Higher PUFA and omega-3 PUFA, CLA, α-tocopherol and iron, but lower iodine and selenium concentrations in organic milk: A Systematic Literature Review and Meta- and Redundancy Analyses

SUPPLEMENTARY DATA

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1. INFORMATION ABOUT PAPERS INCLUDED IN THE SYSTEMATIC REVIEW AND THE META-ANALYSIS

Table S1. List of papers included in the systematic review and the meta-analysis.

ID	Reference	
69	Burkitt LL, Wales WJ, McDonald JW et al. (2007) Comparing irrigated biodynamic and conventionally managed dairy farms. 2. Milk production and composition and animal health. Aust J Exp Agric 47, 489-494.	*
125	Di Renzo L, Di Pierro D, Bigioni M et al. (2007) Is antioxidant plasma status in humans a consequence of the antioxidant food content influence? Eur Rev Med Pharmacol Sci 11, 185-192.	
153	Aulrich K & Molkentin J (2009) Potential of Near infrared Spectroscopy for differentiation of organically and conventionally produced milk. Landbauforschung Volkenrode 59, 301-307.	*
155	Bergamo P, Fedele E, Iannibelli L et al. (2003) Fat-soluble vitamin contents and fatty acid composition in organic and conventional Italian dairy products. Food Chem 82, 625-631.	‡
157	Butler G, Collomb M, Rehberger B et al. (2009) Conjugated linoleic acid isomer concentrations in milk from high and low input management dairy systems. J Sci Food Agric 89, 697-705.	*
158	Butler G, Nielsen JH, Slots T et al. (2008) Fatty acid and fat soluble antioxidant concetrations in milk from high and low input conventional and organic systems: seasonal variation. J Sci Food Agric 88, 1431-1441.	*
160	Collomb M, Bisig W, Butikofer U et al. (2008) Fatty acid composition of mountain milk from Switzerland: comparison of organic and integrated farming systems. Int Dairy J 18, 976-982.	*
161	Ellis KA, Innocent G, Grove-White D et al. (2006) Comparing the fatty acid composition of organic and conventional milk. J Dairy Sci 89, 1938-1950.	*
162	Ellis KA, Monteiro A, Innocent GT et al. (2007) Investigation of the vitamins A and E and beta-carotene content in milk from UK organic and conventional dairy farms. J Dairy Res 74, 484-491.	*
169	Hermansen JE, Badsberg JH, Kristensen T et al. (2005) Major and trace elements in organically or conventionally produced milk. J Dairy Res 72, 362-368.	*
174	Hoikkala A, Mustonen E, Saastamoinen I et al. (2007) High levels of equol in organic skimmed Finnish cow milk. Mol Nutr Food Res 51, 782-786.	*
176	Jahreis G, Fritsche J & Steinhart H (1996) Monthly variations of milk composition with special regard to fatty acids depending on season and farm management systems - conventional versus ecological. Fett/Lipid 98, 356-359.	
178	Kraft J, Collomb M, Mockel P et al. (2003) Differences in CLA isomer distribution of cow's milk lipids. Lipids 38, 657-664.	*
190	Prandini A, Sigolo S & Piva G (2009) Conjugated linoleic acid (CLA) and fatty acid composition of milk, curd and Grana Padano cheese in conventional and organic farming systems. J Dairy Res 76, 178-282.	*‡
191	Santos JSD, Beck L, Walter M et al. (2005) Nitrate and nitrite in milk produced by conventional and organic systems. Cienc Tecnol Aliment 25, 304-309.	*
196	Vicini J, Etherton T, Kris-Etherton P et al. (2008) Survey of retail milk composition as affectd by label claims regarding farm management practices. J Am Diet Assoc 108, 1109-1203.	*
205	Roesch M, Doherr MG & Blum JW (2006) Management, feeding, production, reproduction and udder health on organic and conventional Swiss dairy farms. Schweiz Arch Tierheilkd 148, 387-395.	
207	Müller U & Sauerwein H (2010) A comparison of somatic cell count between organic and conventional dairy cow herds in West Germany stressing dry period related changes. Livest Sci 127, 30-37.	*

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Table S1 cont. List of papers included in the systematic review and the meta-analysis.

ID	Reference	
216	Sundberg T, Berglund B, Rydhmer L et al. (2009) Fertility, somatic cell count and milk production in Swedish organic and conventional dairy herds. Livest Sci 126, 176-182.	
217	Vetter W & Schröder M (2010) Concentrations of phytanic acid and pristanic acid are higher in organic than in conventional dairy products from the German market. Food Chem 119, 746-752.	‡
229	Malmauret L, Parent-Massin D, Hardy JL et al. (2002) Contaminants in organic and conventional foodstuffs in France. Food Addit Contam Part A Chem Anal Control 19, 524-532.	
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266	Lund P (1991) Characterization of alternatively produced milk. Milchwissenschaft 46, 166-169.	
293	Arnold R (1984) A comparison of quality of liquid milk produced by conventional or alternative farming systems. Arch Lebensmittelhyg 35, 66-69.	
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322	Lavrencic A, Levart A & Salobir J (2007) Fatty acid composition of milk produced in organic and conventional dairy herds in Italy and Slovenia. Ital J Anim Sci 6, 437-439.	*
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350	Molkentin J & Giesemann A (2007) Differentiation of organically and conventionally produced milk by stable isotope and fatty acid anlaysis. Anal Bioanal Chem 388, 297-305.	
352	Nauta WJ, Veerkamp RF, Brascamp EW et al. (2006) Genotype by environment interaction for milk production traits between organic and conventional dairy cattle production in the Netherlands. J Dairy Sci 89, 2729-2737.	*
353	Nauta WJ, Baars T & Bovenhuis H (2006) Converting to organic dairy farming: consequences for production, somatic cell scores and calving interval of first parity Holstein cows. Livest Sci 99, 185-195.	
356	Roesch M, Doherr MG & Blum JW (2005) Performance of dairy cows on Swiss farms with organic and integrated production. J Dairy Sci 88, 2462-2475.	
366	O'Donnell AM, Spatny KP, Vicini JL et al. (2010) Survey of the fatty acid composition of retail milk differing in label claims based on production management practices. J Dairy Sci 93, 1918-1925.	*
367	Knoppler HO & Averdunk G (1986) A comparison of milk quality from conventional farms or from 'alternative' farms. Arch Lebensmittelhyg 37, 94-96.	*
369	Butler G, Stergiadis S, Seal C et al. (2011) Fat composition of organic and conventional retail milk in northeast England. J Dairy Sci 94, 24–36.	*
383	Schröder M & Vetter W (2010) GC/EI-MS Determination of the Diastereomer Distribution of Phytanic Acid in Food Samples. J Am Oil Chem Soc 88, 341-349.	‡
384	Schröder M, Yousefi F & Vetter W (2011) Investigating the day-to-day variations of potential marker fatty acids for organic milk in milk from conventionally and organically raised cows. Eur Food Res Technol 232, 167-174.	
385	Tsiplakou E, Kotrotsios V, Hadjigeorgiou I et al. (2010) Differences in sheep and goats milk fatty acid profile between conventional and organic farming systems. J Dairy Res 77, 343-349.	†

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Table S1 cont. List of papers included in the systematic review and the meta-analysis.

386	Tudisco R, Cutrignelli MI, Calabro S et al. (2010) Influence of organic systems on milk fatty acid profile and CLA in goats. Small Ruminant Res 88, 151-155.	†
387	Ellis K, McLean WG, Grove-White D et al. (2005) Studies comparing the composition of milk produced on organic and conventional dairy farms in the UK. Proceedings of the 4th SAFO Workshop: Systems development: quality and safety of organic livestock products, 41-45.	*
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392	Nielsen J, Lund-Nielsen T & Skibsted LH (2004) Higher antioxidant content in organic milk than in conventional milk due to feeding strategy. http://www.darcof.dk/enews/sep04/milk.html (accessed 4 September 2013)	
393	Zagorska J & Ciprovica I (2008) The chemical composition of organic and conventional milk in Latvia. Proceedings of the 3rd Baltic Conference on Food Science and Technology, 10-14.	
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395	Reksen O, Tverdal A & Ropstad E (1999) A comparative study of reproductive performance in organic and conventional dairy husbandry. J Dairy Sci 82, 2605-2610.	
396	Allard G, Bregard P, Paquin D et al. (2002) Comparing milk components and quality on some organic and coventional dairy farms in Quebec. Proceedings of the 19th General Meeting of the European Grassland Federation.	*
398	Bennedsgaard TW, Thamsborg SM, Vaarst M et al. (2003) Eleven years of organic dairy production in Denmark: herd health and production related to time of conversion and compared to conventional production. (Special issue: Organic livestock production). Livest Prod Sci 80, 121-131.	
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402	Molkentin J (2009) Authentication of Organic Milk Using delta C-13 and the alpha-Linolenic Acid Content of Milk Fat. J Agric Food Chem 57, 785-790.	*
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404	Molkentin J (2008) Authentifizierung von Bio-Milch im Labor. Dtsch Milchwirtschaft 59, 873-874.	*
405	Miotello S (2007) Chemical, nutritional and technological characteristics of milk obtained from organic and conventional dairy farms located in the mountain area. Proceedings of the 58th Annual Meeting of the European Federation of Animal Science (EAAP).	*
406	Miotello S (2008) Chemical composition, fatty acids profile and sensory properties of cheese from organic and conventional milk. Proceedings of the 59th Annual Meeting of the European Federation of Animal Science (EAAP).	‡
408	Adriaansen-Tennekes R, Bloksma J, Huber MAS et al. (2005) Organic products and health. Results of milk research 2005: Universität Kassel/Witzenhausen.	*
409	Buchberger J (2002) Zur Milcheistug und Milchqualitaet aus oekologischer (biologischer) bzw. konventiontioneller Erzeugung. In Fleckvichwelt, Mitteilungen der Pruef und Besamungsstation, Muenchen-Grub, pp. 16-17.	
410	Nogai K, Heide A, Grabowski NT et al. (2003) Production of pasteurised organic and conventional fresh milk. DMZ 124, 22-25.	*
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Table S1 cont. List of papers included in the systematic review and the meta-analysis.

413	Pellerin D, Allard G, Allard Y et al. (1997) Production laitière biologique: résultats d'un groupe de ferme de Lotbinière. Proceedings of the 21st Symposium sur les bovins laitiers, 49-60.	
414	Stergiadis S, Leifert C, Seal C et al. (2012) Effect of Feeding Intensity and Milking System on Nutritionally Relevant Milk Components in Dairy Farming Systems in the North East of England. J Agric Food Chem 60, 7270−7281.	*
418	Bakutis B (2007) Quality analysis of milk production conditions in organic and conventional farms. Veterinarija Ir Zootechnika 39, 3-8.	
419	Butler G, Nielsen AL, Larsen MK et al. (2011) The effects of dairy management and processing on quality characteristics of milk and dairy products. NJAS Wageningen J Life Sci 58, 97-102.	*
420	Larsen MK, Nielsen AL, Butler G et al. (2010) Milk quality as affected by feeding regimes in a country with climatic variation. J Dairy Sci 93, 2863-2873.	*
455	Florence ACR, da Silva RC, do Espirito Santo AP et al. (2009) Increased CLA content in organic milk fermented by bifidobacteria or yoghurt cultures. Dairy Sci Technol 89, 541-553.	*‡
456	Revilla I, Luruena-Martinez MA, Blanco-Lopez MA et al. (2009) Changes in Ewe's Milk Composition in Organic versus Conventional Dairy Farms. Czech J Food Sci 27, S263-S266.	†
457	Popovic-Vranjes A, Krajinovic M, Kecman J et al. (2010) Comparison of fatty acid composition in conventional and organic milk. Mljekarstvo 60, 59-66.	
458	Gruber L, Steinwender R, Guggenberger T et al. (2001) Comparison of organic and conventional farming on a grassland farm - 2(nd) Communication: Feed intake, milk yield, health and fertility parameters. Bodenkultur 52, 55-70.	*
461	Fanti MGN, de Almeida KE, Rodrigues AM et al. (2008) Contribution to the study of physicochemical characteristics and lipid fraction of organic milk. Cienc Tecnol Aliment 28, 259-265.	*
464	Gabryszuk M, Sloniewski K & Sakowski T (2008) Macro- and microelements in milk and hair of cows from conventional vs. organic farms. Anim Sci Pap Rep 26, 199-209.	*
465	Fall N, Forslund K & Emanuelson U (2008) Reproductive performance, general health, and longevity of dairy cows at a Swedish research farm with both organic and conventional production. Livest Sci 118, 11-19.	
467	Fall N & Emanuelson U (2011) Fatty acid content, vitamins and selenium in bulk tank milk from organic and conventional Swedish dairy herds during the indoor season. J Dairy Res 78, 287-292.	
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474	Di Francia A, Masucci F, De Rosa G et al. (2007) Feeding management and milk production in organic and conventional buffalo farms. Ital J Anim Sci 6, 571-574.	†
481	Battaglini LM, Renna M, Garda A et al. (2009) Comparing milk yield, chemical properties and somatic cell count from organic and conventional mountain farming systems. Ital J Anim Sci 8, 384-386.	
487	Carpio A, Rodriguez-Estevez V, Sanchez-Rodriguez M et al. (2010) Differentiation of organic goat's milk based on its hippuric acid content as determined by capillary electrophoresis. Electrophoresis 31, 2211-2217.	†
547	Man C, Maerescu C, Lorincz P et al. (2008) Research concerning the quantity and quality of the sheep milk obtained in organic farms. Bull UASVM Animal Sci Biotech 65, 457.	†
551	Hamilton C, Emanuelson U, Forslund K et al. (2006) Mastitis and related management factors in certified organic dairy herds in Sweden. Acta Vet Scand 48, 11.	
552	Ellis KA, Innocent G, Mihm M et al. (2007) Dairy cow cleanliness and milk quality on organic and conventional farms in the UK. J Dairy Res 74, 302-310.	*

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553	Zwald AG, Ruegg PL, Kaneene JB et al. (2004) Management practices and reported antimicrobial usage on conventional and organic dairy farms. J Dairy Sci 87, 191-201.	*
554	Sato K, Bartlett PC, Erskine RJ et al. (2005) A comparison of production and management between Wisconsin organic and conventional dairy herds. Livest Prod Sci 93, 105-115.	*
555	Pol M & Ruegg PL (2007) Treatment practices and quantification of antimicrobial drug usage in conventional and organic dairy farms in Wisconsin. J Dairy Sci 90, 249-261.	
556	Renna M, Garda A, Lussiana C et al. (2009) Chemical, Nutritional and Microbiological Characterization of Organic Fontina Pdo Cheese. Ital J Food Sci 21, 287-303.	*‡
576	Emanuelson U & Fall N (2007) Vitamins and selenium in bulk tank milk of organic and conventional dairy farms. Proceedings of the 58th Annual Meeting of the European Association for Animal Production (EAAP), 1-35.	*
577	Popovic-Vranjes A, Savic M, Pejanovic R et al. (2011) The effect of organic milk production on certain milk quality parameters. Acta Vet (Beogr) 61, 415-421.	
588	Kuczynska BA (2011) Bioactive components and technological parameters of milk produced at ecological and conventional farms. In Treatises Monographs. Warsaw, Poland: Warsaw University of Life Sciences.	*
589	Fievez V & Vlaeminck B (2006) Fatty acid composition in milk from Flemish conventional and organic dairy farm management systems. J Anim Sci 84, 60.	
590	Malbe M, Otstavel T, Kodis I et al. (2010) Content of selected micro and macro elements in dairy cows' milk in Estonia. Agron Res 8, 323-326.	
591	Florence ACR, Beal C, Silva RC et al. (2012) Fatty acid profile, trans-octadecenoic, alpha-linolenic and conjugated linoleic acid contents differing in certified organic and conventional probiotic fermented milks. Food Chem 135, 2207-2214.	‡
592	Pattono D, Battaglini LM, Barberio A et al. (2009) Presence of synthetic antioxidants in organic and conventional milk. Food Chem 115, 285-289.	*
593	Bath SC, Button S & Rayman MP (2012) Iodine concentration of organic and conventional milk: implications for iodine intake. Br J Nutr 107, 935-940.	
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595	Florence ACR, Oliveira RPS, Silva RC et al. (2012) Organic milk improves Bifidobacterium lactis counts and bioactive fatty acids contents in fermented milk. LWT - Food Sci Technol 49, 89-95.	‡
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597	Huszti S (2009) Cercetări preliminare pentru producerea brânzeturilor organice. PhD thesis, Universitatea Dunărea de Jos din Galati	
598	McBride WD & Greene C (2007) A comparison of conventional and organic milk production systems in the U. S. Proceeding of the American Agricultural Economics Association Annual Meeting.	
599	Fall N & Emanuelson U (2009) Milk yield, udder health and reproductive performance in Swedish organic and conventional dairy herds. J Dairy Res 76, 402-410.	
600	Kuczyńska B, Puppel K, Gołębiewski M et al. (2012) Differences in whey protein content between cow's milk collected in late pasture and early indoor feeding season from conventional and organic farms in Poland. J Sci Food Agric 92, 2899–2904.	
601	Baars T, Schroeder M, Kusche D et al. (2012) Phytanic acid content and SRR/RRR diastereomer ratio in milk from organic and conventional farms at low and high level of fodder input. Org Agric 2, 13-21.	

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602	Koehler M, Fechner A, Leiterer M et al. (2012) Iodine content in milk from German cows and in human milk: new monitoring study. Trace Elem Electrolytes 29, 119-126.	*
616	Pirisi A, Piredda G, Sitzia M et al. (2001) Organic and conventional systems: Composition and cheese-making aptitude of Sarda ewes' milk. Proceedings of the Joint International Conference - Organic Meat and Milk from Ruminants, 143-146.	†
617	Bilancia MT, Caponio F, Summo C et al. (2011) Comparison between organic and conventional goat yoghurts marketed in Italy. Milchwissenschaft 66, 65-68.	†
618	Pilarczyk B, Pilarczyk R, Tomza-Marciniak A et al. (2011) Selenium concentrations in the serum and milk of cows from organic and conventional farms in West Pomerania. Tieraerztl Umsch 66, 248-253.	
626	Benbrook CM, Butler G, Latif MA et al. (2013) Organic Production Enhances Milk Nutritional Quality by Shifting Fatty Acid Composition: A United States-Wide, 18-Month Study. PLoS ONE 8, e82429.	*
627	Capuano E, Elgersma A, Tres A et al. (2014) Phytanic and pristanic acid content in Dutch farm milk and implications for the verification of the farming management system. Int Dairy J 35, 21-24.	*
628	Carpio A, Bonilla-Valverde D, Arce C et al. (2013) Evaluation of hippuric acid content in goat milk as a marker of feeding regimen. J Dairy Sci 96, 5426-5434.	*†
629	Cicconi-Hogan KM, Gamroth M, Richert R et al. (2013) Associations of risk factors with somatic cell count in bulk tank milk on organic and conventional dairy farms in the United States. J Dairy Sci 96, 3689-3702.	
630	Cicconi-Hogan KM, Gamroth M, Richert R et al. (2013) Risk factors associated with bulk tank standard plate count, bulk tank coliform count, and the presence of Staphylococcus aureus on organic and conventional dairy farms in the United States. J Dairy Sci 96, 7578-7590.	
631	da Silva JB, Fagundes GM, Guimaraes Soares JP et al. (2013) Dairy goat health management and milk production on organic and conventional system in Brazil. Semin-Cinac Agrar 34, 1273-1279.	†
663	Adler SA, Jensen SK, Thuen E et al. (2013) Effect of silage botanical composition on ruminal biohydrogenation and transfer of fatty acids to milk in dairy cows. J Dairy Sci 96, 1135-1147.	
664	Adler SA, Jensen SK, Govasmark E et al. (2013) Effect of short-term versus long-term grassland management and seasonal variation in organic and conventional dairy farming on the composition of bulk tank milk. J Dairy Sci 96, 5793-5810.	
665	Almeida-Gonzalez M, Luzardo OP, Zumbado M et al. (2012) Levels of organochlorine contaminants in organic and conventional cheeses and their impact on the health of consumers: an independent study in the Canary Islands (Spain). Food Chem Toxicol 50, 4325-4332.	‡
666	Bergamo P, Luongo D, Maurano F et al. (2005) Butterfat fatty acids differentially regulate growth and differentiation in Jurkat T-cells. J Cell Biochem 96, 349-360.	‡
667	Brambilla G, Abate V, De Filippis SP et al. (2011) Polychlorodibenzodioxin and -furan (PCDD and PCDF) and dioxin-like polychlorobiphenyl (DL-PCB) congener levels in milk of grazing sheep as indicators of the environmental quality of rural areas. J Agric Food Chem 59, 8513-8517.	†
668	Butikofer U, Meyer J, Sieber R et al. (2008) Occurrence of the angiotensin-converting enzyme inhibiting tripeptides Val-Pro-Pro and Ile-Pro-Pro in different cheese varieties of Swiss origin. J Dairy Sci 91, 29-38.	‡
669	Hoac T, Lundh T, Purup S et al. (2007) Separation of selenium, zinc, and copper compounds in bovine whey using size exclusion chromatography linked to inductively coupled plasma mass spectrometry. J Agric Food Chem 55, 4237-4243.	‡

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670	Malissiova E, Tsakalof A, Arvanitoyannis IS et al. (2013) Monitoring Aflatoxin M1 levels in ewe's and goat's milk in Thessaly, Greece; potential risk factors under organic and conventional production schemes. Food Control 34, 241-248.	†
671	Luukkonen J, Kemppinen A, Karki M et al. (2005) The effect of a protective culture and exclusion of nitrate on the survival of enterohemorrhagic E. coli and Listeria in Edam cheese made from Finnish organic milk. Int Dairy J 15, 449-457.	*
672	Mullen KAE, Sparks LG, Lyman RL et al. (2013) Comparisons of milk quality on North Carolina organic and conventional dairies. J Dairy Sci 96, 6753-6762.	*
673	Pape-Zambito DA, Roberts RF & Kensinger RS (2010) Estrone and 17beta-estradiol concentrations in pasteurized-homogenized milk and commercial dairy products. J Dairy Sci 93, 2533-2540.	*
674	Prema D, Pilfold JL, Krauchi J et al. (2013) Rapid Determination of Total Conjugated Linoleic Acid Content in Select Canadian Cheeses by H-1 NMR Spectroscopy. J Agric Food Chem 61, 9915-9921.	‡
675	Rey-Crespo F, Miranda M & Lopez-Alonso M (2013) Essential trace and toxic element concentrations in organic and conventional milk in NW Spain. Food Chem Toxicol 55, 513-518.	*
676	Tsakiris IN, Tzatzarakis MN, Alegakis AK et al. (2013) Risk assessment scenarios of children's exposure to aflatoxin M1 residues in different milk types from the Greek market. Food Chem Toxicol 56, 261-265.	*
678	Vetter W, Laure S, Wendlinger C et al. (2012) Determination of furan fatty acids in food samples. J Am Oil Chem Soc 89, 1501-1508.	‡
679	Ptasinska-Marcinkiewicz J, Halagarda M & Fijorek K (2012) Physicochemical properties of conventional and organic milk available on Polish market - comparative analysis. Milchwissenschaft 67, 242-245.	*
680	Cimen M, Yildirim N, Dikici A et al. (2010) Seasonal variations of biochemical taste parameters in milks from conventional and environment - Friendly organic farming. Bulg J Agri Sci 16, 728-732.	
681	Hanus O, Vorlicek Z, Sojkova K et al. (2008) A comparison of selected milk indicators in organic herds with conventional herd as reference. Folia Veterinaria 52, 155-159.	
682	Kastelic M & Kompan D (2008) Milk production of Bovska sheep in conventional and organic farming system. Acta Agric Slovenica 92, 41-46.	†
683	Kompan D & Kastelic M (2009) Productivity of Slovenian Alpine goat in the conventional and organic farming system. Proceedings of the 36th ICAR Biennial Session Identification - Breeding, Production, Health and Recording of Farm Animals, 137-142.	†
684	Kuhnen S, Moacyr JR, Trevisan R et al. (2013) Carotenoid content in cow milk from organic and conventional farms in Southern Brazil. J Food Agri Environ 11, 221-224.	*
686	Sarubbi F, Polimeno F, Auriemma G et al. (2013) Effects of season calving and managements on lactating curves in two different farms (organic vs conventional) in buffalo cows. Open J Anim Sci 3, 83-87.	†
687	Selegovska E & Spruzs J (2008) Welfare of goats and the production of products in organic and conventional farms. Latv J Agron 10, 287-292.	†
688	Klir Z, Potocnik K, Antunovic Z et al. (2013) Comparison of milk production traits by Istrian pramenka between conventional and organic systems in Slovenia. Agric Conspec Sci 78, 271-274.	†
689	Cermanova I, Hanus O, Roubal P et al. (2011) Effect of organic farming on selected raw cow milk components and properties. Acta Univ Agric Silvic Mendelianae Brun 59, 81-92.	*
690	Gutierrez R, Rosell P, Vega S et al. (2013) Self and foreign substances in organic and conventional milk produced in the eastern region of Mexico. Food Nutr Sci 4, 586-593.	

