			



	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Sulfur(S)	<ul style="list-style-type: none"> • amino acid synthesis • enzyme activation • supports joint regeneration • insulin component 	<p>Typically not observed, as it is present in high amounts in the amino acids methionine and cysteine.</p> <ul style="list-style-type: none"> • discolouration, brittleness and dullness of the coat • claw brittleness • dandruff • skin diseases (eczema, allergies, dermatitis) 	<ul style="list-style-type: none"> • lower absorption of selenium 	<ul style="list-style-type: none"> • animal products 	Lack of generalised data, it can differ

Magnesium

The next element – magnesium (Mg) – is an enzyme activator, and participates in cellular respiration and muscular contraction. It plays an important role in the process of contraction and relaxation of the heart, and affects the work of arterial muscles. Inadequate amounts of this element lead to a weakening of the contractility of the heart muscle and the development of arrhythmias, i.e. irregular heartbeat. The correct concentration of magnesium is very important in heart patients, because a deficiency can increase the side effects of heart medications. Vitamin B6 influences the proper absorption of magnesium.

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Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Magnesium(Mg)*	512,78	175,33 – 222,05			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Magnesium(Mg)	<ul style="list-style-type: none"> • enzyme component • muscle contraction • cellular respiration 	<ul style="list-style-type: none"> • soft tissue calcification • neuromuscular disorders • inhibited growth • hyperaesthesia • seizures • damage to the cardiovascular system 	<p>Excess from the diet is unlikely, as absorption is reduced.</p> <p><u>Severe excess:</u></p> <ul style="list-style-type: none"> • diarrhoea 	<ul style="list-style-type: none"> • meat • eggs • seafood • magnesium oxide • brewer's yeast (vitamin B6) 	0,07 g/100 g dry matter



MICROELEMENTS

Iron

The most important microelements in dogs are iron (Fe), copper (Cu), zinc (Zn) selenium (Se) and manganese (Mn). Iron is a part of haemoglobin and myoglobin, which are responsible for transporting oxygen in the blood and muscles. This element is stored in the liver, spleen, and bone marrow in the form of ferritin and haemosiderin.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Iron(Fe)	28,83	175,93 – 251,25			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Iron(Fe)	<ul style="list-style-type: none"> component of haemoglobin and myoglobin component of enzymes that participate in cellular respiration 	<ul style="list-style-type: none"> microcytic and hypochromatic anaemia quick fatigue weakness, apathy anisocytosis (abnormally sized erythrocytes) poikilocytosis (very misshapen red blood cells) tarry stools 	<p>Excess from the diet is unlikely, as absorption is reduced.</p> <ul style="list-style-type: none"> lack of appetite decreased body mass decreased use of phosphorus, copper, manganese and zinc 	<ul style="list-style-type: none"> meat liver spleen lungs meat and bone meal haemoglobin 	3,6 – 68,18 mg/100 g dry matter

Copper

Copper is part of many metalloproteins. It's responsible for the elasticity of connective tissue, the transport of iron to bone marrow and incorporation into haemoglobin, erythrocyte maturation and many other functions. The most important symptom of copper deficiency is changes in coat appearance, depigmentation and visible dullness. Too much Cu in the feed ration can disrupt the absorption of other minerals, mainly Fe. Among the significant correlations shown in our research, a very likely effect of increased Cu uptake on the reduction of Mn absorption was noted.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Copper(Cu)	12,81	20,01 – 26,46			


	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Copper(Cu)	<ul style="list-style-type: none"> formation of nervous tissue, blood development of bone tissue necessary for the proper pigmentation of skin and hair 	<ul style="list-style-type: none"> anaemia bone growth disorders, bone changes distorted appetite neuromuscular disorders 	<ul style="list-style-type: none"> reduces the absorption of zinc decreased body mass storage disease in Bedlington Terriers (hepatitis) 	<ul style="list-style-type: none"> crustaceans offal (liver, hearts, kidneys) meat 	0,72 – 2,8 mg/ 100 g dry matter

Zinc

Zinc is also a very important microelement in the feed ration of dogs – it's a component of over 100 enzymes. It has a positive effect on the state of the skin, coat and claws. It has been found to be beneficial for sperm count and motility. The concentration of zinc in the coat provides much important information on the level of this element in the body, but interpretation of this can be complicated. Elevated zinc levels in the coat can mean a deficiency in the body, but a low level of zinc in the coat can mean the same. That's why both low and high levels of this mineral in the coat indicate a need for supplementation. For zinc supplementation, it's more effective to provide this element several times a day than increasing a one-off dose.

