Summary of available food-matrix CRMs with assigned values for trace elements

Certified value for some toxic element

Matrix	CRM number	Supplier	As (mg/kg)	Cd (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Price	Description (certified trace elements and species)
Meat								
Bovine liver	BCR-185R	IRMM	**0.0330 ± 0.0029**	**0.544 ± 0.017**	**0.172 ± 0.009**		216.50 CHF (Signa Aldrich)	15 g lyophilised bovine liver (Trace Elements: As, Cd, Cu, Mn, Pb, Se, Zn)
Bovine liver	SRM 1577c	NIST	**0.0196 ± 0.0014**	**0.097 ± 0.0014**	**0.0628 ± 0.001**			20 g of freeze-dried liver powder, Elements: Antimony (SB), Arsenic (As), Cadmium (Cd), Calcium (Ca), Cesium (Cs), Chlorine (Cl2), Chromium (Cr), Cobalt (Co), Copper (Cu), Gold (Au), Hydrogen (H), Iron (Fe), Lead (Pb), Lithium (Li), Magnesium (Mg), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Potassium (K), Rubidium (Rb), Selenium (Se), Silicium (Si), Sodium (Na), Strontium (Sr), Sulfur (S), Vanadium (V), Zinc (Zn)
Bovine muscle	ERM-BB184	IRMM	**0.0234 ± 0.0026**	**0.0022 ± 0.0004**		*0.00536 ± 0.00017* *0.0018 ± 0.0010*	1041 CHF (Sigma Aldrich) 170 CHF (Sigma Aldrich)	7 g (Trace Elements: As, Cd, Cu, Fe, Mn, Se, Zn)
Seafood								
Mussel tissue	ERM-CE278k	IRMM	**6.7 ± 0.4**	**0.336 ± 0.025**	**2.18 ± 0.18**	*0.071 ± 0.007*	174 CHF (Sigma Aldrich)	8 g (Trace Elements: As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Rb, Se, Sr, Zn)
Fish muscle	ERM BC422	IRMM	**12.7 ± 0.7**	**0.0075 ± 0.0018**		**0.601 ± 0.030**	113 CHF (Sigma Aldrich)	10 g (Trace Elements: As, Cd, Cu, Fe, Hg, I, Mn, Se, Zn)
Tuna fish	ERM-CE464	IRMM				*5.24 ± 0.10 / CH3Hg= 5.50 ± 0.17*	265 € (IRMM)	15 g, Tuna Fish (total Hg, methylmercury)
Dogfish liver DOLT-5	DOLT-5	NRCC	**34.6 ± 2.4**	**14.5 ± 0.6**	**0.162 ± 0.032**	**0.44 ± 0.18**	440 $ (NRCC)	20 g, (Trace Elements: As, Cd, Ca, Co, Cu, Fe, Pb, Mg, Hg, Mo, K, Se, Ag, Na, Sr, Sn, V, Zn, Arsenobetaine)
Fish protein (Dogfish)	DORM-4	NRCC	**6.87 ± 0.44**	**0.299 ± 0.018**	**0.404 ± 0.062**	**0.412 ± 0.036**	440 $ (NRCC)	20 g (Trace Elements: As, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Sr, V, Zn, Arsenobetaine, MeHg)
Lobster	LUTS-1	NRCC	**2.83 ± 0.13**	**2.12 ± 0.15**	**0.010 ± 0.002**		230 $ (NRCC)	60 g, Non defatted lobster hepatopancreas (Trace Elements: As, Cd, Ca, Cr, Co, Cu, Fe, Pb, mg, Mn, Ni, K, Se, Ag, Sr, Zn)
Lobster	TORT-3	NRCC	**59.5 ± 3.8**	**42.3 ± 1.8**	**0.225 ± 0.018**	**0.292 ± 0.022**	440 $ (NRCC)	15 g, Lobster hepatopancreas marine (Trace Elements: As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Sr, Sn, V, Zn, Arsenobetaine, MeHg)
Crab paste	LGC 7164	LGC	**13.8 ± 1.8**	**9.20 ± 0.48**	**0.0697 ± 0.0047**			Trace Elements: As, Cd, Ca, Co, Cu, Fe, Pb, Mg, Mn, K, Zn