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692	Kusche D, Ruebesam K & Baars T (2010) Fatty acids and antioxidant profiles in summer milk from different biodynamic and conventional systems in Southern Germany. Proceedings of the 23th General Meeting of the European Grassland Federation - Grassland Science in Europe 15, 604-606.	
693	Zagorska J & Ciprovica I (2005) The comparison of chemical pollution between organic and conventional milk. Proceedings of the Research for rural development: International scientific conference, 196-198.	*
694	Zagorska J, Ciprovica I & Mikelsone V (2007) Evaluation of antibodies concentration in cow's milk from different agricultural systems. LLU Raksti 18, 45-50.	*
695	Almeida M, Boada LD, Zumbado M et al. (2009) High exposure level to dioxin-like carcinogens through intake of commercial milk from the Canary Islands market (Spain). J Vet Pharmacol Ther 32, 194-195.	*
696	Jahreis G, Leiterer M & Fechner A (2007) Appropriate nutrition eliminates iodine deficiency : the contribution of milk, seafood and iodized table salt to the iodine supply in Germany. Präv Gesundheitsf 2, 179-184.	*
697	Kaffarnik S, Schröder M, Lehnert K et al. (2014) δ13C values and phytanic acid diastereomer ratios: combined evaluation of two markers suggested for authentication of organic milk and dairy products. Eur Food Res Technol 238, 819-827.	*‡
698	Man C, Hicea S & Ciupe M (2009) Data regarding the nutritional, functional and sensory quality of bio milk. Bull UASVM Animal Sci Biotech 66, 119-125.	†
699	Martínez-Fernández A, Vicente F, Morales-Almaráz E et al. (2009) Effects of conventional versus organic management system on perennial ryegrass-white clover rotational grazing pastures: Grass allowance, milk yield and quality of grass and milk. Ir J Agric Food Res 48, 264.	
700	Venturoso RC, Almeida KEd, Rodrigues AM et al. (2007) Determination of the physical-chemical composition of dairy products: exploratory study to compare the results obtained by classic methodology and by ultra-sound. Rev Bras Cienc Farm 43, 607-613.	*
702	Stergiadis S, Leifert C, Seal CJ et al. (2013) Individual cow variation on milk polyunsaturated fatty acids. Proc Nutr Soc 72, 109.	
703	Jakobsen J & Saxholt E (2009) Vitamin D metabolites in bovine milk and butter. J Food Compos Anal 22, 472-478.	*
704	Gustafson GM, Salomon E, Jonsson S et al. (2003) Fluxes of K, P, and Zn in a conventional and an organic dairy farming system through feed, animals, manure, and urine - a case study at Ojebyn, Sweden. Eur J Agron 20, 89-99.	*
705	Florence ACR, Beal C, Silva RCd et al. (2014) Survival of three Bifidobacterium animalis subsp. lactis strains is related to trans-vaccenic and alpha -linolenic acids contents in organic fermented milks. LWT - Food Sci Technol 56, 290-295.	*‡
706	Chotyakul N, Pateiro-Moure M, Martinez-Carballo E et al. (2014) Development of an improved extraction and HPLC method for the measurement of ascorbic acid in cows' milk from processing plants and retail outlets. Int J Food Sci Technol 49, 679-688.	*
707	Chotyakul N, Pateiro-Moure M, Saraiva JA et al. (2014) Simultaneous HPLC-DAD quantification of vitamins A and E content in raw, pasteurized, and UHT cow's milk and their changes during storage. Eur Food Res Technol 238, 535-547.	*
708	Kelly T, Butcher N, Harrington K et al. (2005) Organic-conventional dairy systems trial in New Zealand: four years' results. Proceedings of the First Scientific Conference of the International Society of Organic Agriculture Research (ISOFAR), held in Cooperation with the International Federation of Organic Agriculture Movements (IFOAM) and the National Association for Sustainable Agriculture, Australia (NASAA), 268-271.	

ID, Paper unique identification number. *Paper included in standard meta-analysis; †Paper with data on goat, sheep or buffalo milk or dairy products; ‡Paper with data on bovine dairy products.

Table S1 cont. List of papers included in the systematic review and the meta-analysis.

709	Muntean D (2011) Impact organic products from sheep's milk on human health compared to conventional. Bull UASVM Agric 68, 339-343.	†
710	Rehberger B, Bisig W, Eberhard P et al. (2007) Assessment of processing technologies which may improve the nutritional composition of dairy products - overview of progress. Proceedings of the 3rd International Congress of the European Integrated Project Quality Low Input Food (QLIF) - Improving sustainability in organic and low input food production systems, 384-387.	‡
712	Smiechowska M (2001) The nitrate intake with food of animal and plant origin. Acta Pol Toxicol 9, 115-123.	*
713	Zervas G, Koutsotolis K, Theodoropoulos G et al. (2000) Comparison of organic with conventional feeding systems of lactating dairy ewes in Greece. In EAAP Publication No. 97, pp. 107-111 [D Gagnaux and JR Poffet, editors]. Netherlands.	†
714	Cubon J, Foltys V, Hascik P et al. (2008) The raw milk quality from organic and conventional agriculture. Acta Univ Agric Silvic Mendelianae Brun 56, 25-30.	
715	Bennedsgaard TW, Thamsborg SM, Aarestrup FM et al. (2006) Resistance to penicillin of Staphylococcus aureus isolates from cows with high somatic cell counts in organic and conventional dairy herds in Denmark. Acta Vet Scand 48, 24.	
716	Berentsen PBM, Kovacs K & van Asseldonk MAPM (2012) Comparing risk in conventional and organic dairy farming in the Netherlands: an empirical analysis. J Dairy Sci 95, 3803-3811.	*
717	Bidokhti MRM, Traven M, Fall N et al. (2009) Reduced likelihood of bovine coronavirus and bovine respiratory syncytial virus infection on organic compared to conventional dairy farms. Vet J 182, 436-440.	
720	Blank B, Schaub D, Paulsen HM et al. (2013) Comparison of performance and feeding parameters in organic and conventional dairy farms in Germany. Landbauforschung Volkenrode 63, 21-28.	
721	Boutet P, Detilleux J, Motkin M et al. (2005) A comparison of somatic cell count and antimicrobial susceptibility of subclinical mastitis pathogens in organic and conventional dairy herds. Ann Med Vet 149, 173-182.	
722	Brenninkmeyer C, Dippel S, Brinkmann J et al. (2013) Hock lesion epidemiology in cubicle housed dairy cows across two breeds, farming systems and countries. Prev Vet Med 109, 236-245.	
723	Burgoyne D, Levallois R, Perrier JP et al. (1995) A comparison of the profitability of conventional and organic milk production systems in Quebec. Can J Agri Econ 43, 435-442.	
724	Stene O, Thuen E, Haug A et al. (2002) Conjugated linoleic acid (CLA) content of milk from cows in two different production systems. Meieriposten 91, 118-119.	
725	Slots T, Sorensen J & Nielsen JH (2009) Tocopherol, carotenoids and fatty acid composition in organic and conventional milk. DMZ 130, 47-50.	
726	Butler LJ (2002) The economics of organic milk production in California: a comparison with conventional costs. Am J Alternative Agr 17, 83-91.	
727	Cazer CL, Mitchell RM, Cicconi-Hogan KM et al. (2013) Associations between Mycobacterium avium subsp paratuberculosis antibodies in bulk tank milk, season of sampling and protocols for managing infected cows. BMC Vet Res 9, 1-7.	
728	Cho S, Diez-Gonzalez F, Fossler CP et al. (2006) Prevalence of shiga toxin-encoding bacteria and shiga toxin-producing Escherichia coli isolates from dairy farms and county fairs. Vet Microbiol 118, 289-298.	
729	Flysjo A, Cederberg C, Henriksson M et al. (2012) The interaction between milk and beef production and emissions from land use change - critical considerations in life cycle assessment and carbon footprint studies of milk. J Clean Prod 28, 134-142.	

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Table S1 cont. List of papers included in the systematic review and the meta-analysis.

730	Garmo RT, Waage S, Sviland S et al. (2010) Reproductive performance, udder health, and antibiotic resistance in mastitis bacteria isolated from Norwegian Red cows in conventional and organic farming. Acta Vet Scand 52, 11.	*
731	Guerci M, Knudsen MT, Bava L et al. (2013) Parameters affecting the environmental impact of a range of dairy farming systems in Denmark, Germany and Italy. J Clean Prod 54, 133-141.	
732	Honorato LA, Machado Filho LCP, Barbosa Silveira ID et al. (2014) Strategies used by dairy family farmers in the south of Brazil to comply with organic regulations. J Dairy Sci 97, 1319-1327.	*
733	Kristensen T & Kristensen ES (1998) Analysis and simulation modelling of the production in Danish organic and conventional dairy herds. Livest Prod Sci 54, 55-65.	*
734	Kristensen T & Mogensen L (1999) Danish organic dairy cattle production systems - feeding and feed efficiency. Proceedings of the NJF-seminar Np. 303 - DARCOF Report No. 2, 173-178.	*
735	Kristensen T, Mogensen L, Knudsen MT et al. (2011) Effect of production system and farming strategy on greenhouse gas emissions from commercial dairy farms in a life cycle approach. Livest Sci 140, 136-148.	
736	Mayen CD, Balagtas JV & Alexander CE (2010) Technology adoption and technical efficiency: organic and conventional dairy farms in the United States, 1 ed., pp. 181-195. New Mexico, USA: Department of Agricultural Economics and Agricultural Business, New Mexico State University.	*
737	McBride WD & Greene C (2009) Characteristics, costs, and issues for organic dairy farming. Economic Research Report Number 82. USA: Economic Research Service/United States Department of Agriculture.	
738	McLeod KLM, Holmes CW, Morel PCH et al. (2008) Comparison of mastitis prevalence between an organic and a conventional dairy herd from 2004 to 2006. Proceedings of the New Zealand Society of Animal Production 68th Conference, 8-11.	
739	Nielsen AH & Kristensen IS (2005) Nitrogen and phosphorus surpluses on Danish dairy and pig farms in relation to farm characteristics. In EAAP Publication No. 4/2005, 1 ed., pp. 97-107 [JE Hermansen and G Zervas, editors]. Netherlands.	
740	Nordqvist M, Holtenius K & Sporndly R (2014) Methods for assessing phosphorus overfeeding on organic and conventional dairy farms. Animal 8, 286-292.	
741	Ogini YO, Stonehouse DP & Clark EA (1999) Comparison of organic and conventional dairy farms in Ontario. Am J Alternative Agr 14, 122-128.	
742	Richert RM, Cicconi KM, Gamroth MJ et al. (2013) Risk factors for clinical mastitis, ketosis, and pneumonia in dairy cattle on organic and small conventional farms in the United States. J Dairy Sci 96, 4269-4285.	
743	Roesch M, G Doherr M, Scharen W et al. (2007) Subclinical mastitis in dairy cows in Swiss organic and conventional production systems. J Dairy Res 74, 86-92.	
744	Rozzi P, Miglior F & Hand KJ (2007) A total merit selection index for Ontario organic dairy farmers. J Dairy Sci 90, 1584-1593.	
745	Shadbolt N, Kelly T, Horne D et al. (2009) Comparisons between organic & conventional pastoral dairy farming systems: cost of production and profitability. Proceedings of the 17th International Farm Management Congress 13, 671-685.	
746	Sholubi YO, Stonehouse DP & Clark EA (1997) Profile of organic dairy farming in Ontario. Am J Alternative Agr 12, 133-139.	
747	Silva KE, Quinn AK, Morel PCH et al. (2005) A study of mastitis in two small experimental dairy herds managed either organically or conventionally, during one year. Proceedings of the New Zealand Society of Animal Production 65th conference, 148-152.	

ID, Paper unique identification number. *Paper included in standard meta-analysis; †Paper with data on goat, sheep or buffalo milk or dairy products; ‡Paper with data on bovine dairy products.

Table S1 cont. List of papers included in the systematic review and the meta-analysis.

748	Silverlas C & Blanco-Penedo I (2013) Cryptosporidium spp. in calves and cows from organic and conventional dairy herds. Epidemiol Infect 141, 529-539.	
749	Steinwidder A & Guggenberger T (2003) Investigations on feed intake and nutrient supply of dairy cows as well as nutrient balance studies on farms in grassland regions of Austria. Bodenkultur 54, 49-66.	*
750	Werf HMGvd, Kanyarushoki C & Corson MS (2009) An operational method for the evaluation of resource use and environmental impacts of dairy farms by life cycle assessment. J Environ Manage 90, 3643-3652.	*
751	Valle PS, Lien G, Flaten O et al. (2007) Herd health and health management in organic versus conventional dairy herds in Norway. Livest Sci 112, 123-132.	*
752	Thatcher A, Petrovski K, Holmes C et al. (2008) A longitudinal study of mastitis on an experimental farm with two herds, one managed organically, the other conventionally. Proceedings of the 16th IFOAM Organic World Conference in Cooperation with the International Federation of Organic Agriculture Movements (IFOAM) and the Consorzio ModenaBio. Cultivating the future based on science. Volume 2: Livestock, socio-economy and cross disciplinary research in organic agriculture. Proceedings of the Second Scientific Conference of the International Society of Organic Agriculture Research (ISOFAR). 70-73.	
753	Stiglbauer KE, Cicconi-Hogan KM, Richert R et al. (2013) Assessment of herd management on organic and conventional dairy farms in the United States. J Dairy Sci 96, 1290-1300.	
754	Svensson C, Hessle A & Höglund J (2000) Parasite control methods in organic and conventional dairy herds in Sweden. Livest Prod Sci 66, 57-69.	*
755	Thomassen MA, van Calker KJ, Smits MCJ et al. (2008) Life cycle assessment of conventional and organic milk production in the Netherlands. Agric Sys 96, 95-107.	*

ID, Paper unique identification number. *Paper included in standard meta-analysis; †Paper with data on goat, sheep or buffalo milk or dairy products; ‡Paper with data on bovine dairy products.

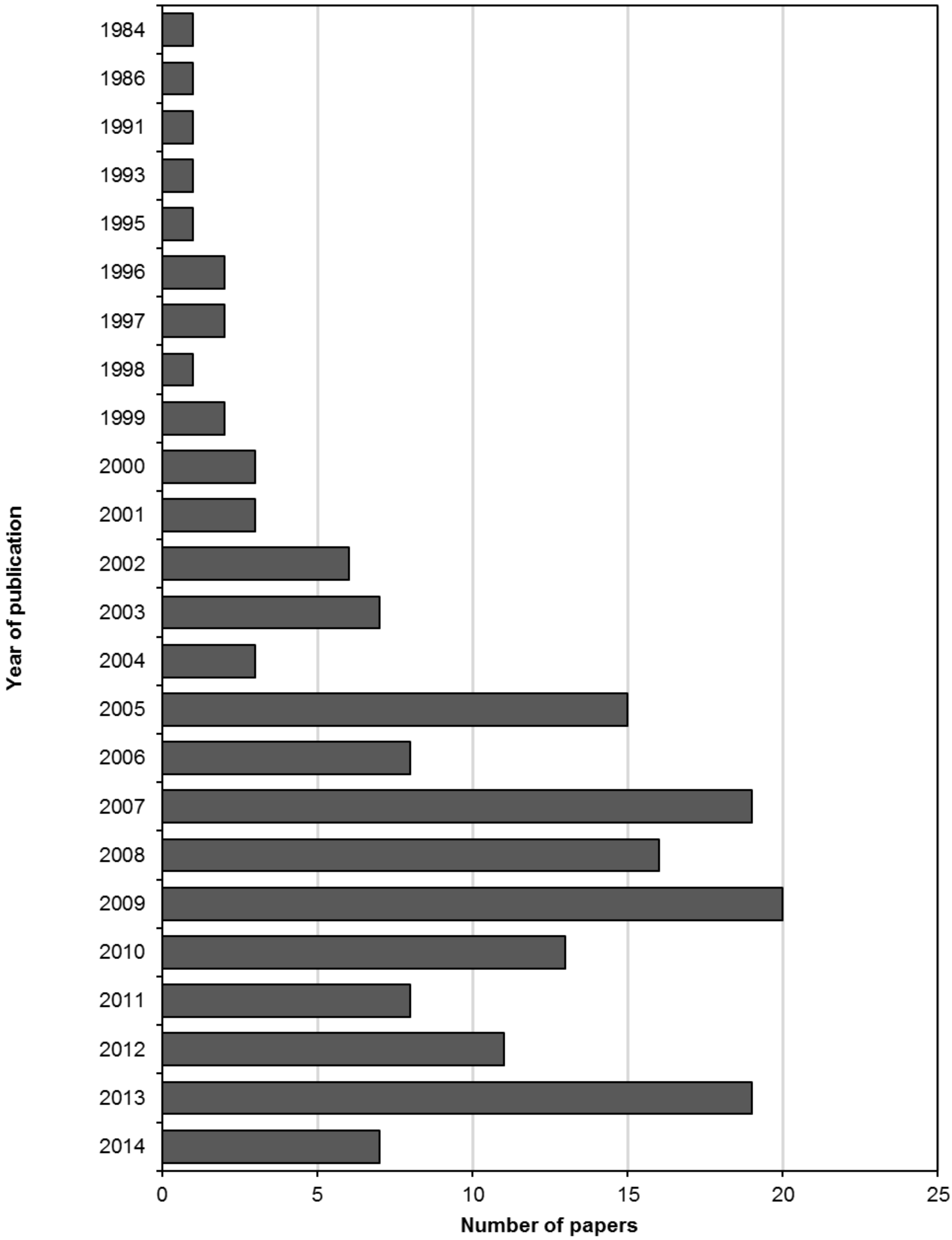


Figure S1. Number of papers included in the systematic review and the meta-analysis by year of publication.

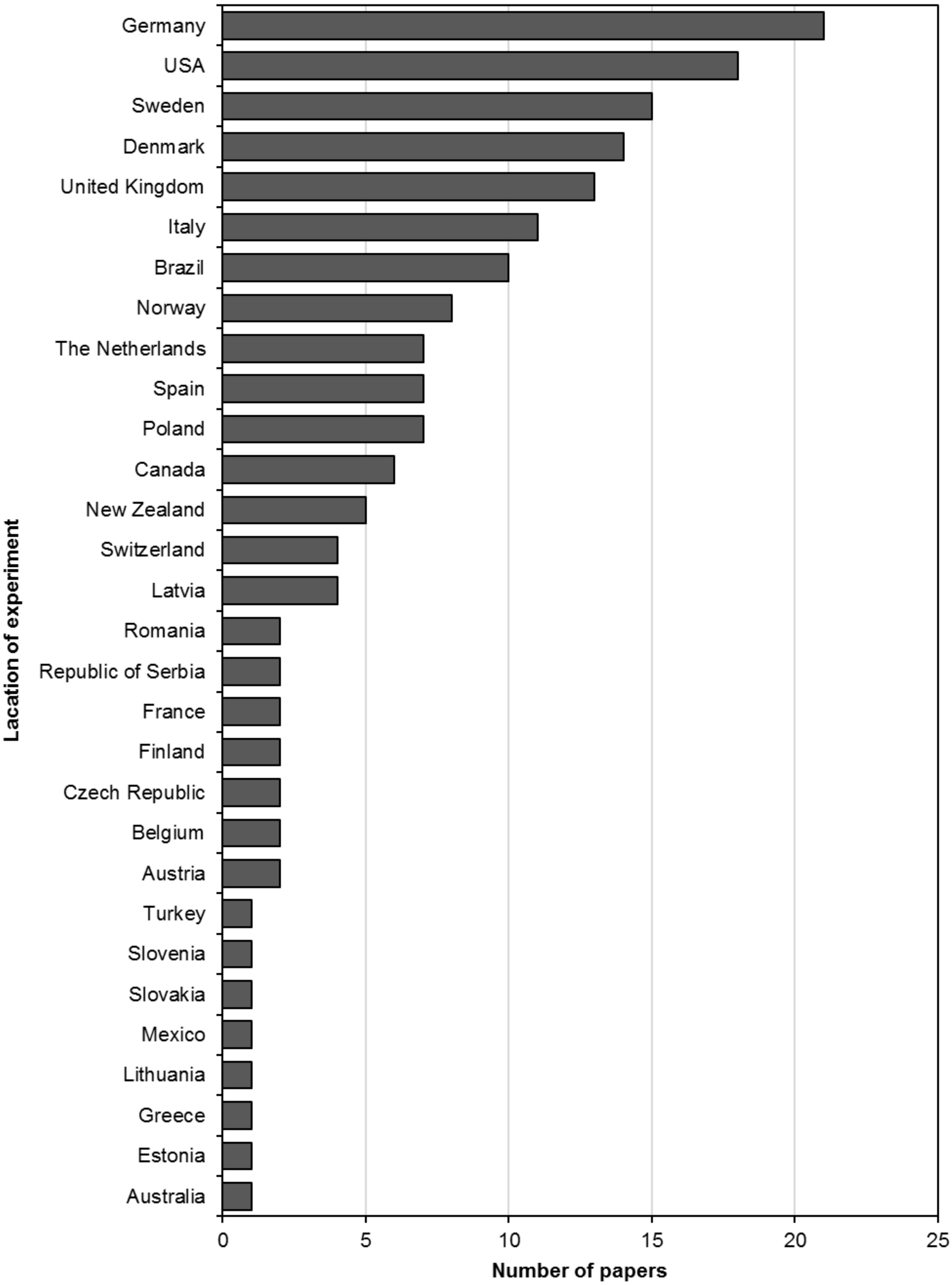


Figure S2. Number of papers included in the systematic review and the meta-analysis by location of the experiment (country).

