



The Seronorm Trace Elements Controls

Accuracy controls and secondary reference materials with many applications

- Nutrition
- Occupational health
- Environmental health
- Toxicology
- Food safety
- Veterinary and biological studies

THE
INDEPENDENT
CONTROL SERA
SPECIALIST
1963-2013

50
- YEARS -

A wide variety of applications

Occupational health

Cadmium in blood of Tunisian men and risk of bladder cancer: interactions with arsenic exposure and smoking

MolkaFeki-Tounsi et al. A. Hamza-Chaffai Unit of Marine and Environmental Toxicology. IPEIS, University of Sfax, Tunisia.

Environ Sci Pollut Res (2013) 20:7204–7213 DOI 10.1007/s11356-013-1716-8

Prior investigations identified an association between low-level blood arsenic (As) and bladder cancer risk among Tunisian men but questions remain regarding by cadmium (Cd), a well-established bladder carcinogen. This study using AAS is the first to report the relationship between As and Cd exposure and risk of bladder cancer occurrence in interaction with smoking.

The analytical method was controlled by using external certified reference materials. Reference samples for whole blood (three levels, references 201505, 201605, and 201705) - Seronorm (SERO, Billingstad, Norway).

Food safety

Mercury in Canned Tuna in Spain. Is Light Tuna Really Light?

Montserrat González-Estecha et al. Trace Element Unit and Laboratory Medicine Department, Instituto de Investigación Sanitaria, Hospital Clínico San Carlos, Madrid, Spain.

Food and Nutrition Sciences, 2013, 4, 48-54

This study analyzed 36 cans of the most popular brands in Spain and examined the influence of the type of tuna, packaging medium (olive oil, sunflower seed oil, water or marinade), different brands, prices and expiration dates. Mercury concentrations (mg/kg) were measured by AAS. The mercury content was variable and high. The results of this study indicate that stricter regulation of Hg in canned tuna is necessary.

Internal quality controls (Seronorm® trace element levels 1 and 2) were assessed in every series of samples to check the reproducibility and accuracy of the measurements.

Nutrition

Zinc and Selenium Nutritional Status in Vegetarians

Maritsa Carla de Bortoli et al - University of São Paulo, Brazil

Biol Trace Elem Res (2009) 127:228–233 DOI 10.1007/s12011-008-8245-1

The aim of the present study was to assess the nutritional status of zinc and selenium in vegetarians in the city of São Paulo. Participants were recruited in Yoga schools. Selenium blood levels are adequate and zinc concentration in erythrocytes is deficient in the studied population. For this reason, vegetarians should

be constantly assessed and receive nutritional support to reduce the effects of inadequate zinc status.

Methods reproducibility was achieved by triplicated sample and double reading, and validity was performed with ... Seronorm Whole Blood® standards.

Dietary habits and selenium, glutathione peroxidase and total antioxidant status in the serum of patients with relapsing-remitting multiple sclerosis

Katarzyna Socha et al, Medical University of Białystok, Poland

Biol Trace Elem Res (2009) 127:228–233 DOI 10.1007/s12011-008-8245-1

The aim of this study was to estimate selenium (Se) concentration, glutathione peroxidase (GSH-Px) activity and total antioxidant status (TAS) in the serum of patients with MS and the influence of dietary habits on the status. In this study patients with relapsing-remitting MS was compared to a healthy control group.

habits and adequate dietary intake of antioxidants in the diet may be one of the most important environmental factors for the prevention of Multiple Sclerosis (MS).

The concentration of Se in the serum was determined by the electrothermal atomic absorption spectrometry method with Zeeman background. Every day, certified reference material of human serum (Seronorm Trace Elements, Serum Level 1, 0903106, Sero AS, Norway) was used to test the accuracy of this method.