Lake Superior fish tissue	SRM 1946	NIST	**0.277 ± 0.01**	*0.00208 ± 0.00026*		**0.433 ± 0.009**	1430 CHF (Sigma Aldrich)	35 g, Trace Elements: As, Cd, methylmercury, total mercury (+ PCB, chlorinated pesticides, PBDE, PFOS, fatty acids, including omega-3 fatty acids)
Lake Michigan fish tissue	SRM 1947	NIST	**0.732 ± 0.039**			**0.254 ± 0.005**	1430 CHF (Sigma Aldrich)	40 g, Selected trace elements, methylmercury, total mercury (+ PCB, chlorinated pesticides, PBDE, PFAAs, proximates, α-HBCD)
Oyster tissue	SRM 1566b	NIST	**7.65 ± 0.65**	**2.48 ± 0.08**	**0.308 ± 0.009**	**0.0371 ± 0.0013**	1360 CHF (Sigma Aldrich)	25 g (Trace Elements: Al, SB, As, Ba, B, Cd, Ca, Cl2, Co, Cu, Au, H, Fe, Pb, Mg, Mn, Hg, MeHg, Ni, K, Rb, Se, Ag, Na, Sr, S, Th, Sn, Ti, U, V, Zn)
Plankton	BCR-414	IRMM	**6.82 ± 0.28**	**0.383 ± 0.014**	**3.97 ± 0.19**	**0.276 ± 0.018**	195 € (IRMM)	5 g, (Trace Elements: As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Se, V, Zn)
Lichen	BCR-482	IRMM	**0.85 ± 0.07**	**0.56 ± 0.02**	**40.9 ± 1.4**	**0.48 ± 0.02**	200 € (IRMM)	15 g (Trace Elements: Al, As, Cd, Cr, Cu, Hg, Ni, Pb, Zn)
Cereal/Crop/Vegetable/Seaweed								
Brown bread	BCR-191	IRMM		**0.0284 ± 0.0014**	**0.187 ± 0.014**		195 € (IRMM)	25 g, (Trace Elements: Cd, Pb, Cu, Zn, Fe, Mn)
White cabbage	BCR-679	IRMM		**1.66 ± 0.07**		**0.0063 ± 0.0014**	200 € (IRMM)	15 g, (Trace elements: Cd, Cu, Fe, Mn, Mo, Ni, Sr, Zn, Hg, Sb, Tl)
Rye grass	ERM-CD281	IRMM	**0.042 ± 0.010**	**0.120 ± 0.007**	**1.67 ± 0.11**	**0.0164 ± 0.0022**	183 € (IRMM)	10 g, (Trace Elements: As, B, Cd, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn)
Wheat flour	SRM 1567b	NIST	*0.0048 ± 0.0003*	**0.0254 ± 0.0009**	**0.0104 ± 0.0024**		910 CHF (Sigma Aldrich)	50 g, (Trace Elements: Al, As, Br, Cd, Ca, Cl2, Cu, Fe, Pb, Mg, Mn, Hg, Mo, K, Rb, Se, Na, S, Sn, V, Zn)
Rice	ERM-BC211	IRMM	**0.260 ± 0.013**				150 € (IRMM)	10 g, Rice powder, As Species: total arsenic, dimethylarsinic acid, Sum Arsenite + Arsenate
Rice flour	IRMM-804	IRMM	**0.049 ± 0.004**	**1.61 ± 0.07**	**0.42 ± 0.07**		188 € (IRMM)	15 g, (Trace elements: As, Cd, Cu, Mn, Pb, Zn)
Rice flour	SRM 1568b	NIST	**0.285 ± 0.014**	**0.0224 ± 0.0013**	*0.008 ± 0.003*	**0.00591 ± 0.00036**	868 CHF (Sigma Aldrich)	50 g, (Trace Elements: Al, As, Br, Cd, Ca, Cl2, Co, cu, Fe, Pb, Mg, Mn, Hg, Mo, K, Rb, Se, Na, S, Sn, Zn, Dimethylarsinic acid, Inorganic Arsenic, Monomethylarsonic acid)
White clover	BCR-402	IRMM	**0.093 ± 0.010**				158 € (IRMM)	25 g (Trace elements: As, Co, Mo, Se)
Spinach leaves	SRM 1570a	NIST	**0.068 ± 0.012**	**2.876 ± 0.058**		**0.0297 ± 0.0021**	$750.00 (NIST)	60 g (Trace Elements: Al, As, B, Cd, Ca, Co, Cu, Eu, Pb, Mg, Mn, Hg, Ni, N, P, Rb, Sc, Se, Na, Sr, S, Th, U, V, Zn, K