Table S2. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
69	CF	Australia	milk	cow
125	BS	Italy	milk	cow
153	BS	Germany	milk	cow
155	BS	Italy	milk	cow
			cheese (crescenza, fontina, mozzarella, parmigiano, ricotta)*	cow
			butter*	cow
			dairy products (milk, butter, cheeses)*	cow
	CF	Italy	milk	buffalo*
			cheese (mozzarella)	buffalo*
157	CF	United Kingdom	milk	cow
158	CF	United Kingdom	milk	cow
160	CF	Switzerland	milk	cow
161	CF	United Kingdom	milk	cow
162	CF	United Kingdom	milk	cow
169	CF	Denmark	milk	cow
174	BS	Finland	milk	cow
176	CF	Germany	milk	cow
178	CF	Germany	milk	cow
190	BS	Italy	curd*	cow
			cheese*	cow
			milk	cow
191	CF	Brazil	milk	cow
192	CF	Denmark	milk	cow
194	CF	Sweden	milk	cow
196	BS	USA	milk	cow
205	CF	Switzerland	milk	cow
207	CF	Germany	milk	cow
216	CF	Sweden	milk	cow
217	BS	Germany	cheese (crescenza, fontina, mozzarella, parmigiano, ricotta)*	cow
229	CF	France	milk	cow
235	CF	Italy	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
257	CF	Latvia	milk	cow
266	CF	Denmark	milk	cow
293	BS	Germany	milk	cow
309	CF	The Netherlands	milk	cow
322	CF	Italy	milk	cow
		Slovenia	milk	cow
329	CF	Brazil	milk	cow
350	BS	Germany	milk	cow
	CF	Germany	milk	cow
352	CF	The Netherlands	milk	cow
353	CF	The Netherlands	milk	cow
356	CF	Switzerland	milk	cow
366	BS	USA	milk	cow
367	CF	Germany	milk	cow
369	BS	United Kingdom	milk	cow
383	EX	Germany	milk	cow
	BS	Germany	cheese (crescenza, fontina, mozzarella, parmigiano, ricotta)*	cow
			milk	cow
384	EX	Germany	milk	cow
385	CF	Greece	milk	sheep*
			milk	goat*
386	EX	Italy	milk	goat*
387	CF	United Kingdom	milk	cow
	BS	United Kingdom	milk	cow
388	CF	United Kingdom	milk	cow
392	BS	Denmark	milk	cow
393	CF	Latvia	milk	cow
394	CF	Norway	milk	cow
395	CF	Norway	milk	cow
396	CF	Canada	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
398	CF	Denmark	milk	cow
399	CF	Denmark	milk	cow
401	CF	United Kingdom	milk	cow
402	BS	Germany	milk	cow
403	EX	Germany	milk	cow
			cheese*	cow
404	BS	Germany	milk	cow
405	CF	Italy	milk	cow
406	CF	Italy	cheese (latteria)*	cow
			milk	cow
408	CF	The Netherlands	milk	cow
409	CF	Germany	milk	cow
410	BS	Germany	milk	cow
412	EX	Sweden	milk	cow
413	CF	Canada	milk	cow
414	CF	United Kingdom	milk	cow
418	CF	Lithuania	milk	cow
419	CF	Italy	milk	cow
		Sweden	milk	cow
420	CF	Sweden	milk	cow
455	BS	Brazil	milk	cow
			fermented milk*	cow
			yoghurt*	cow
456	BS	Spain	milk	sheep*
457	CF	Republic of Serbia	milk	cow
458	EX	Austria	milk	cow
461	BS	Brazil	milk	cow
464	CF	Poland	milk	cow
465	EX	Sweden	milk	cow
467	CF	Sweden	milk	cow
472	EX	Poland	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
474	CF	Italy	milk	buffalo*
481	CF	Italy	milk	cow
487	EX	Spain	milk	goat*
547	CF	Romania	milk	sheep*
551	CF	Sweden	milk	cow
552	CF	United Kingdom	milk	cow
553	CF	USA	milk	cow
554	CF	USA	milk	cow
555	CF	USA	milk	cow
556	BS	Italy	cheese (fontina)*	cow
			milk	cow
576	CF	Sweden	milk	cow
577	CF	Republic of Serbia	milk	cow
588	CF	Poland	milk	cow
589	BS	Belgium	milk	cow
590	CF	Estonia	milk	cow
591	BS	Brazil	milk	cow
			fermented milk*	cow
			yoghurt*	cow
592	BS/CF	Italy	milk	cow
593	BS	United Kingdom	milk	cow
594	BS	Spain	milk	cow
595	BS	Brazil	milk	cow
			yoghurt*	cow
596	CF	Norway	milk	cow
597	CF	Romania	milk	cow
598	BS/CF	USA	milk	cow
599	CF	Sweden	milk	cow
600	CF	Poland	milk	cow
601	CF	Germany	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
602	BS	Germany	milk	cow
616	EX	Italy	milk	sheep*
617	BS	Italy	yoghurt	goat*
618	CF	Poland	milk	cow
626	BS	USA	milk	cow
627	CF	The Netherlands	milk	cow
628	BS	Spain, United Kingdom	milk	cow
			milk	goat*
	CF	Spain	milk	goat*
629	CF	USA	milk	cow
630	CF	USA	milk	cow
631	CF	Brazil	milk	goat*
663	EX	Norway	milk	cow
664	CF	Norway	milk	cow
665	BS	Spain	cheese*	cow
666	BS	Italy	butter*	cow
667	CF	Italy	milk	sheep*
668	BS	Switzerland	cheese (emmentaler)*	cow
669	CF	Denmark	desalted milk*	cow
			whey*	cow
670	CF	Greece	milk	goat and sheep*
671	CF	Finland	milk	cow
672	CF	USA	milk	cow
673	BS	USA	milk	cow
674	BS	Canada	cheese (cheddar)*	cow
			cheese (feta)*	cow
			cheese (gouda)*	cow
			cheese (feta)	not specified*
			cheese (mozzarella)	not specified*
675	CF	Spain	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
676	BS	Greece	milk	cow
678	BS	Germany	butter*	cow
679	BS	Poland	milk	cow
680	BS	Turkey	milk	cow
681	CF	Czech Republic	milk	cow
682	CF	Slovenia	milk	sheep*
683	CF	Slovenia	milk	goat*
684	CF	Brazil	milk	cow
686	CF	Italy	milk	buffalo*
687	CF	Latvia	milk	goat*
688	CF	Slovenia	milk	sheep*
689	CF	Czech Republic	milk	cow
690	CF	Mexico	milk	cow
692	CF	Germany	milk	cow
693	CF	Latvia	milk	cow
694	CF	Latvia	milk	cow
695	BS	Spain	milk	cow
696	BS	Germany	milk	cow
697	BS	Germany	cheese*	cow
	EX	Germany	milk	cow
698	CF	Romania	milk	cow
			milk	sheep*
699	EX	Spain	milk	cow
700	BS	Brazil	milk	cow
702	EX	United Kingdom	milk	cow
703	BS	Denmark	milk	cow
704	EX	Sweden	milk	cow
705	BS	Brazil	milk	cow
			fermented milk*	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
706	BS	Spain	milk	cow
707	BS	Spain	milk	cow
708	EX	New Zealand	milk	cow
709	BS	Romania	cheese*	sheep*
710	BS	Germany	butter*	cow
			cream*	cow
712	BS	Poland	milk	cow
713	EX	Greece	milk	sheep*
714	CF	Slovakia	milk	cow
715	CF	Denmark	milk	cow
716	CF	The Netherlands	milk	cow
717	CF	Sweden	milk	cow
720	CF	Germany	milk	cow
721	CF	Belgium	milk	cow
722	CF	Germany	milk	cow
723	CF	Canada	milk	cow
724	EX	Norway	milk	cow
725	BS	Denmark	milk	cow
726	CF	USA	milk	cow
727	CF	USA	milk	cow
728	CF	USA	milk	cow
729	CF	Sweden	milk	cow
730	CF	Norway	milk	cow
731	CF	Denmark	milk	cow
732	CF	Brazil	milk	cow
733	CF	Denmark	milk	cow
734	CF	Denmark	milk	cow
735	CF	Denmark	milk	cow
736	CF	USA	milk	cow
737	CF	USA	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S2 cont. Study type, location, product and animal species information for studies included in the systematic review and the meta-analysis.

ID	ST	Location	Product	Animal species
738	EX	New Zealand	milk	cow
739	CF	Denmark	milk	cow
740	CF	Sweden	milk	cow
741	CF	Canada	milk	cow
742	CF	USA	milk	cow
743	CF	Switzerland	milk	cow
744	CF	Canada	milk	cow
745	EX	New Zealand	milk	cow
746	CF	Canada	milk	cow
747	EX	New Zealand	milk	cow
748	CF	Sweden	milk	cow
749	CF	Austria	milk	cow
750	CF	France	milk	cow
751	CF	Norway	milk	cow
752	EX	New Zealand	milk	cow
753	CF	USA	milk	cow
754	CF	Sweden	milk	cow
755	CF	The Netherlands	milk	cow

ID, Paper unique identification number (see Table S1 for references); ST, Study type (CF – Comparison of Farms, BS – Basket Study, EX – Controlled Experiment). *Data for products other than milk and animals other than cow was described in the main paper and summarised in Figure S35, Table S14 and S15.

Table S3. Production systems information for studies with more than two systems included in the meta-analysis.

ID	Location	SI	Production system as described by authors	Additional comparisons used in the sensitivity analyses 3 to 6*
157	United Kingdom	1	organic (low-input)†	1 and 3
		2	conventional (high input, no more than 50% concentrate)†	
		3	non-organic low-input (New Zealand-type)	
158	United Kingdom	1	organic (low-input)†	1 and 3
		2	conventional (high input, no more than 50% concentrate)†	
		3	non-organic low-input (New Zealand-type)	
176	Germany	1	organic†	1 and 3
		2	conventional (pasture)†	
		3	conventional (indoor)	
178	Germany	1	organic†	
		2	conventional†	
		3	conventional (Swiss-type 1)‡	
		4	conventional (Swiss-type 2)‡	
192	Denmark	1	organic†	
		2	conventional†	
		3	conventional (extensive, Danish-type)‡	
196	USA	1	organic (labelled)†	1 and 3
		2	conventional†	
		3	recombinant bovine somatotropin free (rbST-free) milk	

ID, Paper unique identification number (see Table S1 for references); SI, system identifier. *Numbers refer to the SI within the same study; †Used as a standard system in the standard meta-analysis; ‡Results from these treatments were removed from the meta-analysis; §Results from these treatments were averaged and used as a standard system in the meta-analysis.

Table S3 cont. Production systems information for studies with more than two systems included in the meta-analysis.

ID	Location	SI	Production system as described by authors	Additional comparisons used in the sensitivity analyses 3 to 6*
366	USA	1	organic (labelled)†	1 and 3
		2	conventional†	
		3	recombinant bovine somatotropin free (rbST-free) milk	
414	United Kingdom	1	organic (grazing-based, outdoor Apr-Oct)†	1 and 3
		2	conventional (grazing-based, standard milking)†	1 and 4
		3	conventional (grazing-based, robotic milking)	
		4	conventional (indoor, high concentrate)	
464	Poland	1	organic (certified)†	1 and 3
		2	conventional (modern intensive)†	
		3	conventional (extensive)	
601	Germany	1	organic (biodynamic, high-input)†	1 and 4
		2	conventional (high-input)†	2 and 3
		3	organic (biodynamic, low-input)	3 and 4
		4	conventional (low-input)	
627	The Netherlands	1	organic (biodynamic, continuous grazing)†	1 and 3
		2	conventional (daytime grazing)†	1 and 4
		3	conventional (no fresh grass)	1 and 5
		4	conventional (indoor with cut fresh grass)	
		5	conventional (continuous grazing)	

ID, Paper unique identification number (see Table S1 for references); SI, system identifier. *Numbers refer to the SI within the same study; †Used as a standard system in the standard meta-analysis; ‡Results from these treatments were removed from the meta-analysis; §Results from these treatments were averaged and used as a standard system in the meta-analysis.

Table S3 cont. Production systems information for studies with more than two systems included in the meta-analysis.

ID	Location	SI	Production system as described by authors	Additional comparisons used in the sensitivity analyses 3 to 6*
629	USA	1	organic†	1 and 3
		2	conventional (no grazing)†	
		3	conventional (grazing)	
630	USA	1	organic†	1 and 3
		2	conventional (no grazing)†	
		3	conventional (grazing)	
663	Norway	1	organic (short-term grassland with timothy and red clover)†	1 and 4
		2	conventional (ley with timothy)†	2 and 3
		3	organic (long-term grassland with a high proportion of unsown species)	3 and 4
		4	conventional (ley with perennial ryegrass)	
664	Norway	1	organic (short-term grassland)†	1 and 4
		2	conventional (short-term grassland)†	2 and 3
		3	organic (long-term grassland)	3 and 4
		4	conventional (long-term grassland)	
692	Germany	1	organic (high-input)†	1 and 4
		2	conventional (high-input)†	2 and 3
		3	organic (low-input)	3 and 4
		4	conventional (low-input)	

ID, Paper unique identification number (see Table S1 for references); SI, system identifier. *Numbers refer to the SI within the same study; †Used as a standard system in the standard meta-analysis; ‡Results from these treatments were removed from the meta-analysis; §Results from these treatments were averaged and used as a standard system in the meta-analysis.

Table S3 cont. Production systems information for studies with more than two systems included in the meta-analysis.

ID	Location	SI	Production system as described by authors	Additional comparisons used in the sensitivity analyses 3 to 6*
723	Canada	1	organic (certified)†	
		2	conventional (global extensive, production less than 4225 L per ha fodder)§	
		3	conventional (global intensive, production more than 8336 L per ha fodder)§	
		4	conventional (extensive dairy, production less than 5719 L per cow)§	
		5	conventional (intensive dairy, production more than 7338 L per cow)§	
		6	conventional (low-input, production less than 257 kg per cow protein concentrate)§	
		7	conventional (high-input, production more than 490 kg per cow protein concentrate)§	
742	USA	1	organic†	1 and 3
		2	conventional (no grazing)†	
		3	conventional (grazing)	
753	USA	1	organic†	1 and 3
		2	conventional (no grazing)†	
		3	conventional (grazing)	

ID, Paper unique identification number (see Table S1 for references); SI, system identifier. *Numbers refer to the SI within the same study; †Used as a standard system in the standard meta-analysis; ‡Results from these treatments were removed from the meta-analysis; §Results from these treatments were averaged and used as a standard system in the meta-analysis.

Table S4. Information extracted from papers and included in the database used for meta-analysis.

Information about the paper	Paper ID, authors, publication year, title, journal/publisher, type of paper (journal article, conference proceedings, conference paper, report, book chapter, thesis), corresponding author, language of publication, information about peer-review, source of paper (electronic databases, contact with authors, reference list of reviews and original publications).
Study characteristics	Study type (CF, comparison of farms; BS, basket study; EX, controlled experiment), product, species, breed, production system description, experimental year(s), location of the study by country*.
Data	Name of the compositional parameter, number of replicates, mean, standard error (SE), standard deviation (SD), measurement unit, data type (numeric, graphical).

*Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*)

Table S5. Summary of inclusion criteria used in the standard and the sensitivity analyses carried out. Results of the sensitivity analyses 2-8 are shown in the Appendix on the Newcastle University website (*http://research.ncl.ac.uk/nefg/QOF*)

Analysis	**Data available**		**Experimental years**		**Production systems compared**		**20% of studies with the least precise treatment effects excluded**
	Only papers reporting N, mean, SD/SE	All papers reporting means	One data point from one paper*	Individual year as separate data points†	Standard organic with standard conventional‡	Each organic with each conventional	
Standard§							
WM	+		+		+		
Sensitivity‖							
1 (UM)§		+	+		+		
2 (WM)	+			+	+		
3 (UM)		+		+	+		
4 (WM)	+		+			+	
5 (UM)		+	+			+	
6 (WM)	+			+		+	
7 (UM)		+		+		+	
8 (WM)	+		+		+		+

*If data from more than one experimental years were presented separately in the paper, average was calculated and included in the meta-analysis; †If data from more than one experimental years were presented separately in the paper, they were analysed separately, as individual data points; ‡A pragmatic choice was made to compare standard organic with a standard conventional comparator; §Results of the standard meta-analysis and sensitivity analysis 1 are presented in the main paper; ||Sensitivity analysis was conducted to explore the robustness of the arbitrary decisions and to illustrate all effects (see Supplementary Table S3 for details and Appendix Table A1 and A2 for results). WM, weighted meta-analysis; UM, unweighted meta-analysis.

Table S6. List of composition parameters included in the meta-analysis.*

Category	Parameters
Major components	Ash, Casein, Fat, Lactose, Protein, Protein (whey), Solids, Solids (no-fat), α-lactalbumin, β-lactoglobulin
Fatty acids	18:1, 18:2, 18:3, 18:4, 10:0 (capric acid), 10:1 (4-cis-decenoic acid), 12:0 (lauric acid), 12:0+14:0+16:0†, 12:1 (lauroleic acid), 13:0 (tridecylic acid), 14:0 (myristic acid), 14:1 (myristoleic acid), 15:0 (pentadecanoic acid), 16:0 (palmitic acid), 16:1 (palmitoleic acid), 17:0 (heptadecanoic acid), 17:1 (heptadecenoic acid), 18:0 (stearic acid), 20:0 (arachidic acid), 22:0 (behenic acid), 24:0 (lignoceric acid), 4:0 (butyric acid), 6:0 (caproic acid), 8:0 (caprylic acid), AA (cis-5,8,11,14-20:4), ALA (cis-9,12,15-18:3), cis-11,14-20:2, cis-11-18:1 (cis-vaccenic acid), cis-11-20:1 (eicosenoic acid), cis-12-18:1, cis-13-18:1, cis-9-20:1, CLA9 (cis-9-trans-11-18:2), CLA (total), CLA10 (trans-10-cis-12-18:2), CLA (trans-11,13-18:2), CLA (trans-12,14-18:2), CLA (trans-7,9-18:2), CLA (trans-9,11-18:2), DGLA (cis-8-11-14-C20:3), DHA (cis-4,7,10,13,16,19-22:6), DPA (cis-7,10,13,16,19-22:5), EPA (cis-5,8,11,14,17-20:5), ETE (cis-11,14,17-20:3), Free fatty acids, GLA (cis-6,9,12-18:3), LA (cis-9,12-18:2), LA/ALA ratio†, Long chain FA, Medium chain FA, MUFA, n-3 FA, n-3/n-6 ratio, n-6 FA, n-6/n-3 ratio, OA (cis-9-18:1), Phytanic acid diastereomers ratio (SRR/RRR), PUFA, SFA, Short chain FA, trans-12-18:1, trans-18:1, trans-6-8-18:1, trans-9,12-18:2, trans-9-18:1 (elaidic acid), USFA, VA (trans-11-18:1), VLC n-3 PUFA (EPA+DPA+DHA)†
N components	Urea
Vitamins and antioxidants	2R (synthetic) isomers of α-tocopherol, 3R (natural) isomers of α-tocopherol, Carotenoids, Lutein, Vitamin A, Vitamin C, Vitamin D, Vitamin E activity, Zeaxanthin, α-tocopherol, β-carotene
Minerals and undesirable metals	Cadmium (Cd), Calcium (Ca), Cobalt (Co), Copper (Cu), Iodine (I), Iron (Fe), Lead (Pb), Magnesium (Mg), Manganese (Mn), Molybdenum (Mo), Phosphorus (P), Potassium (K), Selenium (Se), Sodium (Na), Zinc (Zn)
Pesticides, mycotoxins and other contaminants	Aflatoxin M1, Dieldrin, Hexachlorobenzene (HCB), α-esachlorciclohexane (α-HCH), γ-esachlorciclohexane (γ-HCH)
Other	Atherogenicity Index, Bacteria count, Dry mass, Lactoferrin, Lysozyme, Milk yield, pH, SCC, Thrombogenicity index, Titratable acidity

*Compounds for which number of comparisons organic vs. conventional was ≥ 3, †Calculated based on published fatty acids composition data.

