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The fatty acid composition of Estonian and Latvian retail milk; implications for human nutrition compared with a designer milk

Article

Supplemental Material

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Henno *et al*

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SUPPLEMENTARY FILE

Table S1. *Mean fatty acid composition of designed milk and retail milk purchased in Estonia and Latvia supermarkets for 12 month·*

Fatty acid, g/100 g of total fatty acids	Designed milk (*n*=4)	Retail milk (*n*=152) Means by state		Means by season and state Winter		Summer		Analysis of variance: p-values[J]		
		Estonia (*n*=84)	Latvia (*n*=68)	Estonia (*n*=42)	Latvia (*n*=32)	Estonia (*n*=42)	Latvia (*n*=36)	State	Season	Interaction
C4:0	4·13	4·27	4·29	4·29	4·27	4·25	4·32	0·387	0·929	0·033
C5:0	0·037	0·046	0·045	0·048	0·049	0·044	0·041	0·573	< 0·001	0·137
C6:0	2·43[a]	2·26[b]	2·25[b]	2·29	2·25	2·23	2·26	0·571	0·014	0·001
C7:0	0·034[ab]	0·040[a]	0·032[b]	0·048	0·037	0·032	0·028	< 0·001	< 0·001	0·007
C8:0	1·40[a]	1·32[b]	1·29[c]	1·34	1·28	1·29	1·30	0·166	0·230	< 0·001
C9:0	0·043[ab]	0·042[a]	0·037[b]	0·043	0·039	0·041	0·035	0·031	0·014	0·683
C10:0	3·28[a]	2·85[b]	2·75[c]	2·91	2·72	2·78	2·77	0·097	0·138	< 0·001
C10:1 *cis*-9	0·29[ab]	0·30[a]	0·31[b]	0·31	0·32	0·29	0·31	0·032	0·001	0·505
C11:0	0·091[a]	0·064[b]	0·055[c]	0·066	0·054	0·062	0·056	0·045	0·708	0·041
C12:0	3·51[a]	3·22[b]	3·13[c]	3·30	3·13	3·14	3·14	0·221	0·031	0·004
C12:1 *cis*-9	0·066	0·069	0·067	0·066	0·066	0·073	0·068	0·140	0·007	0·127
C13:0	0·13[a]	0·11[a]	0·10[b]	0·11	0·10	0·11	0·10	0·044	0·128	0·504
iso C13:0	0·042[a]	0·059[a]	0·063[b]	0·062	0·066	0·056	0·061	0·013	0·007	0·798
C14:0	9·77[a]	10·39[b]	10·40[b]	10·55	10·61	10·23	10·21	0·875	< 0·001	0·500
iso C14:0	0·08[a]	0·12[b]	0·14[c]	0·12	0·14	0·12	0·13	0·021	0·102	0·102
C14:1 *cis*-9	0·72[a]	0·91[b]	0·97[c]	0·93	1·02	0·89	0·93	< 0·001	< 0·001	0·024
C15:0	0·95[a]	1·15[b]	1·20[c]	1·15	1·23	1·16	1·18	0·008	0·121	0·001
iso C15:0	0·20[a]	0·26[b]	0·30[c]	0·26	0·29	0·27	0·30	< 0·001	0·011	0·692

