Micro Trace Minerals Laboratory

environmental & clinical laboratory

Röhrenstrasse 20, 91217 Hersbruck, Germany
P.O.Box 4613; Boulder, CO 80306-4613, USA

Phone: +49 (0) 9151/4332
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https://microtrace.de
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MINERAL ANALYSIS — Hair

		Lab Number		1H290007	
Doctor/Clinic				Test Date	6/2/2025
Patient Name	Anna	Sex	f	Age	45
Clinical Information	Extended Profile			Page	1/5

	Acceptable Range	Test Value	
Essential Trace Elements (ppm = mg/kg = mcg/g)			
Chromium (Cr)	< 0.210	0.028	
Cobalt (Co)	0.010 --- 0.300	< 0.005	↓
Copper (Cu)	10.000 --- 41.000	34.690	
Iodine (I)	0.050 --- 5.000	1.134	
Iron (Fe)	4.600 --- 17.700	4.121	↓
Manganese (Mn)	0.050 --- 0.920	0.432	
Molybdenum (Mo)	0.030 --- 1.100	0.025	↓
Selenium (Se)	0.400 --- 1.700	0.587	
Vanadium (V)	0.010 --- 0.200	0.006	↓
Zinc (Zn)	150.000 --- 272.000	217.231	
Essential Macroelements (ppm = mg/kg = mcg/g)			
Calcium (Ca)	220.000 --- 1,600.000	705.618	
Magnesium (Mg)	20.000 --- 130.000	89.189	
Nonessential Trace Elements (ppm = mg/kg = mcg/g)			
Boron (B)	< 0.840	0.512	
Germanium (Ge)	< 1.650	< 0.003	
Lithium (Li)	< 0.300	0.003	
Strontium (Sr)	0.650 --- 6.900	4.124	
Tungsten (W)	< 0.010	n.n.	
Potentially Toxic Elements (ppm = mg/kg = mcg/g)			
Aluminum (Al)	< 8.000	1.987	
Antimony (Sb)	< 0.300	0.007	

n.n. = not detected, < x = below Detection Limit
Quality control: Dipl. Ing. Friedle, Accreditation: DIN EN ISO 17025; Validation: Dr. E. Blaurock-Busch PhD;
Analytical method: ICP-MS with collision cell technique

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	Acceptable Range	Test Value		
Potentially Toxic Elements (ppm = mg/kg = mcg/g)				
Arsenic-total (As)	< 0.200	0.066		
Barium (Ba)	< 4.640	1.601		
Beryllium (Be)	< 0.100	0.013		
Bismuth (Bi)	< 0.200	< 0.010		
Cadmium (Cd)	< 0.200	0.021		
Cerium (Ce)	< 0.100	0.003		
Cesium (Cs)	< 0.010	n.n.		
Dysprosium (Dy)	< 0.006	n.n.		
Erbium (Er)	< 0.005	n.n.		
Europium (Eu)	< 0.005	n.n.		
Gadolinium (Gd)	< 0.100	n.n.		
Gallium (Ga)	< 0.200	n.n.		
Iridium (Ir)	< 0.006	n.n.		
Lanthanum (La)	< 0.032	0.002		
Lead (Pb)	< 3.000	1.851		
Lutetium (Lu)	< 0.010	n.n.		
Mercury (Hg)	< 0.600	10.675	↑	
Nickel (Ni)	< 1.000	0.354		
Palladium (Pd)	< 0.100	n.n.		
Platinum (Pt)	< 0.010	n.n.		
Praseodymium (Pr)	< 0.013	n.n.		
Rhenium (Re)	< 0.005	n.n.		
Rhodium (Rh)	< 0.007	n.n.		