The most important symptoms of zinc deficiency include parakeratosis, i.e. damage to the skin and epidermis, hair loss, poor wound healing, and deterioration of semen quality. Proper absorption of zinc is difficult in the case of vitamin E deficiency, as well as excess calcium, magnesium, iron and phytic acid. Too much Zn in the feed ration can disrupt the absorption of other minerals, including Fe.

Your dog's EHAA result showed:


Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Zinc(Zn)	213,99	215,34 – 234,87			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Zinc(Zn)	<ul style="list-style-type: none">enzyme componentimpacts the state of the skin, coat and mucous membranes	<ul style="list-style-type: none">slowed growthreproductive disordersskin changesloss of hair pigmentationvomitinglack of appetitedecreased body massskin changes	<ul style="list-style-type: none">rarelydeficiency in Ca and Cuacute gastritis	<ul style="list-style-type: none">red meat (e.g. beef)ready-made products	7,2 – 22,7 mg/100 g dry matter

Selenium

Another important microelement is selenium. It plays an important role in controlling the metabolism of thyroid hormones, maintaining the integrity of cell membranes, growth and reproduction. Selenium works together with vitamin E, which enhances its antioxidant effect. A vitamin E deficiency multiplies the effects of selenium deficiency. A large selenium deficiency can lead to low immunity in animals, as well as significant deterioration in semen quality.

Your dog's EHAA result showed:


Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Selenium(Se)	2,07	1,19 – 1,41			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Selenium(Se)	<ul style="list-style-type: none"> antioxidant impacts on cellular immunity works together with vitamin E 	<ul style="list-style-type: none"> muscular dystrophy reproductive disorders decrease in appetite subcutaneous oedema kidney mineralisation cardiomyopathy (including vitamin E deficiency) 	<ul style="list-style-type: none"> nervousness lack of appetite; vomiting muscle weakness shortness of breath pulmonary oedema death 	<ul style="list-style-type: none"> liver kidneys meat 	18 – 56,8 µg/ 100 g dry matter

Silicon

Silicon is a crucial trace element. It plays an important role in the functioning of connective tissue, and in particular the bones and cartilage. It provides them with the right elasticity and resistance. In addition, silicon is a component of an enzyme that participates in collagen synthesis. It supports the work of joints and accelerates epidermal regeneration.

Your dog's EHA result showed:


Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Silicon(Si)	91,54	386,60 – 546,39			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Silicon(Si)	<ul style="list-style-type: none"> supports the metabolism of connective tissues collagen synthesis 	<ul style="list-style-type: none"> joint problems 	<ul style="list-style-type: none"> no confirmed deficiency symptoms (can be detected only using appropriate diagnostics) 	<ul style="list-style-type: none"> vegetables 	Lack of generalised data, it can differ

Manganese

It's a microelement with a wide spectrum of action. It's responsible, among other things, for the activation of enzymes that participate in fat and carbohydrate metabolism, and is part of the synthesis of proteins and nucleic acids. It also impacts correct body weight, the skeletal system and fertility. Significant excess inhibits the absorption of iron.

Your dog's EHA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Manganese(Mn)	0,64	11,45 – 15,48			




	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Manganese(Mn)	<ul style="list-style-type: none"> in the metabolism of fats and amino acids in ossification processes 	<ul style="list-style-type: none"> slowed growth reproductive disorders miscarriages enlargement of the joints stiff gait short and thin bones 	<ul style="list-style-type: none"> partial albinism decline in fertility 	<ul style="list-style-type: none"> meat fish 	0,58 – 17 mg/100 g dry matter

Chromium

This is another microelement needed for the correct functioning of the body. It participates in metabolic processes and supports insulin activity. Chromium increases the endurance of dogs, and improves resistance to stress.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Chrome(Cr)	0,22	0,82 – 1,16			


	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Chrome(Cr)	<ul style="list-style-type: none"> in the metabolism of carbohydrates and fats supports the action of insulin reduces the amount of glucose in plasma during training 	<ul style="list-style-type: none"> impaired glucose tolerance increase in serum triglycerides and cholesterol 	<ul style="list-style-type: none"> toxic skin inflammation irritation of the respiratory tract lung cancer 	<ul style="list-style-type: none"> ready-made products 	Lack of generalised data, it can differ



Cobalt

Cobalt is the first trace element that's part of vitamin B12. It participates in the synthesis of erythrocytes, nucleic acids, and the myelin sheath of nerve cells.