Tomato paste	ERM-BC084	IRMM		**0.112 ± 0.007**	**0.316 ±0.021**			50 g Tomato paste (Trace Elements: Cd, Pb, Sn)
Strawberry leaves	LGC7162	LGC	**0.28 ± 0.07**	**0.17 ± 0.04**	**1.8 ± 0.4**	**0.027 ± 0.006**	253 € (LGC Standards GmbH)	20 g strawberry leaves powder (Trace Elements: Al, As, B, cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, N, P, K, Se, Na, Sr, S, V, Zn)
Tea Leaves No. 23	NIES CRM No. 23	NIES					270 CHF (Nies)	35 g, powdered tea leaves stabilized by 60Co irradiation (Trace Elements: Mg, P, K, ca, Mn, Ni, Cu, Zn, Sr)
Seaweed (bladderwrack)	ERM-CD200	IRMM	**55 ± 4**	**0.95 ± 0.06**	**0.51 ± 0.06**	**0.0186 ± 0.0016**	120 € (IRMM)	5g Seaweed (bladderwrack) (Trace Elements: As, Cd, Cu, Hg, Pb, Se, Zn)
Seaweed	CRM 7405-a	NMIJ	**35.8 ± 0.9**	**0.79 ± 0.02**	**0.43 ± 0.03**	**0.0186 ± 0.0016**		20 g Seaweed (Trace Elements: As, iAs, Al, Ba, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, P, Na, Sr, Zn)
Kelp Powder (Thallus Laminariae)	SRM 3232	NIST						Seeweed Powder (Thallus Laminariae) (Trace Elements:As und Species, Ca, Cd, Cr, Cu, Fe, Hg, I, K, Mg, Mn, Mo, Na, Pb, Zn)
Food/Dairy								
Typical diet	SRM 1548a	NIST	**0.20 ± 0.01**	**0.035 ± 0.0015**	**0.044 ± 0.009**			6.5 g of the freeze-dried homogenate of mixed diet foods - (Trace Elements: Al, SB, As, Ba, B, Br, Cd, Ca, Cs, Cl2, Co, Cu, I, Fe, Pb, Mg, Mn, Hg, Mo, Ni, K, Sc, Se, Si, Na, Sr, S, Sn, Ti, Zn)
Typical Japanese diet	NIES No. 27	NIES	**0.60 ± 0.04**	**0.069 ± 0.009**				18 g of freeze-dried homogenate of mixed japanese diet foods(Trace Elements: Ca, K, Na, As, Ba, Cc
Milk powder (skimmed)	ERM BD150	IRMM		**0.0114 ± 0.029**	**0.019 ± 0.004**	**0.060 ± 0.007**	150 € (IRMM)	20 g, Skimmed Milk powder (Trace Elements: Ca, Cl, K, Mg, Na, P, Cd, Cu, Fe, Hg, I, Mn, Pb, Se, Zn)
Milk powder (skimmed)	ERM BD151	IRMM		**0.106 ± 0.013**	**0.207± 0.014**	**0.52 ± 0.04**	150 € (IRMM)	20 g, Skimmed Milk powder (Trace Elements: Ca, Cl, K, Mg, Na, P, Cd, Cu, Fe, Hg, I, Mn, Pb, Se, Zn)
Whole egg powder	SRM 1845a	NIST	**0.00635 ± 0.00028**				1830 CHF (Sigma Aldrich)	50 g (Trace Elements: Ba, Ca, Cu, Fe, Mg, Mn, P, K, Se, Na, Sr, Zn)
Baking chocolate	SRM 2384	NIST		**0.0734 ± 0.0077**	**0.0357 ± 0.0046**		1910 CHF (Sigma Aldrich)	455 g (5 pk à 91 g) (Trace Elements: Cd, Ca, Cu, Fe, Pb, Mg, Mn, K, Na, Zn)
Dark Chocolate	ERM-BD512	IRMM		**0.302 ± 0.013**			100 € (IRMM)	3 g, Dark Chocolate (Cd, Cu, Mn, Ni)
Fortified breakfast cereal	SRM 3233	NIST		**0.0819 ± 0.002**			1130 CHF (Sigma Aldrich)	60 g (Trace Elements: Ba, Cd, Ca, Cu, Fe, Mg, Mn, P, K, Na, Sr, Zn)
Water								