Table S7. List of composition parameters excluded from the meta-analysis.*

Category	Parameters
Major components	Butterfat, Protein (crude), Protein (true), Solids (other), Water, α-casein, β-casein, β-lactoglobulin A (βLgA), β-lactoglobulin B (βLgB), κ-casein
Fatty acids	9:0, 11:0, 15:1, 19:0, 20:1, 20:3, 21:0, 22:1, 22:2, 18:2 ttNMID, 23:0 (cerotic acid), 3R,7R,11R,15-phytanic acid (RRR), 3R,7R,11R,15-phytanic acid (RRR), 3S,7R,11R,15-phytanic acid (SRR) (% total phytanic acid isomers), 5:0 (valeric acid), 6:0+15:1+17:0+cis-9,12,15-18:3, 7:0 (enanthic acid), ALA+CLA, ALA+GLA, Anteiso-12:0, Anteiso-13:0, Anteiso-14:0, Anteiso-15:0, Anteiso-16:0, Anteiso-17:0, Branched 15:0, Branched 17:0, Branched chain FA (total), Cis fatty acids, cis-11-22:1, cis-12:1+13:0, cis-13,16-22:2, cis-13-22:1, cis-14:1, cis-14-18:1+trans-16-18:1, cis-15-18:1, cis-15-24:1, cis-4,7,10,13,16-22:5 (total), cis-5-20:1, cis-7-10-18:1, cis-7-14:1, cis-7-16:1, cis-9,15-18:2, cis-9-16:1, cis-9-17:1 (margaroleic acid), cis-9-20:1, cis-9-trans-12-18:2, cis-9-trans12-18:2+cis-cis-MID+trans-8-cis-13-18:2, cis-9-trans-13-18:2+trans-8-cis-12-18:2, CLA (cis/trans-12,14-18:2), CLA (cis-10-trans-12/trans-10-cis-12-18:2), CLA (cis-11-trans-13/trans-11-cis-13-18:2), CLA (cis-11-trans-13-18:2), CLA (cis-18:2), CLA (cis-7-trans-9/trans-7-cis-9-18:2), CLA (cis-9-trans-11/trans-9-cis-11-18:2), CLA (cis-9-trans-11-18:2) + (trans-8-cis-10-18:2) + (trans-7-cis-9-18:2), CLA (cis-9-trans-11-18:2) + (trans-9-cis-11-18:2), CLA (cis-trans/trans-cis-18:2), CLA (trans-8,10-18:2), CLA (trans-10,12-18:2), CLA (trans-11-cis-13-18:2), CLA (trans-11-cis-13-18:2) / (trans-7-cis-9-18:2) ratio, CLA (trans-11-cis-13-18:2) + (cis-9,11-18:2), CLA (trans-6,8-18:2), CLA (trans-7-cis-9-18:2), CLA (trans-8-cis-10-18:2), CLA (trans-trans-18:2), CLA/LA ratio, DTA (cis-7,10,13,16-22:4), Fatty acids (total), Functional Fatty Acid, Furan fatty acid DiMeF(11,5), Furan fatty acid DiMeF(9,5), Furan fatty acid MeF(11,5), Furan fatty acid MeF(7,5), Furan fatty acid MeF(9,5), Furan fatty acids, Iso-12:0, Iso-13:0, Iso-14:0, Iso-15:0, Iso-16:0, Iso-17:0, LA/ALA ratio, Long chain n-3 FA, n-6/(n-3+CLA) ratio, Pristanic acid, Serum albumin, SFA/USFA ratio, Trans FA, Trans fatty acids without CLA, trans-10-18:1, trans-10-18:1+trans-11-18:1, trans-11-cis-15-18:2+trans-9-cis-12-18:2, trans-13-14-18:1+cis-6-8-18:1, trans-13-18:1, trans-14:1, trans-15-18:1, trans-16:1, trans-16-18:1, trans-17:1, trans-18:2 (trans-octadecadienoic acid), trans-20:1, trans-4-18:1, trans-5-18:1, trans-7-16:1, trans-9,12-18:2+cis-16-18:1, trans-9-14:1, trans-9-cis-12-18:2, Triglycerides
N components	Alanine, Ammonia, Arginine, Aspartic acid, Cysteine, Glutamine, Glycine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Nitrate, Nitrite, Nitrogen, Nitrogen (non-protein), Nitrogen (non-protein), Phenylalanine, Proline, Protein N (% total N), Serine, TCA-soluble nitrogen, Threonine, Tyrosine, Valine, Val-Pro-Pro (VPP) peptide, VPP + IPP peptides
Vitamins and antioxidants	Antioxidant Capacity (Trolox equivalent), Biochanin (isoflavone), Butylated hydroxytoluene (BHT) (synthetic antioxidant), Butylated hydroxytoluene (BHT) (synthetic antioxidant), Canthaxanthin, Citric acid, Coumestrol (coumestans), Daidzein, Enterodiol, Enterolactone, Formononetin, Genistein, Hippuric acid, Matairesinol, Prunetin, Riboflavin, Secoisolariciresinol, Total antioxidant status (TAS), Vitamin B1, Vitamin K, α-carotene, β-carotene isomers, β-cryptoxanthin
Minerals and undesirable metals	Aluminium (Al), Arsenic (As), Barium (Ba), Bismuth (Bi), Boron (B), Chromium (Cr), Europium (Eu), Germanium (Ge), Lithium (Li), Mercury (Hg), Minerals (total), Neodymium (Nd), Nickel (Ni), Rhenium (Re), Rhodium (Rh), Silicon (Si), Strontium (Sr), Sulfur (S), Tin (Sn), Vanadium (V)

*Compounds for which number of comparisons organic vs. conventional was < 3.

Table S7 cont. List of composition parameters excluded from the meta-analysis.*

Category	Parameters
Pesticides, mycotoxins and other contaminants	1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,4,7,8-HxCDD, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDD, 1,2,3,7,8,9-HxCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF, 2,3,4,6,7,8-HxCDF, 2,3,4,7,8-PeCDF, 2,3,7,8-TCDD, 2,3,7,8-TCDF, Aflatoxin, Aldrin, Chlordanes, Cis-clordane, Cis-clordane, Cyclodienes, DDE, DDT, Dioxin-like-polychlorinated biphenyls, Dioxins, Dioxins + furans, Endosulfans, Endrin, Eptachlor, Esachlorciclohexane (HCH), Furans, H-epoxide, Heptachlor, Marker-polychlorinated biphenyls, Methoxychlor, Mirex, Non-ortho polychlorinated biphenyls (Non-ortho-PCB), o,p'DDD, o,p'DDE, o,p'DDT, Ochratoxin A, Octaclorostyrene, Organochlorine pesticides, Ortho polychlorinated biphenyls (Ortho-PCB), Ossiclordane, p,p'DDD, p,p'DDE, p,p'DDT, Pesticide residues, Polybrominated diphenyl ethers (PBDE), Polychlorinated biphenyl 101 (PCB 101), Polychlorinated biphenyl 105 (PCB 105), Polychlorinated biphenyl 114 (PCB 114), Polychlorinated biphenyl 118 (PCB 118), Polychlorinated biphenyl 123 (PCB 123), Polychlorinated biphenyl 126 (PCB 126), Polychlorinated biphenyl 138 (PCB 138), Polychlorinated biphenyl 153 (PCB 153), Polychlorinated biphenyl 156 (PCB 156), Polychlorinated biphenyl 157 (PCB 157), Polychlorinated biphenyl 167 (PCB 167), Polychlorinated biphenyl 169 (PCB 169), Polychlorinated biphenyl 180 (PCB 180), Polychlorinated biphenyl 189 (PCB 189), Polychlorinated biphenyl 28 (PCB 28), Polychlorinated biphenyl 52 (PCB 52), Polychlorinated biphenyl 77 (PCB 77), Polychlorinated biphenyl 81 (PCB 81), Polychlorinated biphenyls (PCB), Polychlorinated Biphenyls toxicity equivalents (TEQ-PCB), Quintozene, Trans-clordane, Trans-clordene, Trans-nonachlor, WHO-Toxic Equivalents (TEQ), α+β-esachlorciclohexane (α+β-HCH), α-endosulfan, β-endosulfan, β-esachlorciclohexane (β-HCH), Δ-esachlorciclohexane (Δ-HCH)
Volatile compounds	Acetone, Ether extract
Other	Acidity, Alcohol stability, Bovine serum albumin (BSA), Bovine somatotropin, Coliforms bacteria, Equol, Estradiol, Estrone (E1), Hypocholesterolemic/ hypercholesterolemic FA ratio, Ile-Pro-Pro (IPP) peptide, Immunoglobulin A (IgA), Immunoglobulin G (IgG), Immunoglobulin M (IgM), Insulin-like growth factor-1 (IGF-1), Lactate, Lactic acid, Lactoperoxidase, Lymphocyte stimulation index (in vitro), Plate loop count, Progesterone, Sodium chloride (NaCl), Spontaneous lymphocyte activity (in vitro), Stable carbon isotope 13C, Δ-9 desaturase 14:1/14:0 activity index, Δ-9 desaturase 16:1/16:0 activity index, Δ-9 desaturase 18:1/18:0 activity index, Δ-9 desaturase CLA (cis-9-trans-11-18:2) / VA activity index

*Compounds for which number of comparisons organic vs. conventional was < 3.

2. ADDITIONAL RESULTS

Table S8. Basic information/statistics on the publications/data used for meta-analyses of composition parameters included in Fig. 2 and 3 in the main paper.

					Number of comparisons reporting that concentrations were					
			Total sample size*		Numerically higher in		Identical	Significantly higher in		Not significantly different§
Parameter	Studies	*n*	ORG	CONV	ORG	CONV		ORG†	CONV‡	
Milk yield	81	81	4237	23587	8	73	0	2	29	9
SFA	32	33	390	384	16	17	0	3	3	16
12:0 (lauric acid)	17	17	260	250	8	9	0	7	3	4
14:0 (myristic acid)	18	18	265	255	11	7	0	7	2	6
16:0 (palmitic acid)	20	20	279	269	7	13	0	4	6	7
MUFA	30	31	365	360	13	18	0	2	9	10
OA (cis-9-18:1)	16	16	252	242	8	8	0	3	4	6
VA (trans-11-18:1)	18	18	219	266	18	0	0	9	0	4
PUFA	29	30	595	581	25	4	1	11	1	9
CLA (total)	18	19	159	141	17	2	0	4	0	6
CLA9 (cis-9-trans-11-18:2)	20	20	557	590	19	1	0	7	0	5
CLA10 (trans-10-cis-12-18:2)	7	7	109	120	4	0	2	1	0	4
n-3 FA	19	20	289	281	20	0	0	13	0	1
ALA (cis-9,12,15-18:3)	33	34	678	698	34	0	0	17	0	3
EPA (cis-5,8,11,14,17-20:5)	13	14	287	281	13	0	1	9	0	2
DPA (cis-7,10,13,16,19-22:5)	8	8	198	192	8	0	0	6	0	2
DHA (cis-4,7,10,13,16,19-22:6)	6	6	187	181	4	0	2	2	0	3
VLC n-3 PUFA‖	5	5	175	169	5	0	0	0	0	0

n, numbers of data points (comparisons) included in the meta-analysis; ORG, organic samples; CONV, conventional samples; SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; OA, oleic acid; VA, vaccenic acid; PUFA, polyunsaturated fatty acids; FA, fatty acids; CLA, conjugated linoleic acid; ALA, α-linolenic acid; EPA, eicosapentaenoic acid; DPA, docosapentaenoic acid; DHA, docosahexaenoic acid; VLC n-3 PUFA, very long chain n-3 PUFA (EPA+DPA+DHA). *Total number of samples analysed in different publications; †The number of comparisons in which statistically significant difference was found with higher level in ORG; ‡The number of comparisons in which statistically significant difference was found with higher level in CONV; §The number of comparisons in which there was no significant difference between ORG and CONV; ‖Calculated based on published fatty acids composition data.

Table S8 cont. Basic information/statistics on the publications/data used for meta-analyses of composition parameters included in Fig. 2 and 3 in the main paper.

					Number of comparisons reporting that concentrations were					
			Total sample size*		Numerically higher in		Identical	Significantly higher in		Not significantly different§
Parameter	**Studies**	***n***	**ORG**	**CONV**	**ORG**	**CONV**		**ORG†**	**CONV‡**	
n-6 FA	19	20	545	526	8	11	1	3	4	5
LA (cis-9,12-18:2)	22	22	311	323	7	15	0	4	7	6
AA (cis-5,8,11,14-20:4)	9	9	194	188	0	7	2	0	6	3
LA/ALA ratio‖	19	19	269	285	0	19	0	0	0	0
n-6/n-3 ratio	22	23	308	304	0	23	0	0	9	3
n-3/n-6 ratio	23	24	310	307	23	1	0	9	0	0
α-tocopherol	16	17	123	147	12	4	1	3	0	4
Carotenoids	4	5	38	60	2	3	0	1	0	2
β-carotene	13	14	129	159	8	5	1	3	1	4
Lutein	5	6	38	60	5	1	0	2	0	2
Zeaxanthin	5	6	38	60	5	1	0	3	1	0
Iodine (I)	7	7	194	172	0	7	0	0	4	1
Iron (Fe)	9	9	85	67	6	3	0	2	0	2
Selenium (Se)	8	8	100	85	2	6	0	0	1	2
Urea	11	11	208	217	4	7	0	0	2	6
SCC	47	47	3012	18429	32	15	0	4	3	18

n, numbers of data points (comparisons) included in the meta-analysis; ORG, organic samples; CONV, conventional samples; FA, fatty acids; LA, linoleic acid; AA, arachidonic acid; ALA, α-linolenic acid; SCC, somatic cell count. *The number of comparisons in which statistically significant difference was found with higher level in ORG; †The number of comparisons in which statistically significant difference was found with higher level in CONV; ‡The number of comparisons in which there was no significant difference between ORG and CONV; §Calculated based on published fatty acids composition data.

Table S9. Mean percentage differences (MPD) and confidence intervals (CI) calculated using the data included in standard meta-analyses and sensitivity analysis 1 of composition parameters shown in Fig. 2 and 3 of the main paper (MPDs are also shown as symbols in Fig. 2).

	Standard meta-analysis			Sensitivity analysis 1		
Parameter	***n***	**MPD***	**95% CI**	***n***	**MPD***	**95% CI**
Milk yield	32	-22.49	-30.47, -14.52	81	-19.57	-23.62, -15.52
SFA	19	-0.69	-2.24, 0.86	33	-0.80	-1.96, 0.37
12:0 (lauric acid)	11	-3.59	-10.22, 3.03	17	-1.98	-8.12, 4.16
14:0 (myristic acid)	12	1.02	-2.60, 4.63	18	1.57	-1.60, 4.74
16:0 (palmitic acid)	14	-4.65	-8.45, -0.85	20	-3.74	-6.81, -0.67
MUFA	19	1.20	-3.13, 5.53	31	-0.15	-3.34, 3.04
OA (cis-9-18:1)	10	2.78	-3.32, 8.88	16	1.41	-3.29, 6.10
VA (trans-11-18:1)	12	65.91	19.70, 112.12	18	58.07	27.01, 89.12
PUFA	19	7.30	-0.73, 15.34	30	14.78	7.05, 22.51
CLA (total)	11	41.13	14.19, 68.08	19	47.47	20.78, 74.16
CLA9 (cis-9-trans-11-18:2)	14	23.89	8.39, 39.39	20	34.36	17.93, 50.80
CLA10 (trans-10-cis-12-18:2)	3	28.24	-20.92, 77.40	7	34.96	2.94, 66.98
n-3 FA	12	55.67	37.68, 73.66	20	60.14	45.07, 75.20
ALA (cis-9,12,15-18:3)	21	68.62	53.04, 84.20	34	78.66	66.04, 91.29
EPA (cis-5,8,11,14,17-20:5)	8	67.14	32.35, 101.94	14	66.34	39.86, 92.82
DPA (cis-7,10,13,16,19-22:5)	5	44.83	18.23, 71.44	8	38.23	20.57, 55.89
DHA (cis-4,7,10,13,16,19-22:6)	3	21.48	-3.71, 46.67	6	194.07	-89.14, 477.29
VLC n-3 PUFA†	-	-	-	5	57.16	27.25, 87.07

n, number of data points included in the comparison; MPD, mean percentage difference; SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; OA, oleic acid; VA, vaccenic acid; PUFA, polyunsaturated fatty acids; FA, fatty acids; CLA, conjugated linoleic acid; ALA, α-linolenic acid; EPA, eicosapentaenoic acid; DPA, docosapentaenoic acid; DHA, docosahexaenoic acid; VLC n-3 PUFA, very long chain n-3 PUFA (EPA+DPA+DHA). *Magnitude of difference between organic (ORG) and conventional (CONV) samples (value <0 indicate higher concentration in CONV, value >0 indicate higher concentration in ORG); †Calculated based on published fatty acids composition data.

Table S9 cont. Mean percentage differences (MPD) and confidence intervals (CI) calculated using the data included in standard meta-analyses and sensitivity analysis 1 of composition parameters shown in Fig. 2 and 3 of the main paper (MPDs are also shown as symbols in Fig. 2).

	Standard meta-analysis			Sensitivity analysis 1		
Parameter	***n***	**MPD***	**95% CI**	***n***	**MPD***	**95% CI**
n-6 FA	12	-4.03	-13.83, 5.76	20	-1.50	-10.62, 7.61
LA (cis-9,12-18:2)	12	-14.40	-29.51, 0.71	22	-4.82	-15.27, 5.64
AA (cis-5,8,11,14-20:4)	5	-24.15	-41.00, -7.30	9	-20.58	-30.83, -10.32
LA/ALA ratio†	-	-	-	19	-93.34	-116.41, -70.28
n-6/n-3 ratio	7	-71.16	-122.01, -20.31	23	-72.07	-92.86, -51.29
n-3/n-6 ratio	5	72.21	36.08, 108.35	24	64.95	44.22, 85.67
α-tocopherol	9	12.98	0.51, 25.45	17	11.68	2.52, 20.84
Carotenoids	5	31.83	-37.01, 100.66	5	31.83	-37.01, 100.66
β-carotene	7	0.64	-14.55, 15.82	14	27.79	-2.40, 57.97
Lutein	3	12.71	-46.12, 71.54	6	104.08	-33.66, 241.82
Zeaxanthin	-	-	-	6	38.99	1.43, 76.55
Iodine (I)	6	-73.85	-115.19, -32.5	7	-73.08	-108.05, -38.10
Iron (Fe)	8	20.18	-0.10, 40.46	9	16.59	-2.63, 35.81
Selenium (Se)	4	-21.42	-48.93, 6.09	8	-28.06	-69.25, 13.13
Urea	7	-9.67	-24.70, 5.36	11	-8.75	-19.64, 2.14
SCC	20	8.19	-12.98, 29.36	47	1.15	-22.52, 24.82

n, number of data points included in the comparison; MPD, mean percentage difference; FA, fatty acids; LA, linoleic acid; AA, arachidonic acid; ALA, α-linolenic acid; SCC, somatic cell count. *Magnitude of difference between organic (ORG) and conventional (CONV) samples (value <0 indicate higher concentration in CONV, value >0 indicate higher concentration in ORG); †Calculated based on published fatty acids composition data.

Table S10. Mean values and confidence intervals (CI) calculated using the data for all papers reporting means of composition parameters shown in Fig. 2 and 3 of the main paper.

			Organic		Conventional	
Parameter	**Unit**	***n***	**Mean**	**95% CI**	**Mean**	**95% CI**
Milk yield*	kg/cow/day	51	18.76	17.49, 20.03	22.53	20.99, 24.06
Milk yield*	kg/cow/lactation	16	6451	5976, 6926	7550	6969, 8132
SFA	mg/g FA	32	678.41	665.44, 691.39	683.82	669.78, 697.85
12:0 (lauric acid)	mg/g FA	17	33.32	29.93, 36.70	33.79	30.75, 36.83
14:0 (myristic acid)	mg/g FA	18	113.08	106.61, 119.55	111.23	105.60, 116.85
16:0 (palmitic acid)	mg/g FA	20	304.35	289.80, 318.90	315.14	300.57, 329.71
MUFA	mg/g FA	30	271.96	261.46, 282.46	272.25	262.79, 281.71
OA (cis-9-18:1)	mg/g FA	16	225.00	205.20, 244.80	222.38	202.05, 242.71
VA (trans-11-18:1)	mg/g FA	18	23.82	20.57, 27.08	16.30	14.02, 18.58
PUFA	mg/g FA	29	41.42	37.57, 45.26	36.31	33.48, 39.14
CLA (total)	mg/g FA	18	9.72	8.00, 11.43	6.98	5.55, 8.41
CLA9 (cis-9-trans-11-18:2)	mg/g FA	20	8.66	6.87, 10.46	6.71	5.17, 8.25
CLA10 (trans-10-cis-12-18:2)	mg/g FA	7	0.55	0.16, 0.94	0.38	0.15, 0.62
n-3 FA	mg/g FA	19	10.22	9.04, 11.41	6.69	5.53, 7.84
ALA (cis-9,12,15-18:3)	mg/g FA	33	7.73	7.02, 8.43	4.38	3.96, 4.80
EPA (cis-5,8,11,14,17-20:5)	mg/g FA	13	0.87	0.72, 1.02	0.56	0.45, 0.66
DPA (cis-7,10,13,16,19-22:5)	mg/g FA	8	1.02	0.85, 1.18	0.76	0.59, 0.93
DHA (cis-4,7,10,13,16,19-22:6)	mg/g FA	6	0.29	0.00, 0.58	0.09	0.05, 0.13
VLC n-3 PUFA†	mg/g FA	5	2.10	1.68, 2.52	1.38	1.04, 1.71

n, number of data points included in the comparison; MPD, mean percentage difference; SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; OA, oleic acid; VA, vaccenic acid; PUFA, polyunsaturated fatty acids; FA, fatty acids; CLA, conjugated linoleic acid; ALA, α-linolenic acid; EPA, eicosapentaenoic acid; DPA, docosapentaenoic acid; DHA, docosahexaenoic acid; VLC n-3 PUFA, very long chain n-3 PUFA (EPA+DPA+DHA). *Data for energy-, fat-, protein- corrected milk yield and milk solids yield were removed from calculations; †Calculated based on published fatty acids composition data.

Table S10 cont. Mean values and confidence intervals (CI) calculated using the data for all papers reporting means of composition parameters shown in Fig. 2 and 3 of the main paper.

			Organic		Conventional	
Parameter	**Unit**	***n***	**Mean**	**95% CI**	**Mean**	**95% CI**
n-6 FA	mg/g FA	19	22.45	20.28, 24.61	22.79	20.47, 25.1
LA (cis-9,12-18:2)	mg/g FA	22	19.33	17.93, 20.73	20.63	18.15, 23.1
AA (cis-5,8,11,14-20:4)	mg/g FA	9	1.03	0.88, 1.18	1.24	1.06, 1.41
LA/ALA ratio†	-	19	2.76	1.95, 3.56	4.95	4.02, 5.88
n-6/n-3 ratio	-	22	3.56	1.9, 5.23	5.42	3.42, 7.42
n-3/n-6 ratio	-	23	0.42	0.34, 0.5	0.26	0.2, 0.31
α-tocopherol	µg/g fat	16	21.85	17.55, 26.15	20.13	16, 24.26
Carotenoids	µg/g fat	4	6.70	4.26, 9.15	6.75	2.89, 10.61
β-carotene	µg/g fat	13	5.37	4.3, 6.45	4.78	3.56, 5.99
Lutein	µg/g fat	5	0.56	0.36, 0.76	0.47	0.11, 0.82
Zeaxanthin	µg/g fat	5	0.23	0, 0.47	0.24	-0.08, 0.56
Iodine (I)	µg/L	7	147.32	87.65, 207	247.63	153.04, 342.22
Iron (Fe)	mg/kg	9	1.03	0.38, 1.68	0.98	0.26, 1.71
Selenium (Se)	µg/kg	8	13.84	11.25, 16.42	17.61	10.85, 24.37
Urea*	mg/kg	10	218.97	205.65, 232.3	237.30	210.29, 264.3
SCC	cells/ml $\times 10^3$	47	218.62	177.22, 260.01	211.06	164.87, 257.25

n, number of data points included in the comparison; MPD, mean percentage difference; FA, fatty acids; LA, linoleic acid; AA, arachidonic acid; ALA, α-linolenic acid; SCC, somatic cell count. *One outlying value (1000 times greater than other values) was removed; †Calculated based on published fatty acids composition data.

Table S11. Meta-analysis results for addition composition parameters for which significant differences were detected by the standard meta-analysis or one of the sensitivity analyses (see also Appendix Table A1 and A2 for results).