Serum Se concentration, GSH-Px activity and TAS value were significantly lower in patients with relapsing-remitting MS compared with healthy volunteers. Dietary

Toxicology

Application of ICP-OES to the Determination of Barium in Blood and Urine in Clinical and Forensic Analysis

Teresa Lech, Institute of Forensic Research, Krakow, Poland.

Journal of Analytical Toxicology, Vol. 37, issue 4, pp 222-226

Exposure to barium (Ba) mostly occurs in the workplace or from drinking water, but it may sometimes be due to accidental or intentional intoxication. This paper presents a reliable, sensitive method for the determination of Ba in blood and urine using ICP-OES. This method allows

the analysis of blood, serum and urine for Ba in people suspected of having been poisoned with Ba compounds.

The overall procedure was checked using Seronorm Whole Blood L-2 and Trace Elements Urine.

Environmental health

Biomonitoring of chromium for residents of areas with a high density of electroplating factories

Feng-Hsiang Chang, Division of Environmental Health and Occupational Medicine, National Health Research Institute, Zhunan, Taiwan

J. Exposure Analysis & Envir. Epidemiology 16, 138-146, 2006

The high density of electroplating factories in the geographic middle of Taiwan has prompted concern over the potential for exposure to harmful metals. The present study aimed to determine the levels of chromium in whole blood (B-Cr) of residents living in the high vs. low factory-density areas, and to examine the relations to gender and age. Chromium determinations (n=641) were made using a graphite furnace atomic absorption spectrometer. The B-Cr levels apparent in the blood samples collected from the high factory-density area were significantly higher than that of the control area.

Standard Reference Material (SRM), Seronorm™ Trace Elements Whole Blood (Lot M11256, Billingstad, Norway) was used for QC evaluation.

Toxic trace elements in maternal and cord blood and social determinants in a Bolivian mining city

Flavia L. Barbieri et al,

International Journal of Environmental Health Research, Published online: 16 Jul 2015

This study assessed lead, arsenic, and antimony in maternal and cord blood, and associations between maternal concentrations and social determinants in the Bolivian mining city of Oruro. Women with lower educational level and women whose husband/partner/father was involved in mining activities were significantly more likely to be in the higher exposure category for all three toxic elements.

Quality control was performed ... two reference materials from SERO AS (Norway) -Seronorm Trace Elements Whole Blood, Level 1 and Level 2.

Veterinary and biological studies

Excessive lead burden among golden eagles in the Swiss Alps

Milena M Madry et al, Zurich Institute of Forensic Medicine, Department of Forensic Pharmacology and Toxicology, University of Zurich, Switzerland

Published 26 February 2015 • © 2015 IOP Publishing Ltd • Environmental Research Letters, Volume 10, Number 3

Fragments from lead ammunition pose a poisoning risk for predators like golden eagles that scavenge on non-retrieved carcasses or offal left behind by hunters. Three golden eagles were found in the Swiss Alps with an acute lead poisoning. In this IP-MS study golden eagles from Switzerland was compared to eagle owls from the same area and to their respective prey.

Bones of golden eagles contained 10 times more lead (median of 12.45 µg

g⁻¹ dry weight) than owl bones (1.28 µg g⁻¹), which represent substantially higher levels than previously reported for golden eagles.

Two different positive control samples served to verify the accuracy of the measurements: Human Hair Certified Reference Material No. 13 (National Institute for Environmental Studies, Japan), and Seronorm™ Trace Elements Whole Blood.

Speciation analysis using Seronorm™ TE products

Hg

Using Seronorm™ Whole Blood samples a specific GC-ICPMS method for analyzing methylmercury has been developed. This method has been used as a reference method for measuring methylmercury in whole blood.