anteiso C15:0	0·41[a]	0·46[b]	0·52[c]	0·44	0·50	0·48	0·53	0·002	0·001	0·804
C16:0	21·50[a]	28·45[b]	28·96[c]	28·85	30·69	28·06	27·41	0·015	0·001	0·001
iso C16:0	0·21[a]	0·26[b]	0·27[c]	0·26	0·28	0·25	0·27	0·034	< 0·001	0·172
C16:1 *cis*-7	0·18[ab]	0·21[a]	0·22[b]	0·20	0·20	0·22	0·24	0·011	< 0·001	0·001
C16:1 cis-9	1·01[a]	1·41[b]	1·45[c]	1·43	1·54	1·39	1·38	0·074	0·001	0·001
C16:1 *trans*-9	0·065[ab]	0·061[a]	0·087[b]	0·052	0·060	0·070	0·112	< 0·001	< 0·001	< 0·001
C16:1 *cis*-13	0·15	0·16	0·16	0·16	0·16	0·16	0·16	0·556	0·531	0·182
C17:0	0·53[a]	0·67[b]	0·72[c]	0·66	0·73	0·67	0·71	< 0·001	0·383	0·010
iso C17:0	0·26[a]	0·30[b]	0·34[c]	0·29	0·32	0·32	0·36	< 0·001	< 0·001	0·018
anteiso C17:0	0·34[a]	0·41[b]	0·44[c]	0·40	0·45	0·41	0·44	< 0·001	0·148	0·015
C17:1 *cis*-9	0·17[a]	0·23[b]	0·27[c]	0·23	0·28	0·24	0·26	< 0·001	0·086	< 0·001
C18:0	11·47[a]	10·26[b]	9·89[c]	10·04	9·48	10·48	10·25	0·056	< 0·001	0·176
iso C18:0	0·072[ab]	0·062[a]	0·069[b]	0·063	0·076	0·062	0·063	0·010	< 0·001	0·001
C18:1 *cis*-9[†]	21·18[a]	19·95[b]	19·25[c]	19·82	18·96	20·07	19·52	0·015	0·012	0·376
C18:1 *cis*-11[‡]	1·46[a]	0·92[b]	0·79[c]	0·93	0·77	0·92	0·80	0·001	0·469	0·092
C18:1 *cis*-12	0·57[a]	0·27[b]	0·24[c]	0·29	0·25	0·26	0·23	0·003	0·003	0·661
C18:1 *cis*-13	0·17[a]	0·12[b]	0·14[a]	0·12	0·14	0·12	0·13	< 0·001	0·355	0·801
C18:1 *trans*-4, -5	0·043[ab]	0·041[a]	0·037[b]	0·042	0·041	0·039	0·033	0·115	0·001	0·162
C18:1 *trans*-6, -7,-8	0·48[a]	0·33[b]	0·30[c]	0·34	0·28	0·32	0·31	0·015	0·548	0·079
C18:1 *trans*-9	0·26[a]	0·20[b]	0·19[b]	0·20	0·19	0·20	0·20	0·215	0·583	0·289
C18:1 *trans*-10	0·79[a]	0·35[b]	0·30[c]	0·36	0·28	0·34	0·31	0·020	0·648	0·016
C18:1 *trans*-11	1·72[a]	1·32[b]	1·74[a]	1·15	1·19	1·49	2·22	0·005	< 0·001	< 0·001
C18:1 *trans*-12	0·60[a]	0·21[b]	0·21[b]	0·18	0·21	0·24	0·22	0·637	< 0·001	0·015
C18:1 *trans*-16[§]	0·88[a]	0·42[b]	0·40[c]	0·41	0·36	0·43	0·44	0·001	< 0·001	< 0·001
C18:2n-6	2·30[a]	1·68[b]	1·52[c]	1·67	1·40	1·70	1·62	0·001	< 0·001	< 0·001
C18:2 *cis*-9, *trans*-13	0·96[a]	0·30[b]	0·28[c]	0·29	0·25	0·30	0·30	0·014	< 0·001	< 0·001
C18:2 *cis*-9, *trans*-12	0·296[a]	0·076[b]	0·067[c]	0·068	0·056	0·085	0·077	0·003	< 0·001	< 0·001
C18:2 *trans*-9, *cis*-12	0·13	0·11	0·11	0·10	0·09	0·12	0·12	0·134	< 0·001	0·148
C18:2 *trans*-11, *cis*-15	0·45[a]	0·15[b]	0·22[c]	0·12	0·15	0·18	0·29	0·001	< 0·001	< 0·001
C19:0	0·22[a]	0·14[b]	0·14[c]	0·14	0·14	0·14	0·15	0·080	0·040	0·427
C18:3 n-3	1·54[a]	0·67[b]	0·68[b]	0·65	0·57	0·70	0·78	0·791	< 0·001	< 0·001
C18:3 n-6	0·044[ab]	0·065[a]	0·051[b]	0·058	0·064	0·071	0·039	0·001	0·113	< 0·001