	Standard meta-analysis							Sensitivity analysis 1				
Parameter	***n***	**SMD**	**95% CI**	***P****	**Heterogen.†**	**MPD‡**	**95% CI**	***n***	**Ln ratio§**	***P****	**MPD‡**	**95% CI**
Fat	31	-0.29	-0.63, 0.05	0.092	Yes (85%)	-1.37	-3.66, 0.91	58	4.60	0.329	-0.45	-2.32, 1.43
Protein	29	-0.17	-0.55, 0.21	0.368	Yes (88%)	-0.24	-1.80, 1.33	56	4.60	0.146	-0.64	-1.84, 0.56
Solids	8	0.64	-0.23, 1.52	0.149	Yes (86%)	1.05	-0.45, 2.55	13	4.62	0.022	1.50	0.11, 2.89
Solids (no-fat)	4	0.24	-0.03, 0.51	0.083	No (0%)	1.37	-0.75, 3.49	7	4.62	0.094	1.08	-0.30, 2.47
Free fatty acids	-	-	-	-	-	-	-	3	4.55	0.247	-5.91	-13.97, 2.15
8:0 (caprylic acid)	9	-0.03	-0.64, 0.59	0.936	Yes (81%)	-1.44	-7.56, 4.68	16	4.64	0.123	3.64	-2.42, 9.70
15:0 (pentadecanoic acid)	8	1.61	-0.39, 3.60	0.115	Yes (98%)	7.15	-0.26, 14.56	13	4.70	0.002	10.24	5.09, 15.39
17:0 (heptadecanoic acid)	9	0.72	-0.45, 1.89	0.226	Yes (95%)	9.71	-2.09, 21.52	11	4.69	0.010	9.87	0.26, 19.48
20:0 (arachidic acid)	4	0.73	-0.76, 2.22	0.336	Yes (96%)	13.64	-2.34, 29.61	9	4.70	0.042	10.72	0.40, 21.05
SRR/RRR	3	-3.27	-6.81, 0.28	0.071	Yes (93%)	-269.48	-552.49, 13.53	4	3.63	0.064	-216.60	-441.96, 8.76
22:0 (behenic acid)	3	1.27	-0.85, 3.39	0.239	Yes (94%)	30.88	-7.82, 69.59	7	4.75	0.158	17.70	-12.19, 47.59
24:0 (lignoceric acid)	-	-	-	-	-	-	-	5	4.78	0.065	20.84	2.57, 39.11

n, number of data points included in the comparison; SMD, standardised mean difference; MPD, mean percentage difference; SRR/RRR, Phytanic acid diastereomers ratio. **P* value <0.05 indicates significance of the difference in composition between organic and conventional milk; †Heterogeneity and the I^2 Statistic; ‡Magnitude of difference between organic (ORG) and conventional (CONV) samples (value <0 indicate higher concentration in CONV, value >0 indicate higher concentration in ORG); §Ln ratio = Ln(ORG/CONV × 100%).

Table S11 cont. Meta-analysis results for addition composition parameters for which significant differences were detected by the standard meta-analysis or one of the sensitivity analyses (see also Appendix Table A1 and A2 for results).

	Standard meta-analysis							Sensitivity analysis 1				
Parameter	***n***	**SMD**	**95% CI**	***P****	**Heterogen.†**	**MPD‡**	**95% CI**	***n***	**Ln ratio§**	***P****	**MPD‡**	**95% CI**
trans-18:1	4	0.39	-0.4, 1.18	0.337	Yes (63%)	50.43	-24.94, 125.80	6	4.94	0.047	49.36	-0.64, 99.37
cis-9-20:1	-	-	-	-	-	-	-	3	4.84	0.247	29.26	-7.76, 66.27
DGLA (cis-8-11-14-C20:3)	-	-	-	-	-	-	-	4	4.40	0.122	-23.89	-40.50, -7.28
GLA (cis-6,9,12-18:3)	4	0.20	-0.19, 0.59	0.311	No (9%)	741.67	-605.31, 2088.65	7	5.29	0.032	430.60	-344.65, 1205.84
18:4	-	-	-	-	-	-	-	3	4.99	0.251	68.89	-59.65, 197.43
2R	-	-	-	-	-	-	-	5	4.27	0.062	-46.38	-86.65, -6.11
3R	-	-	-	-	-	-	-	6	4.81	0.032	24.75	1.59, 47.90
Vitamin A	4	-2.59	-7.81, 2.63	0.331	Yes (99%)	-56.18	-155.88, 43.53	10	4.43	0.019	-27.31	-67.22, 12.60
Copper (Cu)	8	-0.57	-1.16, 0.02	0.060	Yes (60%)	-17.26	-28.43, -6.10	10	4.50	0.049	-12.37	-25.04, 0.30
Potassium (K)	4	0.30	-0.02, 0.62	0.063	No (0%)	4.49	1.35, 7.62	7	4.63	0.091	2.30	-0.34, 4.94

n, number of data points included in the comparison; SMD, standardised mean difference; MPD, mean percentage difference; DGLA, dihomo-γ-linolenic acid; GLA, γ-linolenic acid; 2R, synthetic isomers of α-tocopherol; 3R, natural isomers of α-tocopherol. **P* value <0.05 indicates significance of the difference in composition between organic and conventional milk; †Heterogeneity and the I^2 Statistic; ‡Magnitude of difference between organic (ORG) and conventional (CONV) samples (value <0 indicate higher concentration in CONV, value >0 indicate higher concentration in ORG); §Ln ratio = Ln(ORG/CONV × 100%).

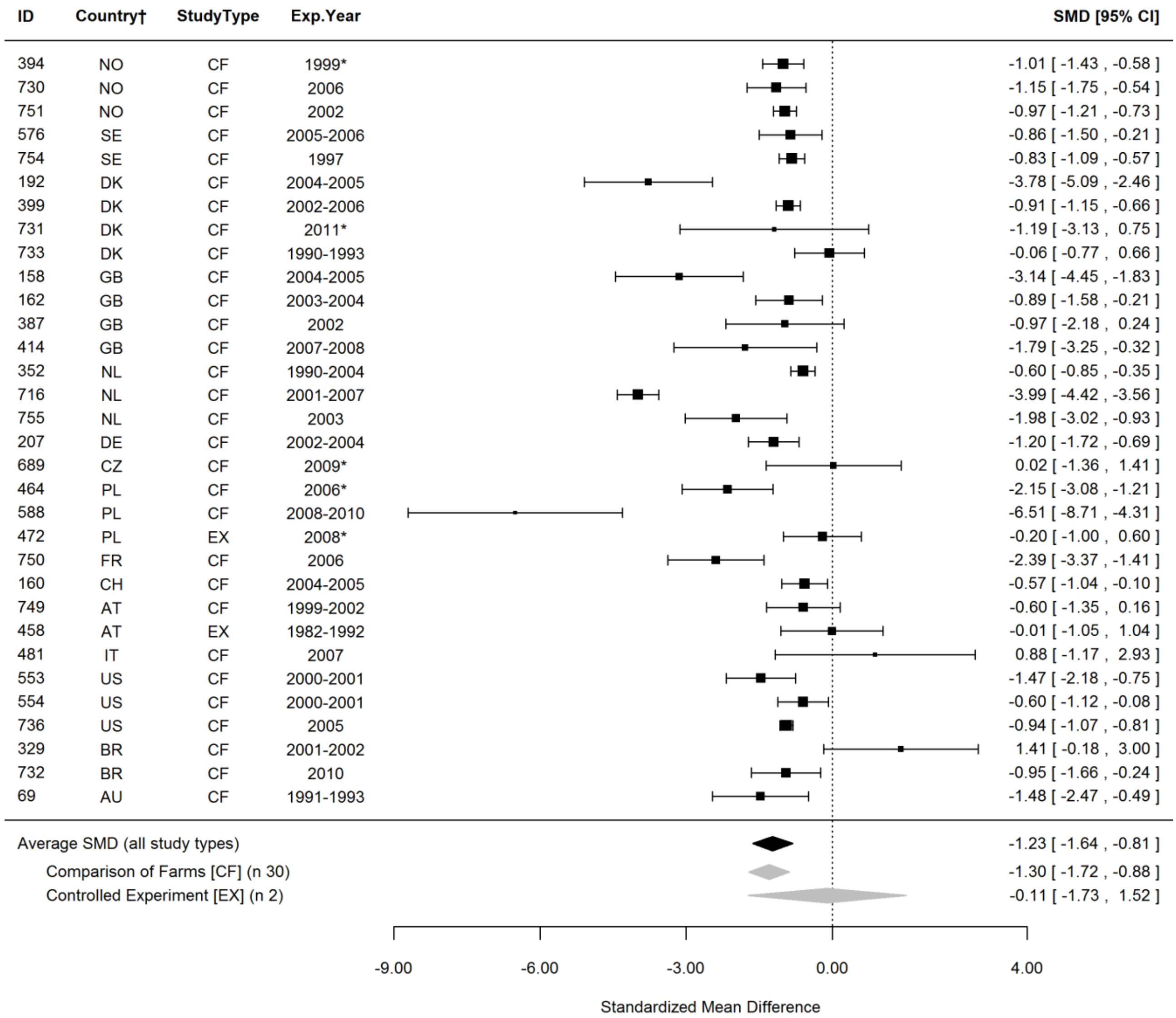


Figure S3. Forest plot showing the results of studies examining the milk yield in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

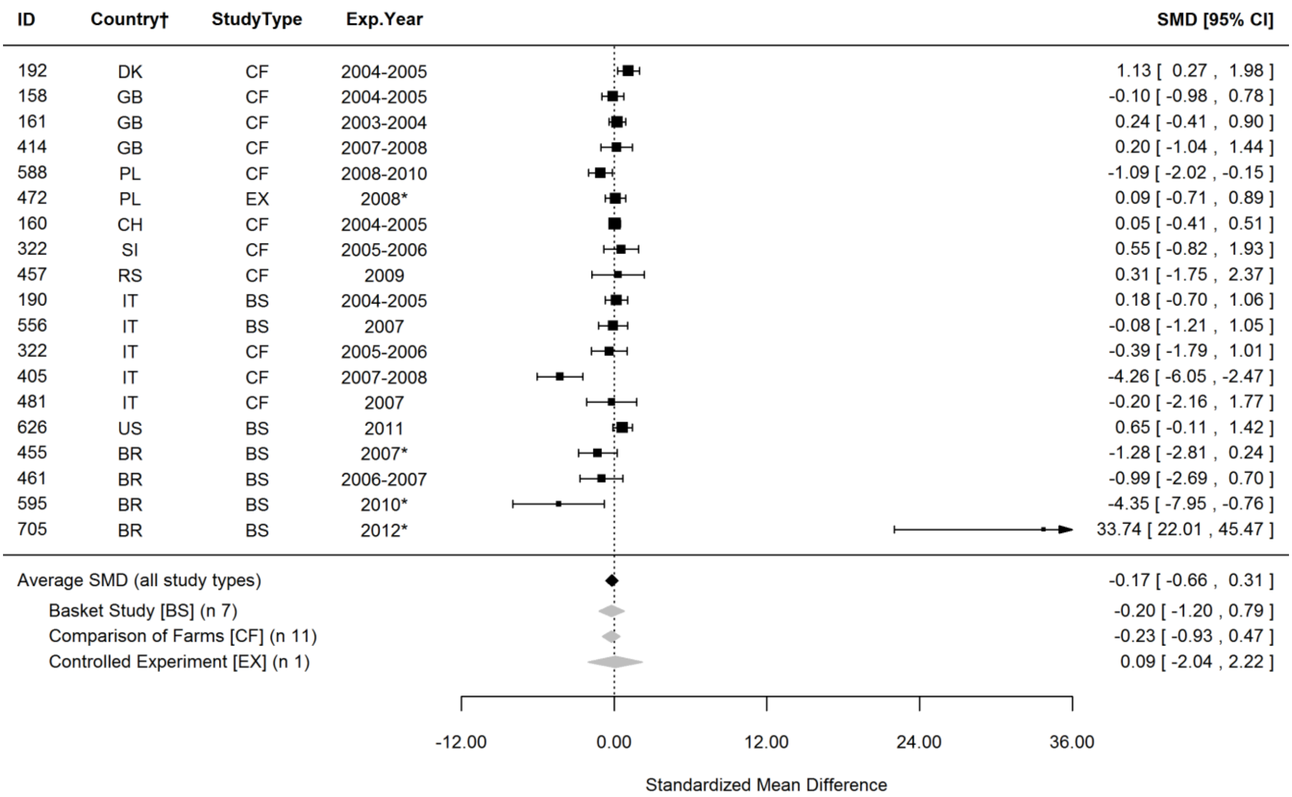


Figure S4. Forest plot showing the results of studies examining the saturated fatty acids (SFA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

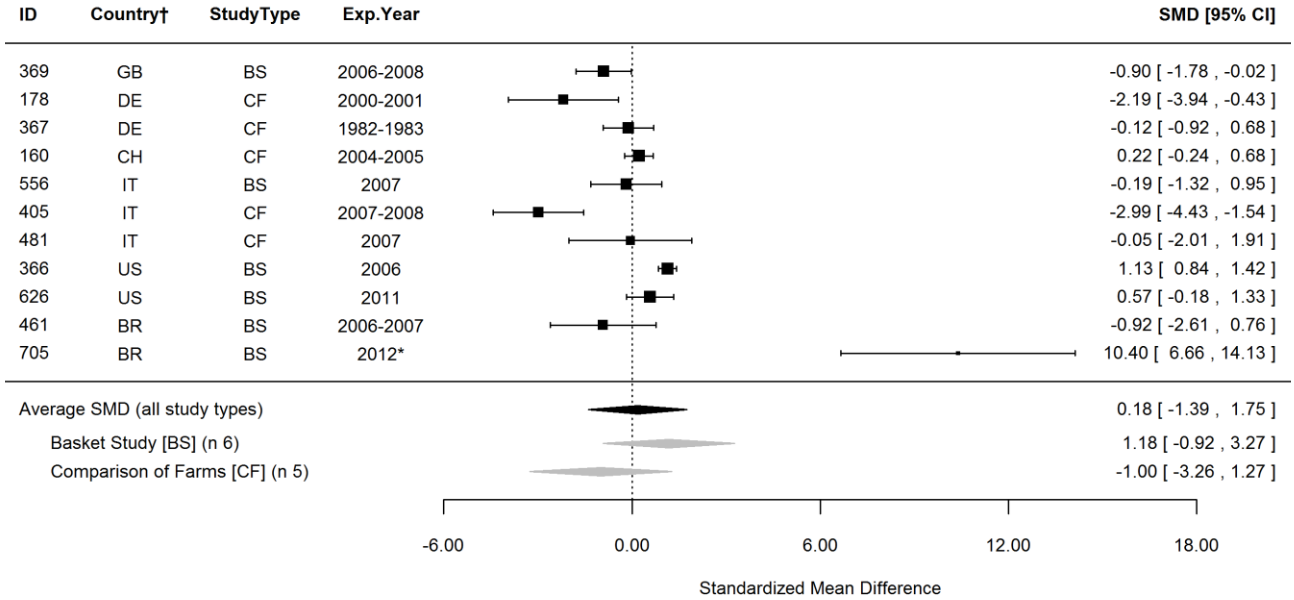


Figure S5. Forest plot showing the results of studies examining the 12:0 fatty acid (lauric acid) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

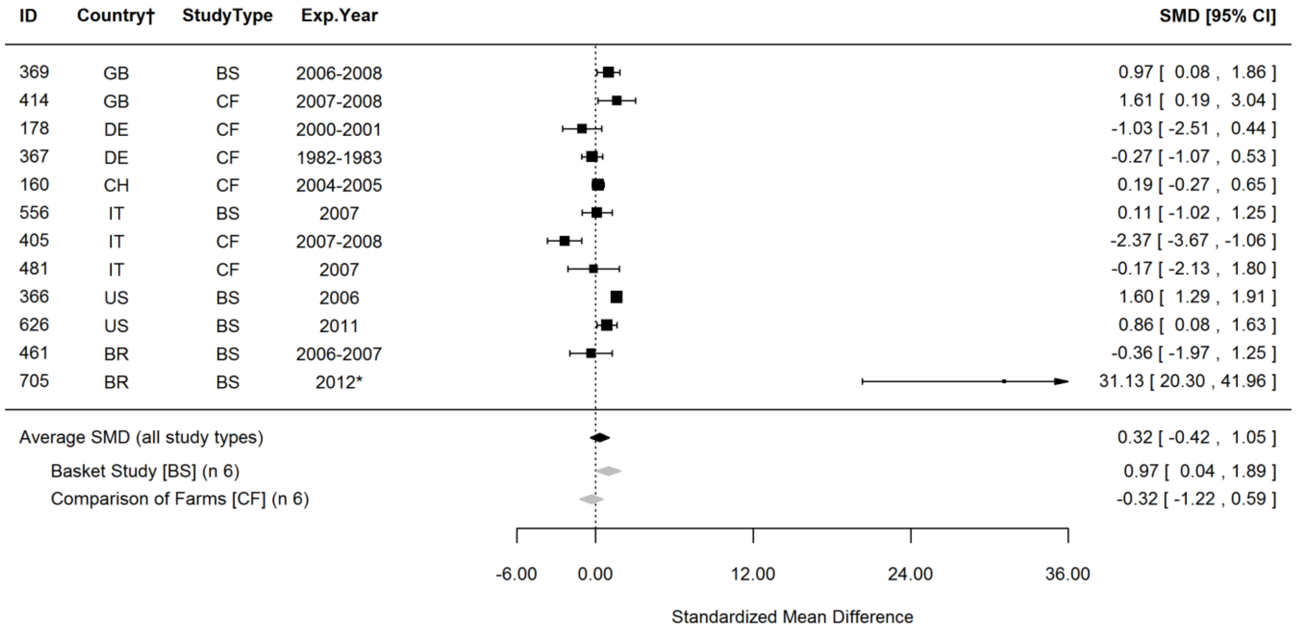


Figure S6. Forest plot showing the results of studies examining the 14:0 fatty acid (myristic acid) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

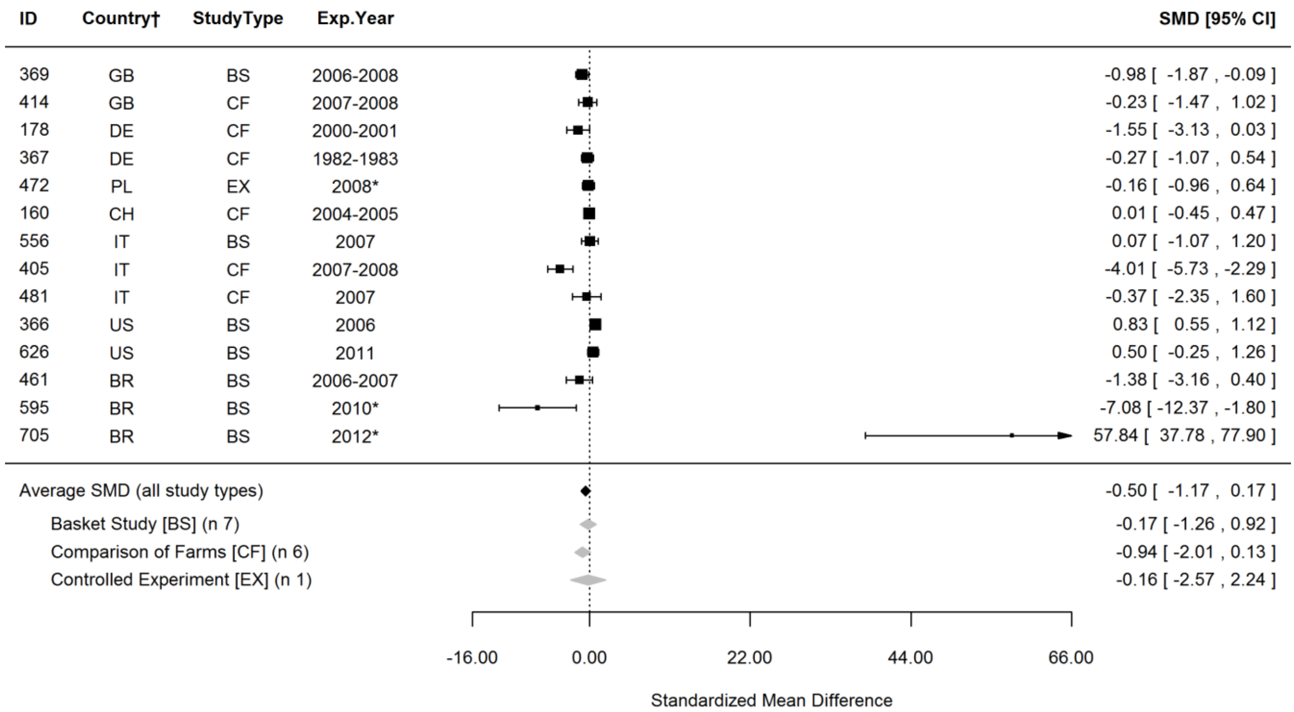


Figure S7. Forest plot showing the results of studies examining the 16:0 fatty acid (palmitic acid) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

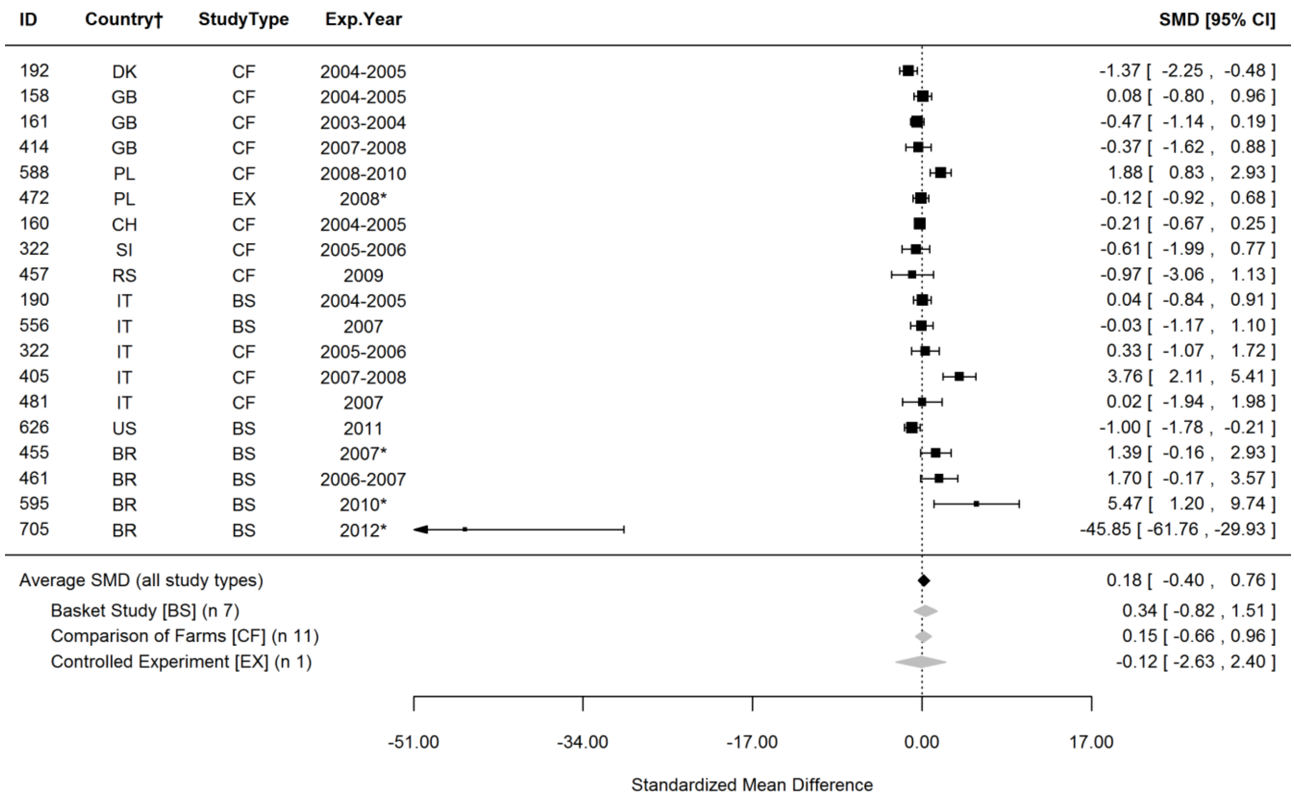


Figure S8. Forest plot showing the results of studies examining the monounsaturated fatty acids (MUFA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