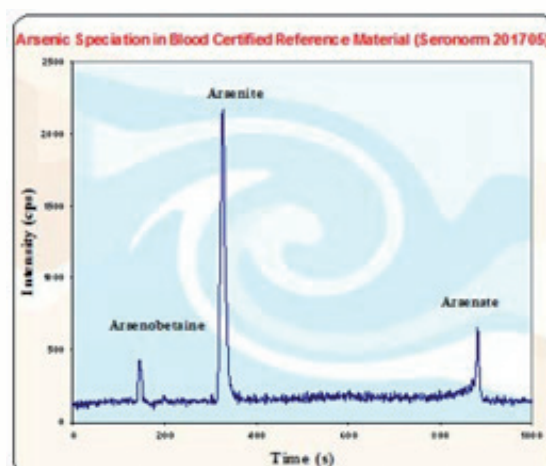
In 4 different batches of Seronorm™ Whole Blood methylmercury was measured to be in the range of 1.30 – 1.48 µg/L.*

* Methylmercury measurement in Whole Blood by Isotope-Dilution GC-ICPMS with 2 sample preparation methods. Douglas C. Baxter et al, Analytica AB, Luleå, Sweden. Clinical Chemistry 53:1 111-116 (2007)

As

Speciation analysis with ICP-MS show that arsenobetaine is the dominant arsenic species in normal donor blood samples. In Seronorm products other arsenic species are present.

Image courtesy of Brooks Applied Labs (www.brooksapplied.com), Seattle, USA.



The Seronorm Trace Elements Controls

- Accuracy controls and secondary reference materials for the analyses of trace elements and heavy metals in serum, urine or whole blood.
- Product quality is ensured through careful selection and handling of raw materials and strict production procedures. No preservatives or stabilizers are added.
- Lyophilized material with an excellent shelf life (serum and urine – 7 years, whole blood – 5 years). After reconstitution, the material is stable for 1 month at -20°C or 7 days at 2-8°C.
- Product documentation includes analytical data for more than 60 analytes. The independent analytical values are traceable to international reference materials.
- Available in two (serum and urine) or three (whole blood) clinically relevant levels – each level is available separately. Contact SERO for package inserts of currently available lots to evaluate target levels.



Seronorm™ Trace Elements Serum



Seronorm™ Trace Elements Whole Blood



Seronorm™ Trace Elements Urine

Overview – certified values in Seronorm™ Trace Elements Controls

1																	2
H																	He
1,0079																	4,0026
3	4											5	6	7	8	9	10
Li	Be											B	C	N	O	F	Ne
6.941	9.0122											10.811	12.011	14.007	15.999	18.998	20.1797
11	12											13	14	15	16	17	18
Na	Mg											Al	Si	P	S	Cl	Ar
22.989	24.305											26.981	28.085	30.974	32.066	35.453	39.948
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
39.098	40.078	44.955	47.887	50.9415	51.9961	54.938	55.845	58.933	58.6934	63.546	65.38	69.723	72.63	74.921	78.971	79.904	83.798
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
85.467	87.62	88.906	91.224	92.9063	95.95	(98)	101.07	101.907	106.42	107.8682	112.414	114.818	118.710	121.760	127.60	126.90	131.293
55	56	57-71*	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
132.905	137.327		178.49	180.94	183.84	186.207	190.23	192.217	195.084	196.96	200.59	204.38	207.2	208.98	(209)	(210)	(222)
87	88	89-103**	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo
(223)	(226)		(267)	(268)	(271)	(272)	(270)	(276)	(281)	(280)	(285)	(284)	(289)	(288)	(293)	(294)	(294)
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71			
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
138.90	140.116	140.90	144.242	(145)	150.36	151.964	157.25	158.92	162.500	164.93	167.259	168.93	173.054	174.9668			
**	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103		
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		
	(227)	232.0377	231.03	238.02	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)		

■ Available in Serum, Whole Blood, Urine ■ Available in Serum, Whole Blood ■ Available in Serum ■ Available in Whole Blood, Urine

- Additional toxic elements available in Seronorm™ Trace Elements Urine: formic acid, mandelic acid, 1-hydroxypyren, phenol, tetrachloroethylen, trichloroacetic acid.
- Additional element available in all Seronorm™ Trace Elements controls: fluoride.