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	Acceptable Range	Test Value
Potentially Toxic Elements (ppm = mg/kg = mcg/g)		
Ruthenium (Ru)	< 0.100	n.n.
Samarium (Sm)	< 0.011	n.n.
Silver (Ag)	< 1.000	0.071
Tantalum (Ta)	< 0.011	n.n.
Tellurium (Te)	< 0.010	n.n.
Thallium (Tl)	< 0.010	n.n.
Thorium (Th)	< 0.010	n.n.
Thulium (Tm)	< 0.002	n.n.
Tin (Sn)	< 0.700	0.061
Titanium (Ti)	< 0.414	0.028
Uranium (U)	< 0.100	0.053
Ytterbium (Yb)	< 0.010	n.n.
Zirconium (Zr)	< 0.500	< 0.050

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MINERAL ANALYSIS		Hair			
Patient Name	Anna	Lab Number	1H290007	Page	4/5

Your Analysis Determined The Following Mineral Deficiencies And Excesses. Since it is difficult to distinguish treated samples from untreated ones, it is assumed that the spectroanalytical analysis was performed on chemically untreated hair as requested in our laboratory brochure. Chemically treated hair does not provide reliable results and TMI does not assume responsibility for data obtained from treated hair. The information contained in this elemental analysis report is designed as an interpretive adjunct to normally conducted diagnostic procedures. The findings are best viewed in the context of a medical examination and history.

COBALT (Co):
Cobalt is part of the Vitamin B12 molecule and is necessary for Vitamin B12 activity and function. Cobalt, which is mainly stored in the liver, activates numerous enzymes, and is excreted in bile. A low dietary intake inhibits fetal development and may reflect a low intake of Vitamin B12.
SOURCES: All animal products, including all meats, fish, cheese, brewer's yeast and yeast extracts. Strict vegetarians (vegans) and those who lack intrinsic factor risk vitamin B12 and cobalt deficiency.
SYMPTOMS: Include pernicious anemia.
THERAPEUTIC CONSIDERATION: Increase vitamin B12 intake and/or consumption of cobalt-rich foods.

IRON (Fe):
Iron is essential for the oxygen transport and utilization. Iron is regulated in the body primarily by absorption rather than by excretion. Gastrointestinal function is important in controlling total body iron. Transferrin is the transport protein for iron in blood. The most common sign of deficiency is anemia. Symptoms include pallor and extreme fatigue, dizziness, decreased immune function, shortness of breath and poor appetite. Predisposing factors to iron deficiency may be excessive intake of copper, manganese, zinc, carbonates, oxalates, phosphates, phytates, antibiotics, coffee, or heavy metal exposure. Excessive blood loss or pregnancy can cause iron deficiency. Daily requirements vary depending on sex, age, and physio-logical status. The RDA is 10-18 mg/day.
SOURCES: Liver, other meats and green leafy vegetables.
THERAPEUTIC CONSIDERATION: Check lead, copper and manganese levels. Check transferrin levels. Prior to iron supplementation, increase intake of vitamin C, B-complex and amino acid to aid absorption.

MERCURY (Hg):
Circulating metals in blood ‘feed’ hair and nail roots. If exposure happened over time, hair and nails reflect long-term or chronic exposure.
Early symptoms of mercury overexposure include insomnia, dizziness, fatigue, drowsiness, weakness, depression, tremors loss of appetite, loss of memory, nervousness, headache, dermatitis, numbness, and tingling of lips and feet, emotional instability and kidney damage.
Symptoms of acute toxicity: loss of teeth, extreme tremor, mental and emotional disorders, kidney failure.
SOURCES: Overexposure may stem from paints, explosives, electrical apparatus, batteries, mercurial diuretics, fungicides, fluorescent lamps, cosmetics, hair dyes, amalgams in dentistry, contaminated seafood, and petroleum products. Improper disposal of broken mercury thermometers and other apparatuses that use mercury including button cells and t result in mercury exposure.
RECOMMENDATION: Increased oral intake of cysteine and antioxidant intake, especially selenium and vitamin E support mercury detoxification. Chelating agents such as DMPS or DMSA effectively bind mercury, resulting in an increased urinary excretion and detoxification. Consult your physician.