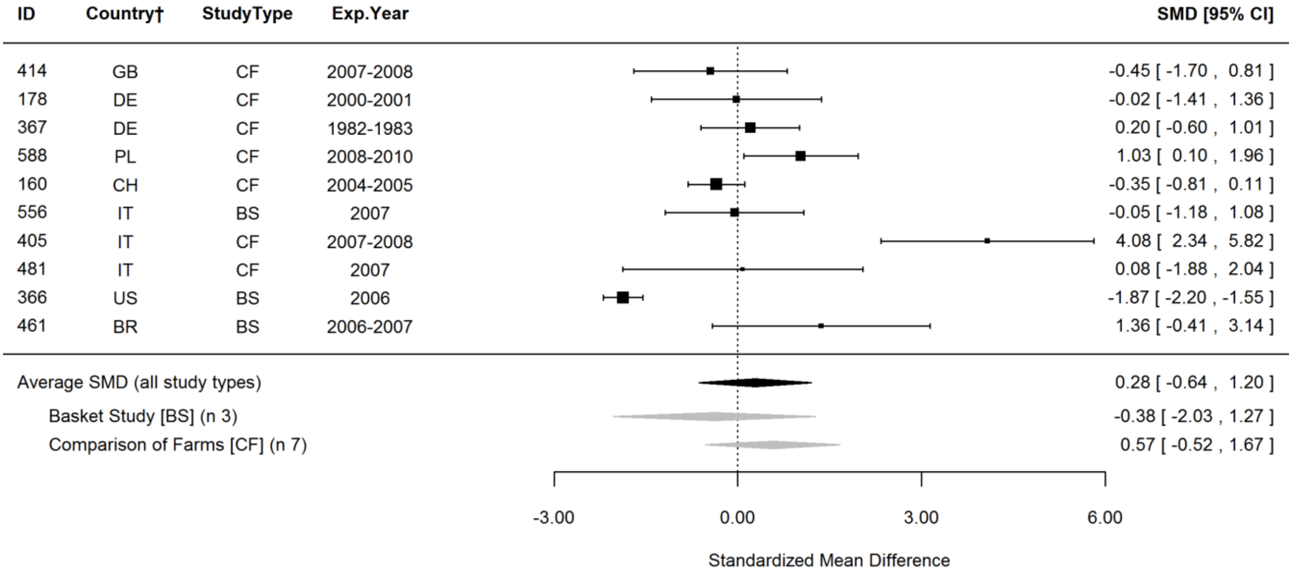


Figure S9. Forest plot showing the results of studies examining the oleic fatty acid (*cis*-9-18:1, OA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

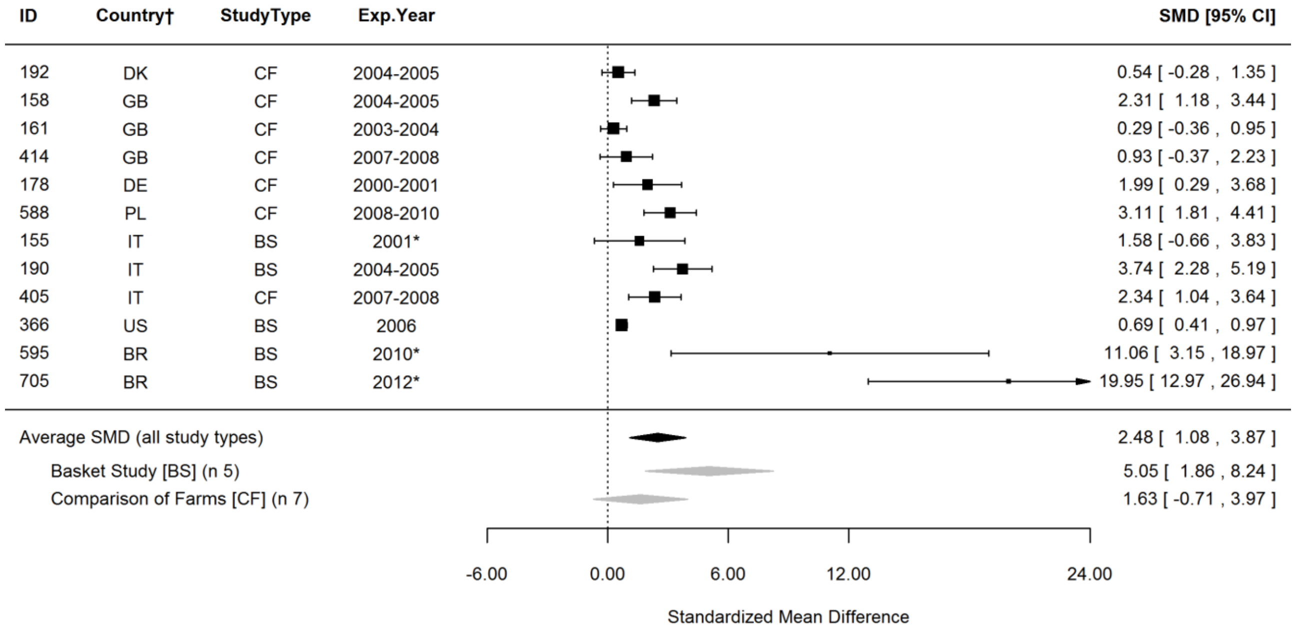


Figure S10. Forest plot showing the results of studies examining the vaccenic fatty acid (*trans*-11-18:1, VA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

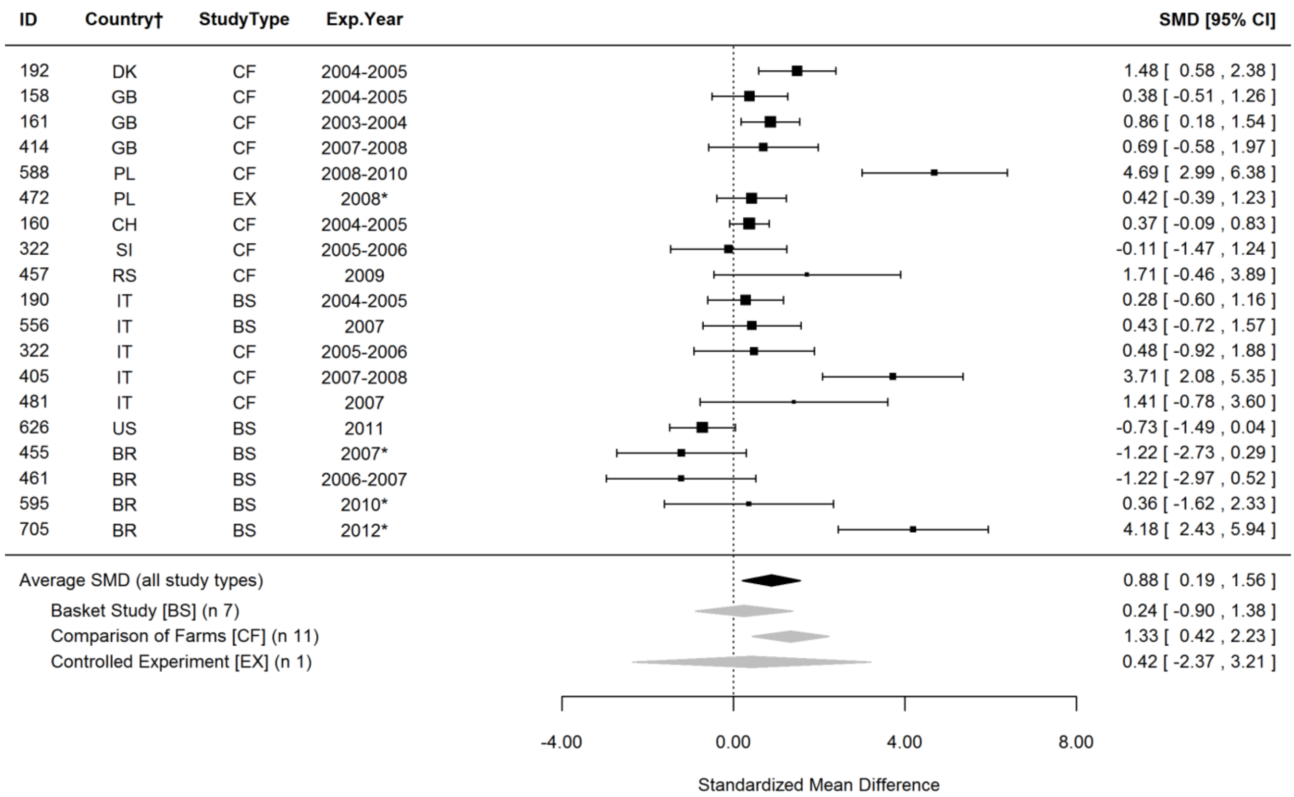


Figure S11. Forest plot showing the results of studies examining the polyunsaturated fatty acids (PUFA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

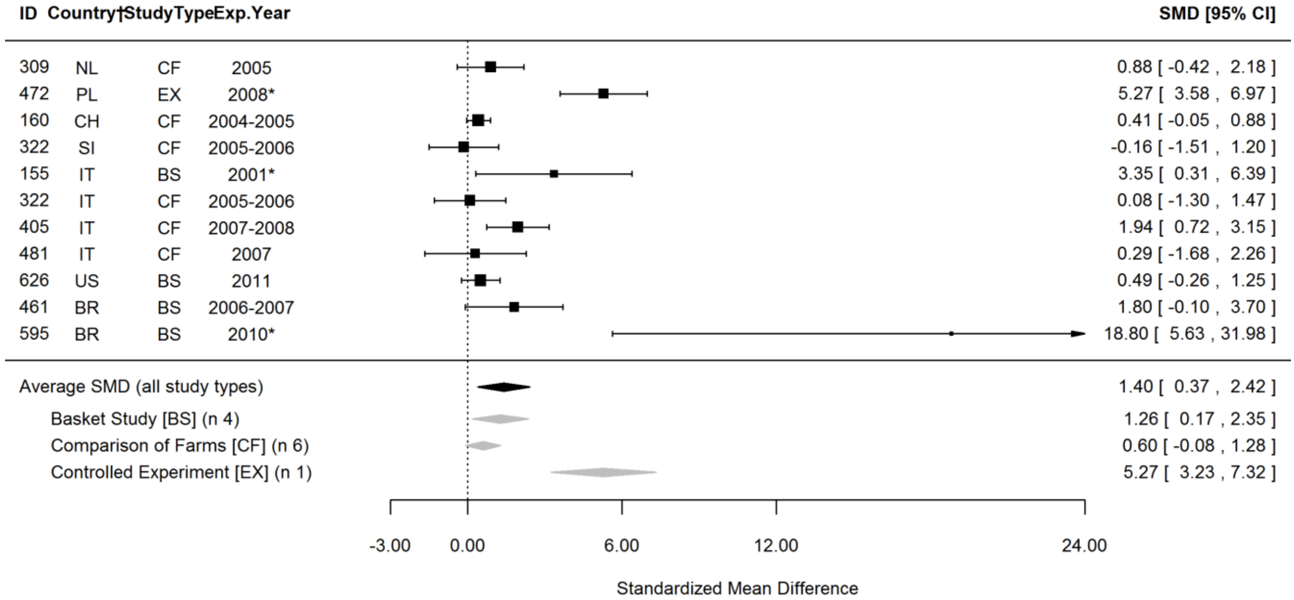


Figure S12. Forest plot showing the results of studies examining the total conjugated linoleic fatty acids (CLA total) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

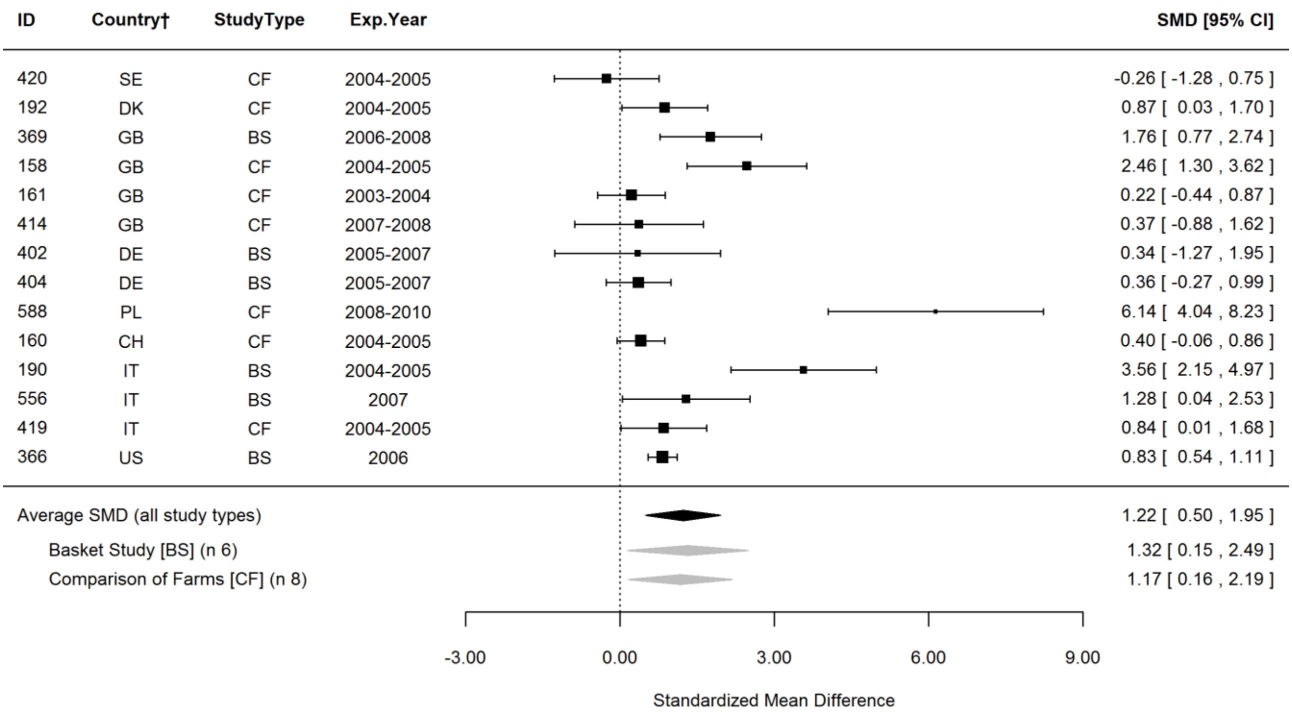


Figure S13. Forest plot showing the results of studies examining the *cis*-9-*trans*-11-18:2 conjugated linoleic fatty acids (CLA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

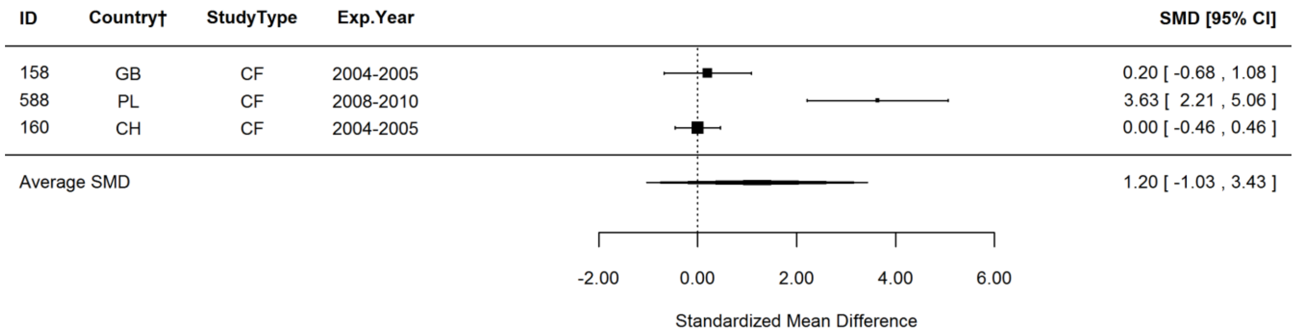


Figure S14. Forest plot showing the results of studies examining the *trans*-10-*cis*-12-18:2 conjugated linoleic fatty acids (CLA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

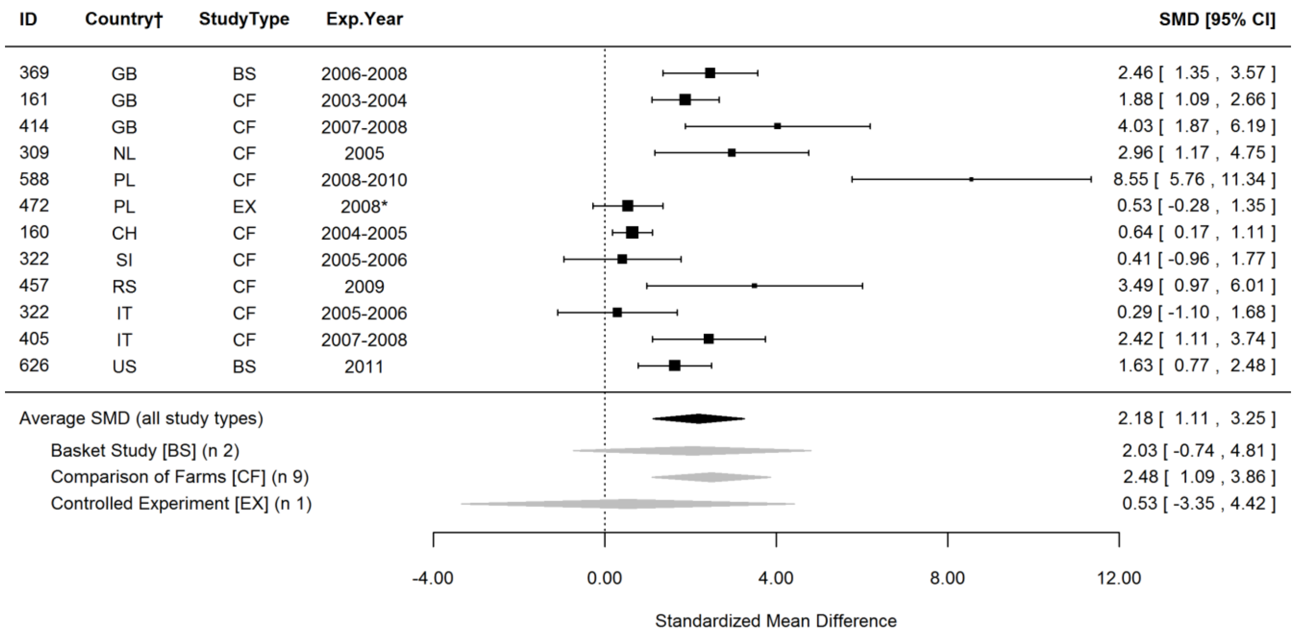


Figure S15. Forest plot showing the results of studies examining the omega-3 fatty acids (*n*-3) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

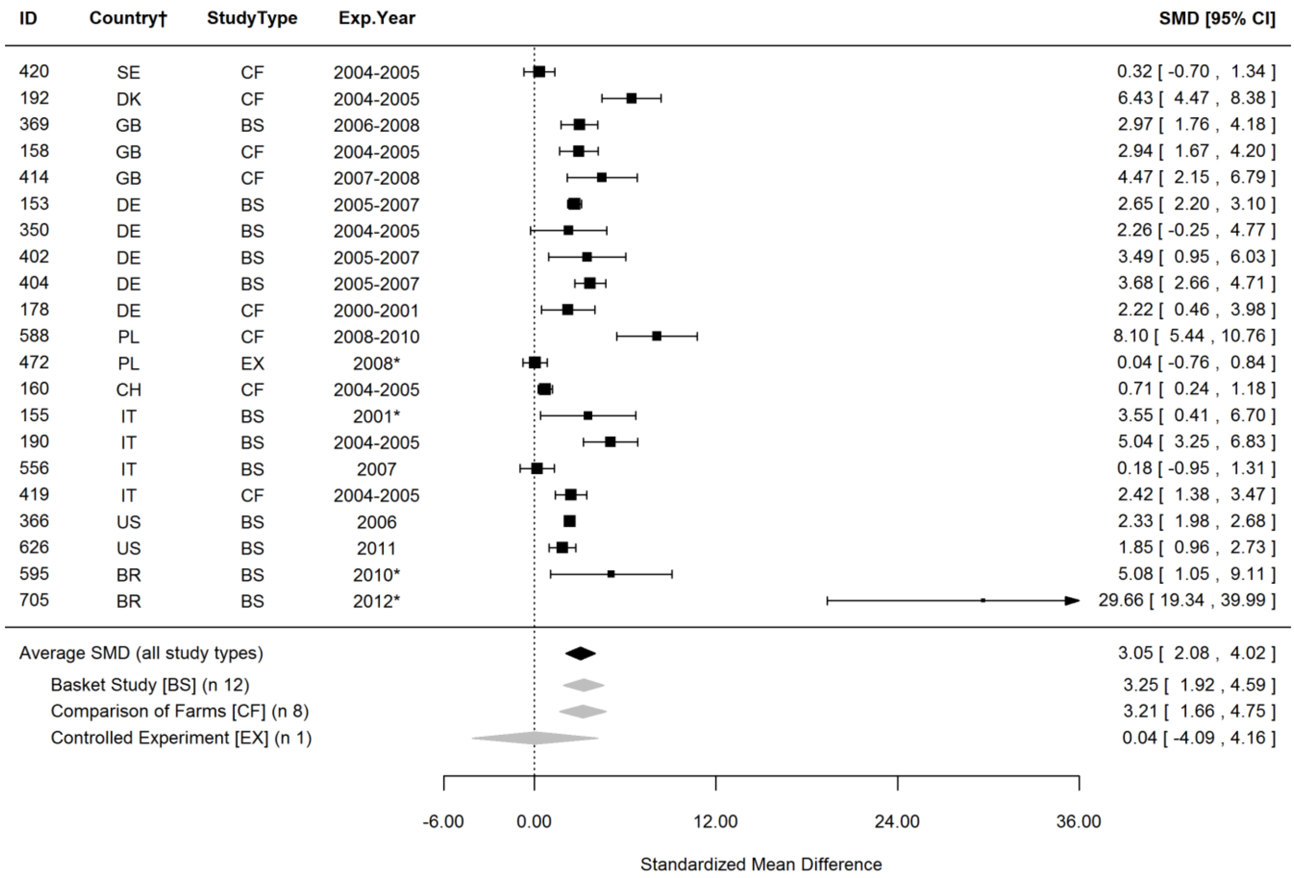


Figure S16. Forest plot showing the results of studies examining the α-linolenic fatty acid (*cis*-9,12,15-18:3, ALA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

