

Table S1: ICP-MS detection limits

Sample	Milk	Soft tissues	Food	Serum
Unit				
Element	[µg/kg]	[mg/kg]	[mg/kg]	[ng/ml]
Ag	3.00	4.00 ^b	10.0 ^b	*
As	3.00	4.00 ^b	10.0 ^b	*
Ba	3.00	40.0 ^b	10.0 ^b	*
Ca	2.50 ^a	28.0	10.0	1.00 ^c
Cd	0.50	2.00 ^b	2.00 ^b	*
Cs	3.00	8.00 ^b	0.10	1.00
Cu	5.00	0.30	20.0 ^b	20.0
Cu	3.00	2.00 ^b	10.0 ^b	*
Fe	10.0	0.50	0.40	20.0
K	2.50 ^a	8.00	10.0	500
Mg	2.50 ^a	4.00	10.0	100
Mn	3.00	0.10	10.0 ^b	*
Na	2.50 ^a	4.00	10.0	
Ni	3.00	0.20	10.0 ^b	*
P	2.50 ^a	8.00	10.0	1.00 ^c
Pb	5.00	0.80 ^b	2.00 ^b	*
Rb	3.00	8.00 ^b	0.10	5.00
Se	2.50	4.00 ^b	10.0 ^b	1.00
Sr	3.00	0.20	10.0 ^b	*
Zn	0.05 ^a	0.80	2.00 ^b	100

* Element not tested for in these samples, ^a [mg/kg], ^b [µg/kg], ^c [µg/ml]

Table S2: Sheep milk, cow milk, modified-AIN-93M diet, and Low Ca/P modified-AIN-93M diet mineral compositions as determined by ICP-MS[^]

Diet component	Basal		Milk	
Element	Modified-AIN-93M [µg/kg]	Low Ca/P modified-AIN-93M [µg/kg]	Sheep [µg/kg]	Cow [µg/kg]
Al *	8.32	9.68	1.72	BDL
Ba	BDL	BDL	741	167
Ca #	2.85	2.17	1.70	1.25
Ce	14.7	12.2	BDL	BDL
Co	113	97.0	164	2.05
Cr *	1.38	1.25	BDL	BDL
Cs	14.0	14.2	25.5	1.13
Cu *	5.60	4.72	0.34	0.04
Er	1.24	1.22	BDL	BDL
Fe *	44.7	41.8	1.40	0.26
K #	6.78	6.75	1.11	1.54
La	10.4	9.26	BDL	BDL
Li	105	103	8.88	BDL
Mg *	557	564	151	108
Mn *	9.87	8.88	0.13	0.02
Mo	137	107	BDL	BDL
Na #	4.65	4.54	0.90	0.005
Nd	8.13	7.44	BDL	BDL
Ni	527	494	3.63	BDL
P #	2.12	1.72	1.42	1.06
Pb	BDL	BDL	20.5	BDL
Rb *	2.72	2.71	1.80	1.92
Sr *	1.58	1.27	1.52	0.53
U	9.07	6.15	BDL	BDL
V	445	421	BDL	BDL
Y	19.3	18.3	BDL	BDL
Zn *	39.0	36.7	5.26	4.28

[^]BDL = mineral present below detection limit (Table S1). * [mg/kg]. # [g/kg].

Table S3: Summary of correlations between mineral intake and macro and trace mineral concentrations in the organs of rats consuming milk diets [^]

Mineral type															
		Non-essential minerals					Macro and trace minerals								
Intake per day		Cs	Pb	Rb	Sr	V	Ca	Cu	Fe	Mg	Mn	Mo	Na	P	Zn
Organ	Concentration														
Spleen	Co	-0.224	-0.147	-0.592**	-0.147	0.696**	-0.628**	0.661**	.279*	-0.309*	0.696**	0.688**	0.253	-0.644**	0.506**
Kidney		0.311*	0.690**	0.685**	0.685**	-0.600**	0.767**	-0.541**	-0.172	0.460**	-0.585**	-0.583**	-0.027	0.774**	-0.257
Liver	Cu	0.184	-0.241	0.185	0.284*	-0.447**	0.223	-0.422**	-0.178	-0.456**	-0.456**	-0.459**	-0.239	0.229	-0.340*
Liver		-0.078	-0.145	-0.316*	-0.385**	0.538**	-0.372**	0.513**	0.315*	0.540**	0.540**	0.515**	0.340*	-0.378**	0.509**
Spleen	Fe	-0.331*	-0.572*	-0.530**	-0.572*	0.603**	-0.662**	0.529**	0.080	-0.372**	0.597**	0.596**	0.067	-0.677**	0.353**
Liver	Mn	0.225	0.171	0.259	0.360**	-0.568**	0.320*	-0.506**	-0.169	-0.579**	-0.579**	-0.584**	-0.276*	0.332*	-0.463**
Liver	Mo	0.280*	0.551*	0.431**	0.520**	-0.547**	0.525**	-0.453**	-0.104	-0.543**	-0.543**	-0.543**	-0.132	0.529**	-0.355**
Liver	Zn	0.218	0.308	0.415**	0.446**	-0.511**	0.446**	-0.468**	-0.144	-0.519**	-0.519**	-0.521**	-0.185	0.458**	-0.360**

