

LAB #: PATIENT: ID: SEX: Female DOB: 11/07/2017 AGE:

CLIENT #: DOCTOR: Adley M. Fernandes, MD Biosytech Medical Laboratory Villa No 172 Mankhool Road Satwa Jaffiliya Dubai, 49527 UNITED ARAB EMIRATES

Toxic & Essential Elements; Hair

TOXIC METALS			
	RESULT µg/g	REFERENCE INTERVAL	PERCENTILE 68 th 95 th
Aluminum (Al)	11	< 8.0	
Antimony (Sb)	0.047	< 0.066	
Arsenic (As)	0.019	< 0.080	
Barium (Ba)	0.17	< 0.75	
Beryllium (Be)	< 0.01	< 0.020	
Bismuth (Bi)	0.013	< 2.0	
Cadmium (Cd)	0.013	< 0.070	
Lead (Pb)	0.66	< 1.0	
Mercury (Hg)	0.08	< 0.40	
Platinum (Pt)	< 0.003	< 0.005	
Thallium (Tl)	0.001	< 0.002	
Thorium (Th)	< 0.001	< 0.002	
Uranium (U)	0.004	< 0.060	
Nickel (Ni)	0.11	< 0.30	
Silver (Ag)	0.04	< 0.20	
Tin (Sn)	0.34	< 0.30	
Titanium (Ti)	0.38	< 0.90	
Total Toxic Representation			

ESSENTIAL AND OTHER ELEMENTS					
	RESULT µg/g	REFERENCE INTERVAL	PERCENTILE 2.5 th 16 th 50 th 84 th 97.5 th		
Calcium (Ca)	300	140- 500			
Magnesium (Mg)	32	15- 45			
Sodium (Na)	83	18- 180			
Potassium (K)	230	10- 150			
Copper (Cu)	13	11- 24			
Zinc (Zn)	67	100- 190			
Manganese (Mn)	0.24	0.10- 0.50			
Chromium (Cr)	0.35	0.43- 0.70			
Vanadium (V)	0.030	0.030- 0.10			
Molybdenum (Mo)	0.059	0.050- 0.13			
Boron (B)	3.5	0.40- 3.5			
Iodine (I)	0.36	0.25- 1.3			
Lithium (Li)	0.006	0.007- 0.020			
Phosphorus (P)	154	150- 220			
Selenium (Se)	0.33	0.70- 1.1			
Strontium (Sr)	0.58	0.19- 2.0			
Sulfur (S)	44900	45500- 53000			
Cobalt (Co)	0.011	0.005- 0.030			
Iron (Fe)	7.6	7.0- 16			
Germanium (Ge)	0.036	0.030- 0.040			
Rubidium (Rb)	0.17	0.012- 0.16			
Zirconium (Zr)	0.066	0.030- 1.0			

SPECIMEN DATA		RATIOS	
COMMENTS:		ELEMENTS	RATIOS
Date Collected: 11/08/2021	Sample Size: 0.203 g	Ca/Mg	9.38
Date Received:	Sample Type: Head	Ca/P	1.95
Date Reported: 11/15/2021	Hair Color:	Na/K	0.361
Methodology: ICP/MS	Treatment:	Zn/Cu	5.15
	Shampoo:	Zn/Cd	> 999
		RANGE	
			4- 30
			1- 12
			0.5- 10
			4- 20
			> 800

HAIR ELEMENTS REPORT INTRODUCTION

Hair is an excretory tissue for essential, nonessential and potentially toxic elements. In general, the amount of an element that is irreversibly incorporated into growing hair is proportional to the level of the element in other body tissues. Therefore, hair elements analysis provides an indirect screening test for physiological excess, deficiency or maldistribution of elements in the body. Clinical research indicates that hair levels of specific elements, particularly potentially toxic elements such as cadmium, mercury, lead and arsenic, are highly correlated with pathological disorders. For such elements, levels in hair may be more indicative of body stores than the levels in blood and urine.

All screening tests have limitations that must be taken into consideration. The correlation between hair element levels and physiological disorders is determined by numerous factors. Individual variability and compensatory mechanisms are major factors that affect the relationship between the distribution of elements in hair and symptoms and pathological conditions. It is also very important to keep in mind that scalp hair is vulnerable to external contamination of elements by exposure to hair treatments and products. Likewise, some hair treatments (e.g. permanent solutions, dyes, and bleach) can strip hair of endogenously acquired elements and result in false low values. Careful consideration of the limitations must be made in the interpretation of results of hair analysis. The data provided should be considered in conjunction with symptomology, diet analysis, occupation and lifestyle, physical examination and the results of other analytical laboratory tests.

Caution: The contents of this report are not intended to be diagnostic and the physician using this information is cautioned against treatment based solely on the results of this screening test. For example, copper supplementation based upon a result of low hair copper is contraindicated in patients afflicted with Wilson's Disease.

Aluminum High

The Aluminum (Al) level in hair may be an indicator of exposure and assimilation of this element, provided that hair preparations have not added exogenous Al. Al is a nonessential element that can be toxic if excessively assimilated into cells.

Excess Al can inhibit the formation of alpha-keto glutarate and result in toxic levels of ammonia in tissues. Al can bond to phosphorylated bases on DNA and disrupt protein synthesis and catabolism. Al excess should be considered when symptoms of presenile dementia or Alzheimer's disease are observed. Hair Al is commonly elevated in children and adults with low zinc and behavioral/learning disorders such as ADD, ADHD and autism. Individuals with renal problems or on renal dialysis may have elevated Al.

Possible sources of Al include some antacid medications, Al cookware, baking powder, processed cheese, drinking water, and antiperspirant components that may be absorbed. Analyses performed at DDI indicate extremely high levels of Al are in many colloidal mineral products.

Al has neurotoxic effects at high levels, but low levels of accumulation may not elicit immediate symptoms. Early symptoms of Al burden may include: fatigue, headache, and symptoms of phosphate depletion.