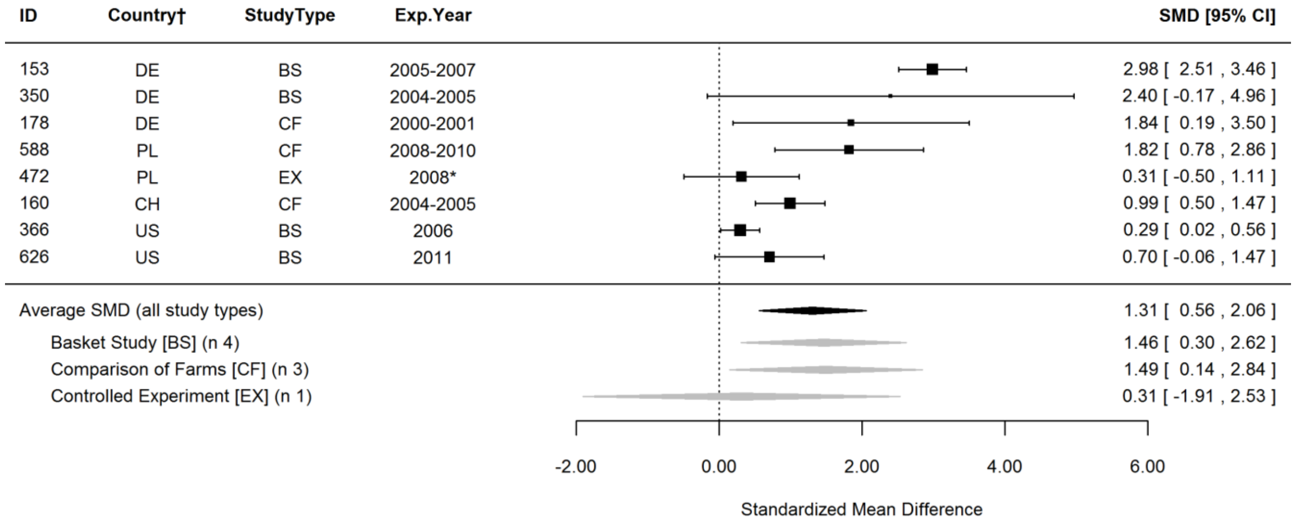


Figure S17. Forest plot showing the results of studies examining the eicosapentaenoic fatty acid (*cis*-5,8,11,14,17-20:5, EPA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

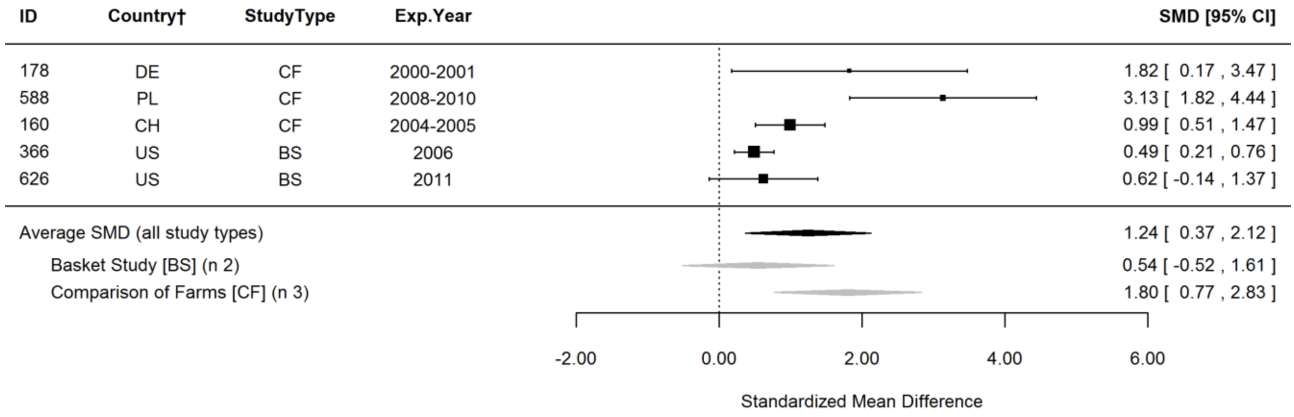


Figure S18. Forest plot showing the results of studies examining the docosapentaenoic fatty acid (*cis*-7,10,13,16,19-22:5, DPA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

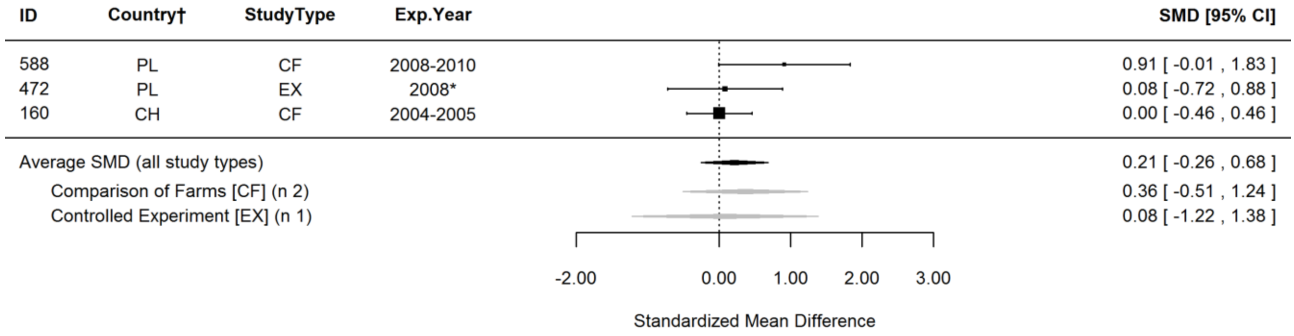


Figure S19. Forest plot showing the results of studies examining the docosahexaenoic fatty acid (*cis*-4,7,10,13,16,19-22:6, DHA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

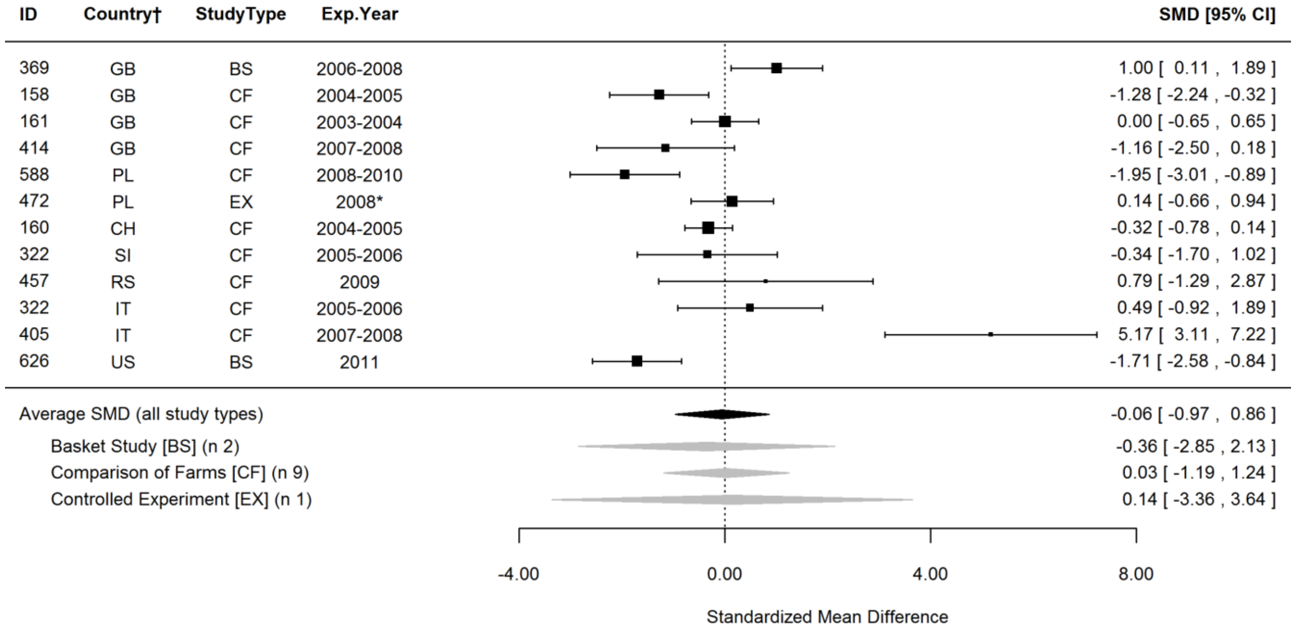


Figure S20. Forest plot showing the results of studies examining the omega-6 fatty acids (*n*-6) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

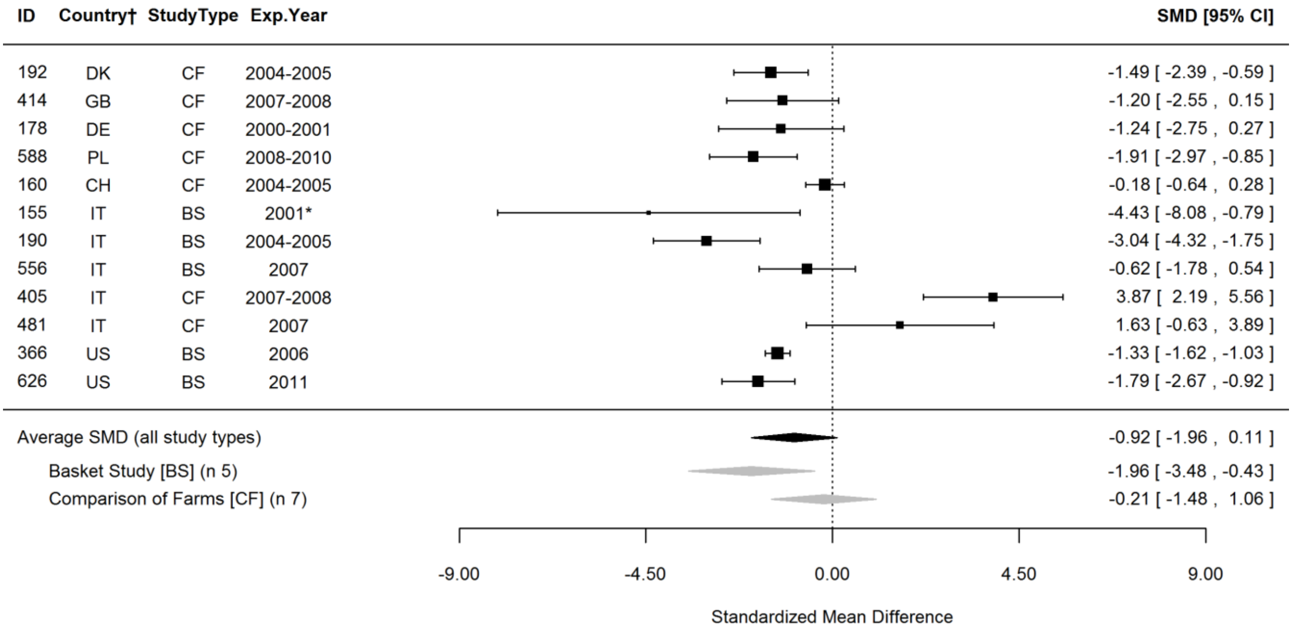


Figure S21. Forest plot showing the results of studies examining the linoleic fatty acid (*cis*-9,12-18:2, LA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

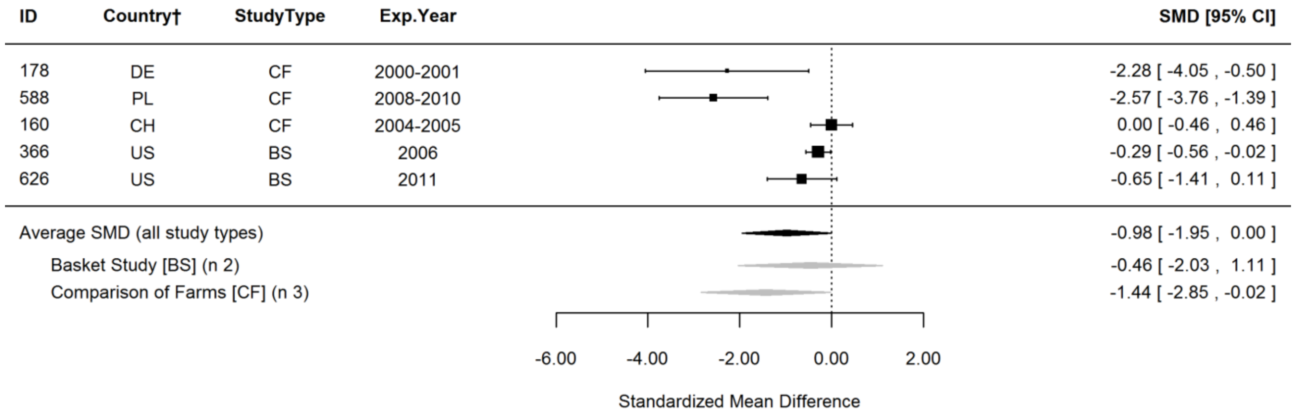


Figure S22. Forest plot showing the results of studies examining the arachidonic fatty acid (*cis*-5,8,11,14-20:4, AA) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

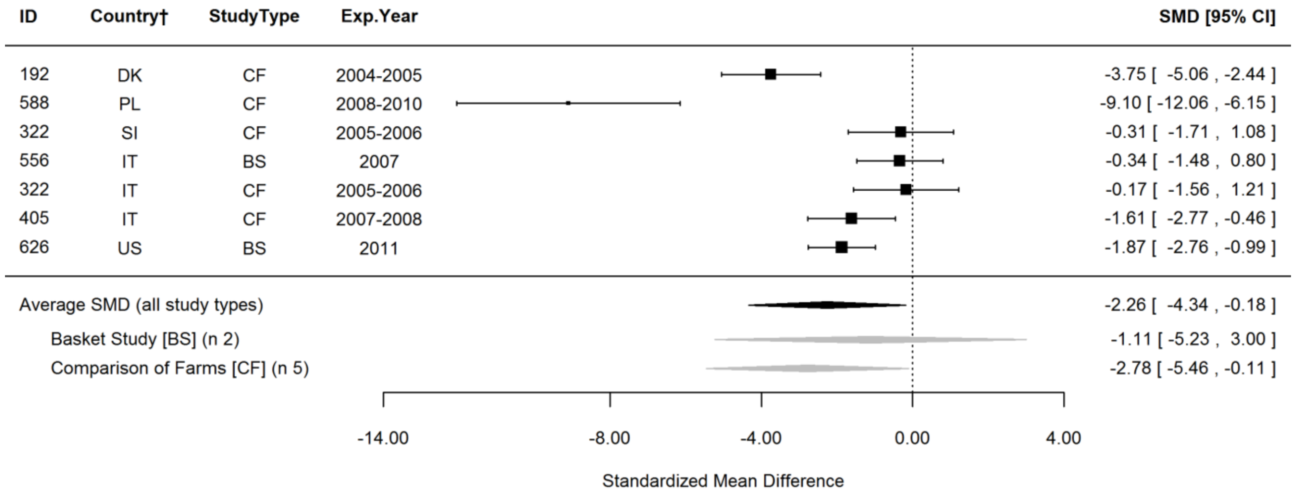


Figure S23. Forest plot showing the results of studies examining the omega-6/omega-3 fatty acids ratio (*n*-6/*n*-3) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

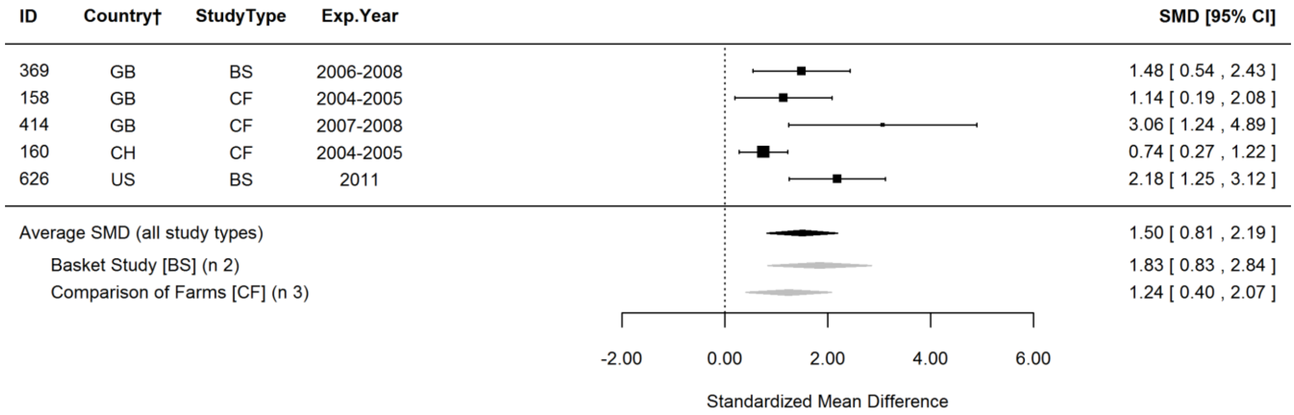


Figure S24. Forest plot showing the results of studies examining the omega-3/omega-6 fatty acids ratio (*n*-3/*n*-6) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

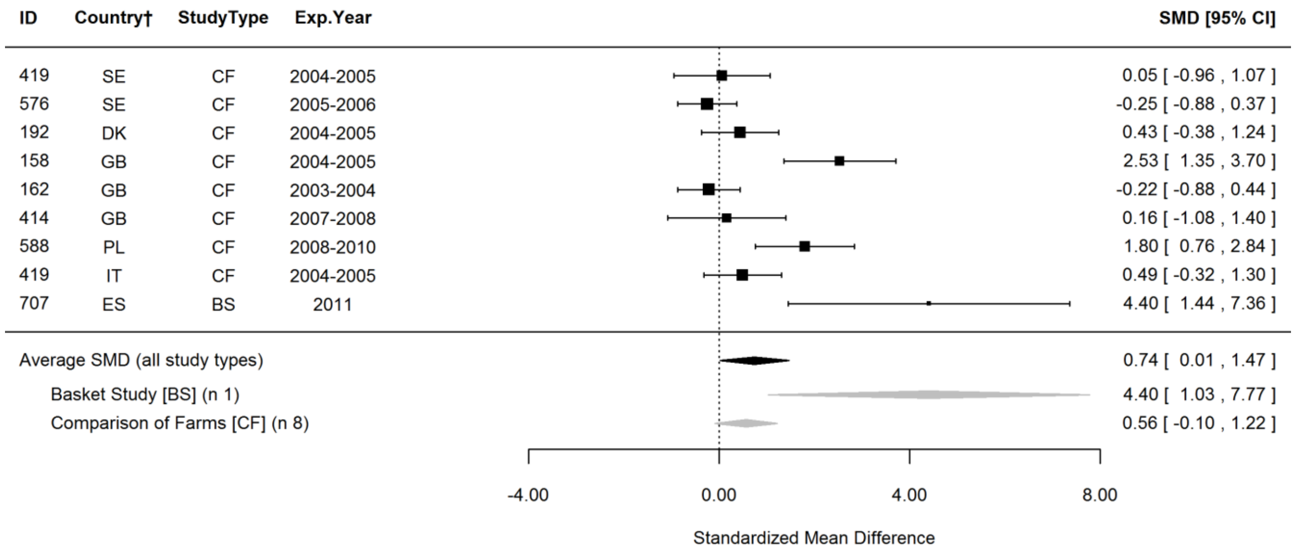


Figure S25. Forest plot showing the results of studies examining the α-tocopherol in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

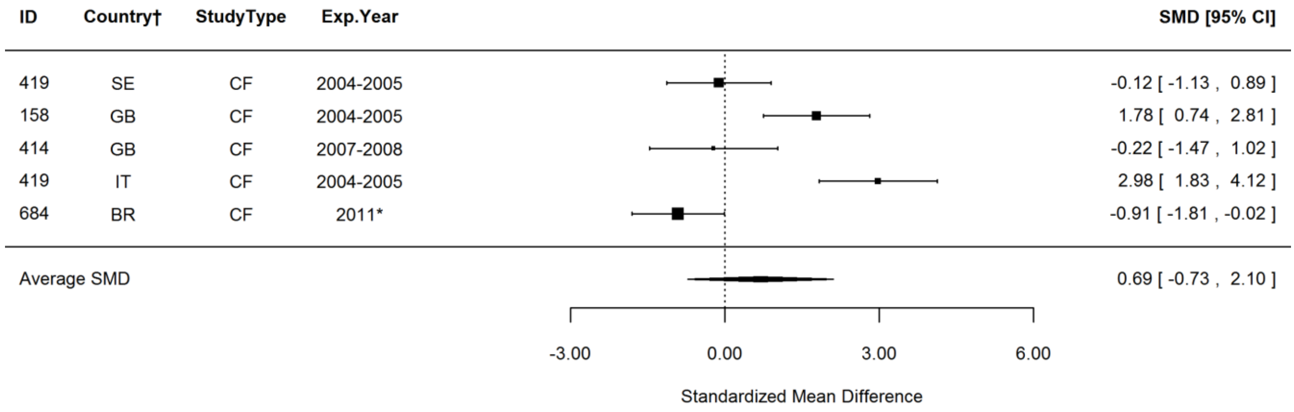


Figure S26. Forest plot showing the results of studies examining the total carotenoids in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

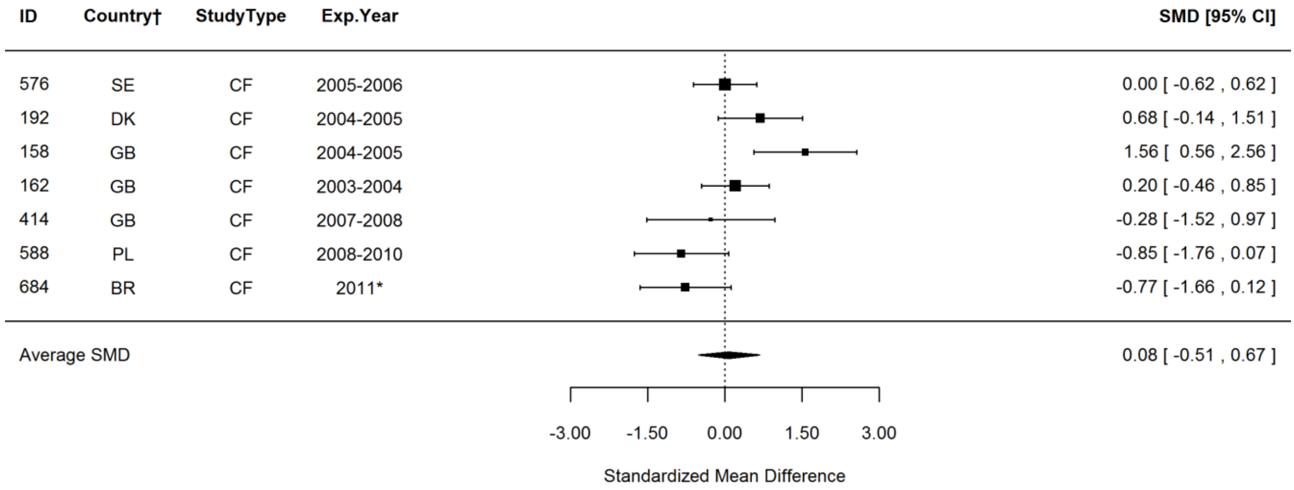


Figure S27. Forest plot showing the results of studies examining the β-carotene in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