[^]Reported as Spearman rank-order correlation coefficients. * Indicates a significant correlation at $p < 0.05$. ** Indicates a significant correlation at $p < 0.01$.

Table S4: Correlations between the intake of minerals (macro trace and non-essential) and the concentrations of non-essential minerals in the organs of rats ^

Mineral type		Non-essential minerals							Macro and trace minerals							
Intake per day																
Concentration	Organ	Cs	Pb	Rb	Sr	V	Ca	Co	Cu	Fe	K	Mg	Mn	Mo	P	Zn
As	Kidney	0.041	0.325	-0.289*	-0.112	0.158	-0.109	0.156	0.251	0.201	-0.165	-0.134	0.174	0.174	-0.115	0.117
	Liver	-0.024	-0.610*	-0.352*	-0.280*	0.330*	-0.354*	-0.004	0.328*	0.217	0.001	0.331*	0.331*	0.311*	-0.353*	0.258
	Spleen	-0.174	0.055	-0.526**	-0.526**	0.616**	-0.553**	-0.113	0.585**	0.266	0.017	-0.280*	0.607**	0.595**	-0.567**	0.469**
Cs	Brain	0.334*	0.409	-0.038	0.409	-0.187	0.223	0.363*	-0.09	0.192	-0.226	0.071	-0.185	-0.191	0.217	-0.161
	Kidney	0.702**	0.143	-0.110	0.562**	-0.422**	0.338*	0.763**	-0.109	0.389**	-0.529**	0.053	-0.380**	-0.412**	0.334*	-0.269*
	Liver	0.606**	0.676**	0.151	0.595**	-0.462**	0.466**	0.622**	-0.255	0.170	-0.353*	-0.424**	-0.424**	-0.444**	0.460**	-0.304*
	Spleen	0.796**	-0.247	-0.118	-0.118	-0.330*	0.246	0.792**	-0.109	0.474**	-0.484**	0.097	-0.307*	-0.355**	0.242	-0.226
	Serum	0.700**		-0.006					-0.030	0.447**	-0.312*	0.197	-0.224		0.298*	
Rb	Brain	0.193	0.556*	0.403**	0.556*	-0.568**	0.516**	0.125	-0.497**	-0.136	-0.090	0.200	-0.571**	-0.581**	0.526**	-0.424**
	Kidney	0.130	0.489*	0.747**	0.602**	-0.659**	0.701**	-0.043	-0.689**	-0.362**	0.185	0.404**	-0.670**	-0.665**	0.723**	-0.345**
	Liver	0.070	0.589*	0.524**	0.462**	-0.551**	0.542**	0.024	-0.514**	-0.272*	0.036	-0.551**	-0.551**	-0.537**	0.549**	-0.358**
	Spleen	0.299*	0.275	0.634**	0.634**	-0.649**	0.680**	0.127	-0.652**	-0.189	0.096	0.420**	-0.662**	-0.684**	0.691**	-0.324*
	Serum	0.231		0.699**					-0.442**	-0.100	0.273	0.525**	-0.462**		0.771**	
Sr	Brain	0.078	0.258	-0.279	0.258	-0.115	-0.172	0.092	-0.115	0.040	-0.348*	-0.291*	-0.143	-0.156	-0.161	-0.207
	Kidney	0.290*	-0.082	-0.350**	0.018	-0.169	-0.166	0.350**	-0.016	0.160	-0.521**	-0.294*	-0.171	-0.205	-0.149	-0.236
	Liver	0.179	-0.007	-0.115	0.048	-0.290*	-0.036	0.165	-0.242	-0.047	-0.399**	-0.295*	-0.295*	-0.316*	-0.023	-0.252
	Spleen	0.468**	-0.201	-0.227	-0.227	-0.152	-0.091	0.396**	-0.057	0.292*	-0.399**	-0.081	-0.167	-0.228	-0.075	-0.16

^ Reported as Spearman rank-order correlation coefficients. * Indicates a significant correlation at $p < 0.05$. ** indicates a significant correlation at a $p < 0.01$