C18:2 *cis*-9, *trans*-11(CLA)	0·71[ab]	0·60[a]	0·77[b]	0·54	0·57	0·67	0·95	0·005	< 0·001	< 0·001
C20:0	0·19[ab]	0·21[a]	0·19[b]	0·21	0·20	0·20	0·18	0·030	0·002	0·008
C20:1 *cis*-9	0·19[a]	0·17[b]	0·17[ab]	0·17	0·16	0·17	0·17	0·987	< 0·001	0·574
C20:1 *cis*-11	0·17[a]	0·12[b]	0·11[c]	0·12	0·10	0·12	0·11	0·005	0·004	0·040
C20:2 n-6	0·036[ab]	0·041[a]	0·034[b]	0·042	0·034	0·040	0·034	0·017	0·529	0·451
C20:3 n-3	0·030	0·020	0·021	0·014	0·013	0·026	0·028	0·689	< 0·001	0·321
C20:3 n-6	0·084[ab]	0·085[a]	0·076[b]	0·084	0·073	0·087	0·078	< 0·001	< 0·001	0·270
C20:4 n-6	0·111[a]	0·102[a]	0·094[b]	0·101	0·092	0·104	0·096	0·013	0·010	0·770
C22:0	0·069[ab]	0·075[a]	0·079[b]	0·073	0·079	0·077	0·079	0·242	0·065	0·063
C22:1	0·036[a]	0·020[ab]	0·020[b]	0·015	0·016	0·026	0·023	0·799	< 0·001	0·157
C20:5 n-3 (EPA)	0·090[a]	0·062[b]	0·064[c]	0·059	0·060	0·064	0·068	0·111	< 0·001	0·023
C22:2 n-6	0·023[a]	0·040[b]	0·048[c]	0·038	0·049	0·042	0·048	0·010	0·184	0·126
C22:5 n-3 (DPA)	0·127[a]	0·096[b]	0·095[b]	0·095	0·093	0·097	0·097	0·646	0·020	0·660
C24:0	0·040[a]	0·045[a]	0·051[b]	0·044	0·050	0·047	0·051	0·049	0·043	0·461
Σ SFA	61·43[a]	67·53[b]	67·76[b]	68·05	69·26	67·02	66·43	0·339	< 0·001	< 0·001
Σ SFA even-chain	57·79[a]	63·34[b]	63·28[b]	63·90	64·76	62·79	61·97	0·952	< 0·001	< 0·001
Σ SFA odd-chain	2·03[a]	2·26[b]	2·34[c]	2·26	2·38	2·26	2·30	0·015	< 0·001	0·011
Σ SFA branched-chain	1·62[a]	1·93[b]	2·14[c]	1·89	2·12	1·97	2·16	< 0·001	0·003	0·330
Σ *cis*-MUFA	26·36[a]	24·86[b]	24·17[c]	24·78	23·98	24·94	24·33	0·018	0·107	0·596
Σ *trans*-MUFA	4·85[a]	2·93[b]	3·26[c]	2·73	2·61	3·13	3·83	0·017	< 0·001	< 0·001
Σ C18:1 *trans*	4·78[a]	2·87[b]	3·17[c]	2·68	2·56	3·06	3·72	0·021	< 0·001	< 0·001
Σ *cis*-PUFA	4·39[a]	2·87[b]	2·69[c]	2·82	2·46	2·93	2·90	0·001	< 0·001	< 0·001
Σ *trans*-PUFA	1·83[a]	0·64[b]	0·67[b]	0·58	0·54	0·69	0·79	0·039	< 0·001	< 0·001
Σ n-6	2·60[a]	2·02[b]	1·83[c]	2·00	1·71	2·05	1·93	0·001	< 0·001	0·004
Σ n-3	1·79[a]	0·85[b]	0·86[b]	0·82	0·74	0·88	0·97	0·728	< 0·001	< 0·001
Σ *de novo*[¶]	25·93	25·88	25·74	26·30	25·95	25·47	25·56	0·617	< 0·001	0·080
Σ *de novo* even-chain	25·60	25·58	25·47	25·98	25·67	25·18	25·30	0·690	< 0·001	0·079
Σ *de novo* odd-chain	0·33[ab]	0·30[a]	0·27[b]	0·32	0·28	0·29	0·26	0·026	< 0·001	0·016

[J]Analysis of variance considering fixed effects of state, season and state by season interaction, and random effect of milk product brand and two replicate measures of the same sample as repeated measures· The denominator degrees of freedom were calculated according to the Kenward-Roger method.