MOLYBDENUM (Mo):
Molybdenum deficiency has been linked to gout. Low levels in heavy meat eaters reflect digestive disorder, the need for digestive enzymes and dietary changes. Such patients should avoid pork, beef, whole grain and rather eat poultry, fish and other light proteins. Vegetarians should either add some meat to their diet or take molybdenum chelate with B-vitamins, which aid the absorption of molybdenum. Dietary molybdenum is readily absorbed by the intestine and is excreted in the urine and bile.
SOURCES: Whole grains, legumes, leafy vegetables and organ meats. The recommended daily intake is 0.15 - 0.5 mg/day, depending on age and status. Acute deficiency symptoms are unknown in humans. Excess intake of copper, zinc, and sulfates can depress Mo-update, causing disturbances in the uric acid cycle. Low molybdenum levels have been associated with impotency, increased cancer susceptibility, gout, dental caries, defects in the metabolism of sulfur-containing amino acids, and asthma.

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VANADIUM (V):
The biological function of this trace element has not been substantiated and deficiency symptoms have not been established; however there is evidence that this trace element influences the glucose metabolism, the sodium/potassium transport and the adrenal catecholamine metabolism. Vanadium appears to catalyze the oxidation of catecholamine's and inhibit cholesterol synthesis and lower phospholipid levels. It may have anti-diabetic, weight-reducing function and anti-caries effects.
SOURCE: Fiber-rich foods, dill seeds, parsley and black pepper. Vanadium is highly concentrated in vegetable oils.
THERAPEUTIC CONSIDERATION: High fiber diet, use of vegetable oil instead of animal fats.

The following nutritional program is aimed at providing optimum health. The program is suitable for patients 12 years and older. It is recommeded for 3-4 months, after which a repeat analysis is recommended. A follow-up test would evaluate and determine your body's ability to digest and absorb nutrients. If any questions or problems arise, consult your medical doctor or health care provider.

Cobalt (Co)

There is no recommended intake of cobalt, however vitamin B12 contains cobalt and increasing the Vitamin B12 intake can improve the cobalt status. Check with your physician. Vitamin B12-rich foods are meat, liver and cheese.

Iron (Fe)

Ask your doctor to check serum iron and serum ferritin levels before supplementing iron. Wholegrain cereals, meats, fish and poultry are the major contributors to iron intake and to improve the bioavailability of iron, increase the intake of B-vitamins and vitamin C. In contrast, a high intake of calcium, zinc or phytates (found in legumes, rice and other grains), polyphenols and vegetable protein can inhibit the absorption of iron. The daily recommended intake for young adults 14-18y is 11mg for males and 15mg for females; female adults older than 18 require 18mg/day, males only 8mg/day. For older adults of both sexes, 8mg/day is sufficient. Pregnant and lactating women require between 9 and 27mg/day.

Mercury (Hg)

Check blood levels, or ask your doctor for a provocation test. Cysteine, Selenium and vitamin E supplementation may be needed. Check for sources of longtime exposure.

Molybdenum (Mo)

Molybdenum deficiency is extremely rare and low hair values generally signify a chronically low dietary intake, which can be improved by increasing the intake of molybdenum-rich foods such as beans and other legumes, whole grains and leafy vegetables. The daily requirement for people 14 to 18 years: 43mcg, 19+ years: 45mcg. Women who are pregnant or breastfeeding: 50mcg. B-vitamins improve the molybdenum absorption. Check copper and iron status. High copper and/or iron intake can decrease molybdenum absorption.

Vanadium (V)

A daily intake of 0.5 to 1.0mg is recommended for adults, and is achieved through a normal diet. Good vanadium sources are black pepper, dill seed, peanut butter, cod fish, scallops, egg yolk, chicken breast, mushrooms, olives and vegetable oils.

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