Your dog's EHA result showed:

Element	Patient's result (ppm)	Normal value (ppm)	DEFICIT	NORM	EXCESS
Cobalt(Co)	0,02	0,02 – 0,04			

	ROLE	DEFICIENCY	EXCESS	SOURCE	DAILY DEMAND for an adult dog (FEDIAF 2020)
Cobalt(Co)	<ul style="list-style-type: none">component of vitamin B12	<ul style="list-style-type: none">unlikely in dogslack of appetitedecreased body massagitation	<ul style="list-style-type: none">no confirmed deficiency symptoms (can be detected only using appropriate diagnostics)	<ul style="list-style-type: none">liverkidneysmeatfishegg yolk	Lack of generalised data, it can differ



TOXIC ELEMENTS

The main threat from toxic minerals is related to their antagonistic nature towards micro- and macroelements. This means that if your animal has significant levels of toxic metals, they can block the absorption of elements needed for correct development, and consequently cause serious diseases.

Sources of heavy metals

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. That's why you need to make sure that dogs don't eat grass that's close by to busy roads, heat and power plants, and other industrial areas.

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.



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 dogs, because it's excreted from the body through the kidneys. However, an excess of this element can lead to liver damage. It's also worth remembering that metal bowls for dogs can increase the level of aluminium in your dog. It's recommended you use ceramic bowls.


Your dog's EHA result showed:

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Aluminium(Al)	27,46	269,54	

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 in dogs is often due to the dog ingesting insecticides containing this element. In addition, dogs can take up excessive amounts of arsenic by consuming large amounts of rice regularly. It's one of the most popular food products with a recorded high arsenic content. Long-term exposure to this element can lead to weight loss due to decreased appetite.


Your dog's EHA result showed:

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Arsenic(As)	0,01	0,12	

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. 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.


Your dog's EHA result showed:

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Cadmium(Cd)	0,03	0,15	

Lithium

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

Your dog's EHA result showed:


Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Lithium(Li)	0,13	0,31	



Nickel

Nickel is present in animal 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.


Your dog's EHAA result showed:

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Nickel(Ni)	0,34	1,23	

Lead

Lead poisoning is one of the most commonly reported types of poisoning in animals. The danger is not only the lead in the soil, but also the lead paints used in old buildings or water pipes made of lead alloys. 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.


Your dog's EHAA result showed:

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Lead(Pb)	1,26	1,55	

Vanadium

Vanadium is a very toxic heavy metal. Vanadium poisoning leads to poor growth, diarrhoea, dehydration, extreme exhaustion and haemorrhages.

Your dog's EHAA result showed:

Element	Patient's result (ppm)	Maximum value (ppm)	EXCESS
Vanadium(V)	0,09	0,70	



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.

Ca:P

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 in your dog. Pay attention to its behaviour – you may see weight loss and hyperactivity.

Your dog's EHAA result showed:

Norm for Calcium(Ca)/Phosphorus(P)	3,99 - 4,87
Patient's result	2,24
Proportion	TOO LOW
Limit intake of	phosphorus
Increase intake of	calcium
Check the trends of your Ca:P ratio	
TOO LOW	Limited calcium absorption. Increased risk of bone brittleness.
TOO HIGH	Excess calcium – excessive bone mineralisation.

Zn: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 dog's EHAA result showed:

Norm for Zinc(Zn)/Copper(Cu)	9,13 - 11,46
Patient's result	16,70
Proportion	TOO HIGH
Limit intake of	zinc
Increase intake of	copper
Check the trends of your Zn:Cu ratio	
TOO LOW	Limited zinc absorption. Liver damage.
TOO HIGH	Limited copper absorption. Weakened skeletal system.



Fe:Cu

Copper is a very important element in a dog'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 dog's EHAA result showed:

Norm for Iron(Fe)/Copper(Cu)	8,10 - 12,17
Patient's result	2,25
Proportion	TOO LOW
Limit intake of	copper
Increase intake of	iron
Check the trends of 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.

Ca:K

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 dog's EHAA result showed:

Norm for Calcium(Ca)/Potassium(K)	5,92 - 7,83
Patient's result	1,34
Proportion	TOO LOW
Limit intake of	potassium
Increase intake of	calcium
Check the trends of your Ca:K ratio	
TOO LOW	Can indicate hypothyroidism.
TOO HIGH	Can indicate hyperthyroidism.



Na:K

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 dog's EHA result showed:

Norm for Sodium(Na)/Potassium(K)	3,37 - 4,84
Patient's result	12,70
Proportion	TOO HIGH
Limit intake of	sodium
Increase intake of	potassium
Check the trends of 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.

The need for specific macro- and microelements (the daily need for an adult dog) is based on the FEDIAF Nutritional Guidelines, 2020.