[†]Co-elutes with C18:1 *trans*-13,-14.·
[‡]Co-elutes with C18:1 *trans*-15.·
[§]Co-elutes with C18:2 *trans*-9, *trans*-12 + C18:1 *cis*-14.·
[¶]Σ *de novo* = C4:0 + C5:0 + C6:0 + C7:0 + C8:0 + C9:0 + C10:0 + C10:1 *cis*-9 + C11:0 + C12:0 + C12:1 *cis*-9 + C13:0 + C14:0 + C14:1 *cis*-9·
[a,b,c] Means with different superscript letters are statistically significantly different (pairwise t-tests with degrees of freedom equal to number of samples and followed by Bonferroni correction for multiple testing).
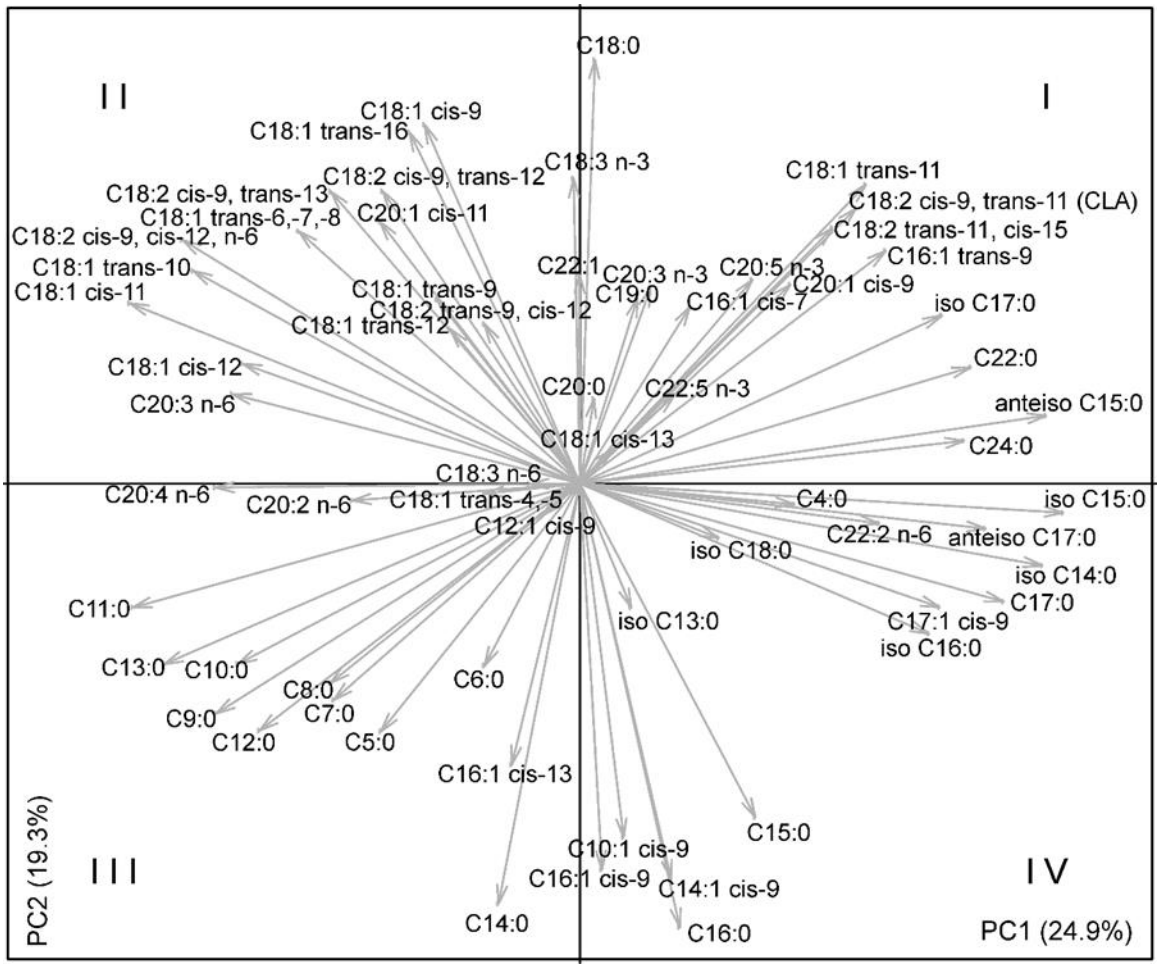
Fig. S1. Results of Estonian and Latvian retail milk samples and designed milk samples (n=308) fatty acids' principal component analysis: factor loadings showing the relative importance of fatty acids in first two principal components.