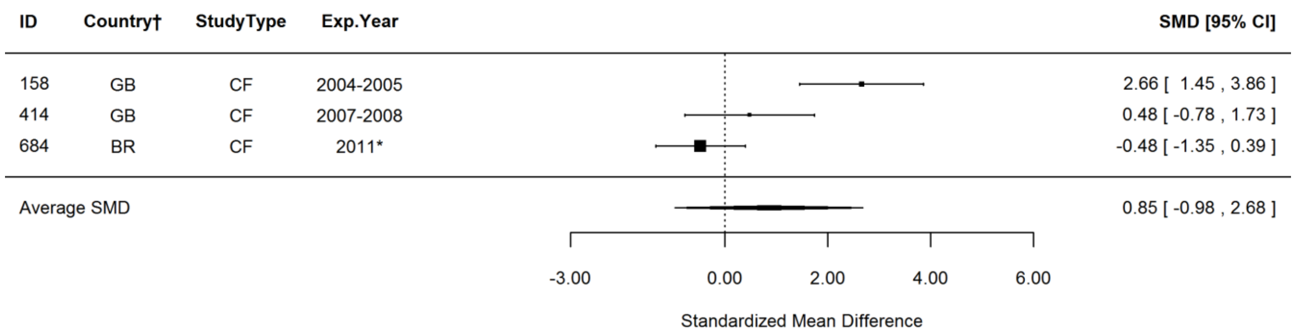


Figure S28. Forest plot showing the results of studies examining the lutein in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

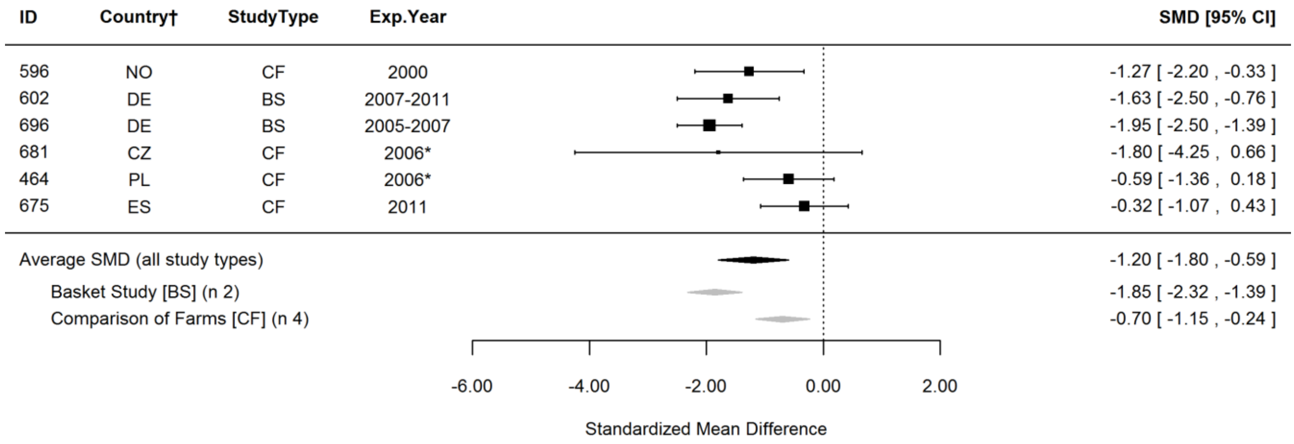


Figure S29. Forest plot showing the results of studies examining the iodine (I) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

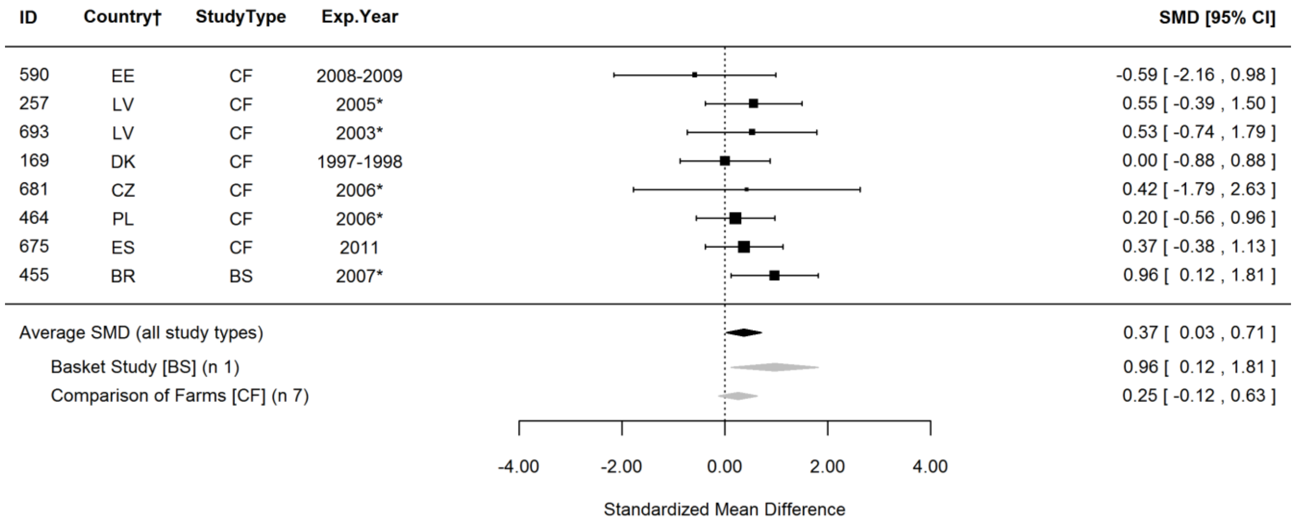


Figure S30. Forest plot showing the results of studies examining the iron (Fe) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

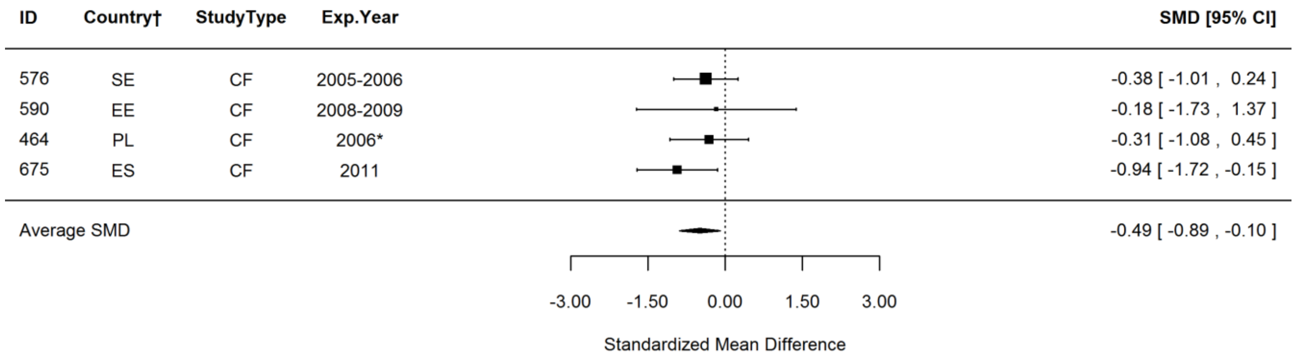


Figure S31. Forest plot showing the results of studies examining the selenium (Se) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

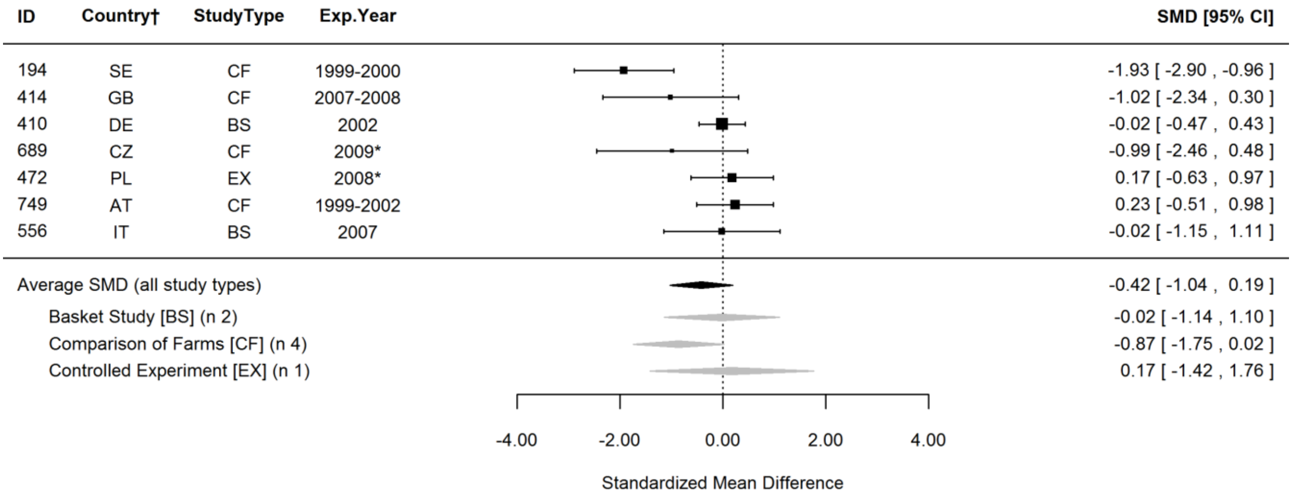


Figure S32. Forest plot showing the results of studies examining the urea in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

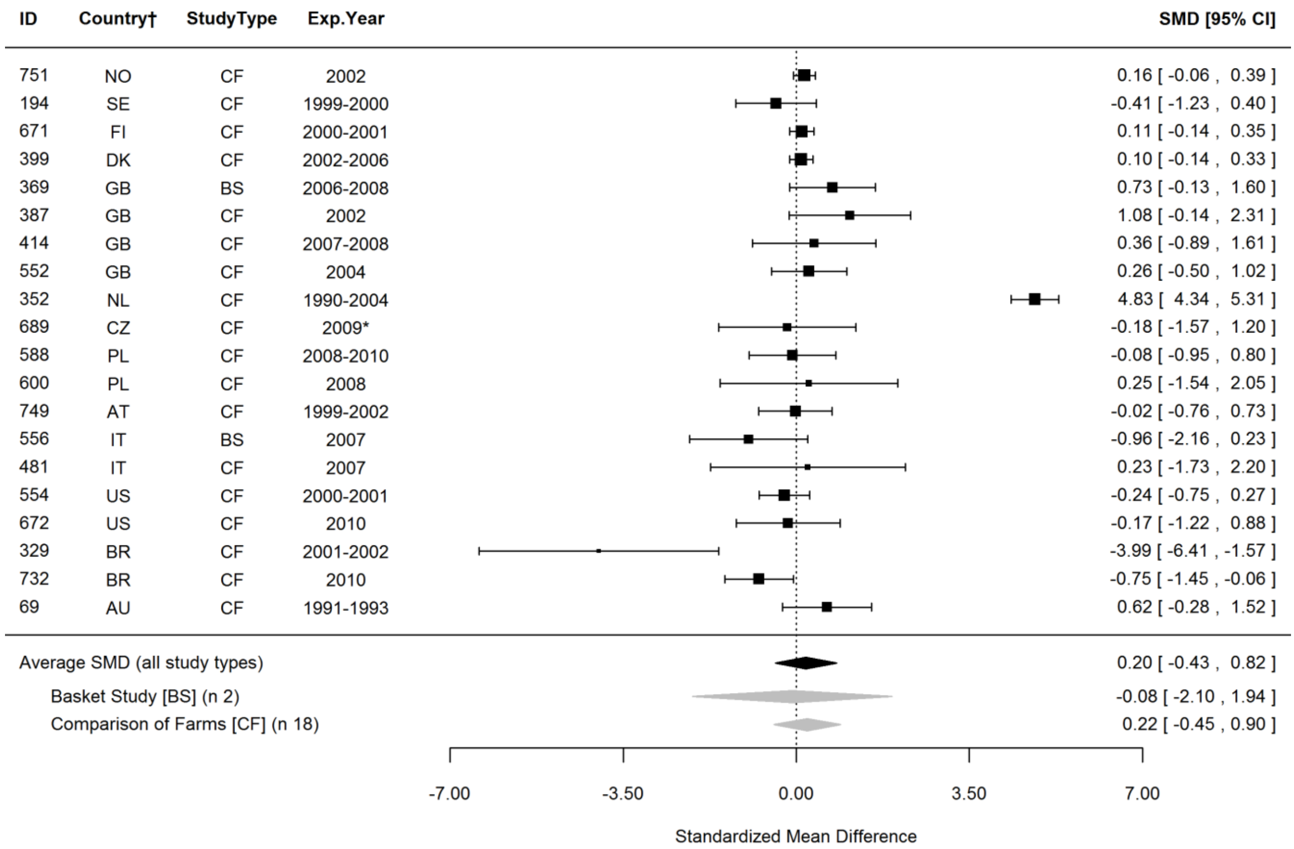


Figure S33. Forest plot showing the results of studies examining the somatic cell count (SCC) in organic and conventional bovine milk. The figure shows the standardised mean differences (SMDs) with 95% confidence intervals, for studies included in standard meta-analysis. The estimated average SMD for all studies and SMDs for different study types are indicated at the bottom of the figure. Sign of the SMD indicates if the analysed parameter is higher (+) or lower (-) in organic milk. ID, Paper unique identification number (see supplementary Table S1 for references); CF, comparison of farms, BS, basket study, EX, controlled experiment. *No information about the experimental year (estimated as publication year -2), †Country codes according ISO 3166-2 (see *http://www.iso.org/iso/home/standards/country_codes.htm*).

Table S12. Results of the standard meta-analysis and sensitivity analysis 1 for parameters where none of the protocols identified significant effects.

	Standard meta-analysis					Sensitivity analysis 1		
Parameter	***n***	**SMD**	**95% CI**	***P****	**Heterogeneity†**	***n***	**Ln ratio‡**	***P****
Major components								
Ash	4	0.10	-0.62, 0.83	0.778	No (0%)	6	4.60	0.357
Casein	7	-0.56	-1.95, 0.82	0.426	Yes (88%)	11	4.61	0.462
Lactose	17	0.00	-0.42, 0.42	0.999	Yes (80%)	31	4.61	0.463
Protein (whey)	-	-	-	-	-	3	4.64	0.496
α-lactalbumin	-	-	-	-	-	3	4.57	0.252
β-lactoglobulin	3	-0.09	-0.77, 0.59	0.790	No (0%)	3	4.66	0.497
Fatty acids								
4:0 (butyric acid)	10	0.17	-0.22, 0.56	0.399	Yes (58%)	15	4.62	0.255
6:0 (caproic acid)	9	-0.77	-2.23, 0.68	0.296	Yes (97%)	14	4.60	0.434
10:0 (capric acid)	10	0.74	-1.74, 3.23	0.556	Yes (99%)	17	4.60	0.487
13:0 (tridecylic acid)	-	-	-	-	-	3	4.57	0.499
18:0 (stearic acid)	13	-0.09	-0.91, 0.72	0.825	Yes (90%)	20	4.58	0.254
12:0+14:0+16:0§	-	-	-	-	-	14	4.59	0.291
USFA	3	0.69	-0.90, 2.28	0.396	Yes (92%)	3	4.61	0.503
18:1	4	-11.96	-38.16, 14.23	0.371	Yes (100%)	4	4.60	0.442
18:2	4	-3.59	-9.92, 2.74	0.266	Yes (99%)	6	4.40	0.145
18:3	-	-	-	-	-	3	4.46	0.381
10:1 (4-cis-decenoic acid)	5	-0.05	-0.44, 0.34	0.805	No (0%)	5	4.47	0.198

n, number of data points included in the comparison; SMD, standardised mean difference; USFA, unsaturated fatty acids. **P* value <0.05 indicates significance of the difference in composition between organic and conventional milk; †Heterogeneity and the I^2 Statistic; ‡Ln ratio = Ln(ORG/CONV × 100%); §Calculated based on published fatty acids composition data.

Table S12 cont. Results of the standard meta-analysis and sensitivity analysis 1 for parameters where none of the protocols identified significant effects.

	Standard meta-analysis					Sensitivity analysis 1		
Parameter	***n***	**SMD**	**95% CI**	***P****	**Heterogeneity†**	***n***	**Ln ratio‡**	***P****
12:1 (lauroleic acid)	3	-0.36	-1.17, 0.46	0.390	No (0%)	3	4.44	0.250
14:1 (myristoleic acid)	7	0.15	-0.44, 0.74	0.619	Yes (65%)	13	4.62	0.281
16:1 (palmitoleic acid)	9	-0.38	-1.08, 0.32	0.292	Yes (85%)	17	4.58	0.172
17:1 (heptadecenoic acid)	3	0.53	-0.55, 1.60	0.336	Yes (33%)	4	4.80	0.439
cis-11-18:1 (cis-vaccenic acid)	-	-	-	-	-	5	4.54	0.281
cis-12-18:1	-	-	-	-	-	3	4.77	0.494
cis-13-18:1	-	-	-	-	-	3	4.79	0.491
trans-9-18:1 (elaidic acid)	3	0.24	-1.52, 2.00	0.787	Yes (97%)	4	4.70	0.375
trans-12-18:1	3	-0.14	-1.67, 1.40	0.862	Yes (96%)	3	4.79	0.507
trans-6-8-18:1	3	0.00	-1.34, 1.35	0.999	Yes (94%)	3	4.71	0.498
CLA (trans-7,9-18:2)	-	-	-	-	-	3	5.07	0.499
CLA (trans-9,11-18:2)	-	-	-	-	-	3	5.34	0.123
CLA (trans-11,13-18:2)	-	-	-	-	-	3	5.61	0.125
CLA (trans-12,14-18:2)	-	-	-	-	-	3	5.55	0.121
cis-11,14-20:2	-	-	-	-	-	3	4.74	0.506
ETE (cis-11,14,17-20:3)	-	-	-	-	-	4	4.70	0.495
Long chain FA	5	0.07	-1.18, 1.32	0.917	Yes (88%)	6	4.63	0.188
Medium chain FA	5	0.10	-0.25, 0.45	0.567	No (0%)	7	4.57	0.205
Short chain FA	5	0.31	-1.43, 2.04	0.728	Yes (93%)	6	4.61	0.463

n, number of data points included in the comparison; SMD, standardised mean difference; CLA, conjugated linoleic acids; ETE, eicosatrienoic acid; FA, fatty acids. **P* value <0.05 indicates significance of the difference in composition between organic and conventional milk; †Heterogeneity and the I^2 Statistic; ‡Ln ratio = Ln(ORG/CONV × 100%).

Table S12 cont. Results of the standard meta-analysis and sensitivity analysis 1 for parameters where none of the protocols identified significant effects.

	Standard meta-analysis					Sensitivity analysis 1		
Parameter	***n***	**SMD**	**95% CI**	***P****	**Heterogeneity†**	***n***	**Ln ratio‡**	***P****
Vitamins and antioxidants								
Vitamin C	-	-	-	-	-	3	4.84	0.131
Vitamin D	3	0.14	-1.00, 1.28	0.805	Yes (56%)	3	4.52	0.369
Vitamin E activity	-	-	-	-	-	4	4.82	0.061
Minerals and undesirable metals								
Cadmium (Cd)	4	-0.29	-0.73, 0.16	0.204	No (2%)	8	4.62	0.476
Calcium (Ca)	7	-0.12	-0.47, 0.23	0.512	No (0%)	12	4.62	0.217
Cobalt (Co)	3	0.01	-0.50, 0.51	0.983	No (0%)	3	4.45	0.254
Lead (Pb)	4	-0.21	-0.65, 0.23	0.348	No (0%)	7	4.58	0.327
Magnesium (Mg)	6	-64.62	-194.47, 65.24	0.329	Yes (100%)	9	4.58	0.131
Manganese (Mn)	4	-0.44	-1.10, 0.22	0.188	Yes (45%)	4	4.50	0.244
Molybdenum (Mo)	3	0.51	-0.18, 1.21	0.147	Yes (54%)	3	4.74	0.123
Phosphorus (P)	5	0.00	-0.30, 0.30	0.997	No (0%)	9	4.60	0.315
Sodium (Na)	3	-0.15	-0.69, 0.38	0.571	No (0%)	5	4.59	0.159
Zinc (Zn)	9	-0.21	-0.49, 0.08	0.155	No (9%)	12	4.56	0.059

n, number of data points included in the comparison; SMD, standardised mean difference. **P* value <0.05 indicates significance of the difference in composition between organic and conventional milk; †Heterogeneity and the I^2 Statistic; ‡Ln ratio = Ln(ORG/CONV × 100%).

Table S12 cont. Results of the standard meta-analysis and sensitivity analysis 1 for parameters where none of the protocols identified significant effects.

	Standard meta-analysis					Sensitivity analysis 1		
Parameter	***n***	**SMD**	**95% CI**	***P****	**Heterogeneity†**	***n***	**Ln ratio‡**	***P****
Pesticides, mycotoxins and other contaminants								
Aflatoxin M1	-	-	-	-	-	5	4.79	0.191
Dieldrin	-	-	-	-	-	3	3.98	0.246
Hexachlorobenzene (HCB)	-	-	-	-	-	5	4.75	0.255
α-esachlorciclohexane (α-HCH)	-	-	-	-	-	3	4.48	0.379
γ-esachlorciclohexane (γ-HCH)	-	-	-	-	-	4	4.05	0.252
Other								
Atherogenicity Index	-	-	-	-	-	3	4.41	0.126
Bacteria count	8	-0.05	-0.29, 0.19	0.682	Yes (35%)	12	4.59	0.458
Dry mass	-	-	-	-	-	5	4.58	0.184
Lactoferrin	3	4.20	-3.13, 11.53	0.261	Yes (98%)	3	4.80	0.256
Lysozyme	3	1.08	-3.04, 5.19	0.608	Yes (96%)	3	4.71	0.506
pH	5	0.34	-0.36, 1.04	0.346	No (18%)	7	4.61	0.500
Thrombogenicity index	-	-	-	-	-	3	4.43	0.125
Titratable acidity	3	0.79	-0.14, 1.73	0.096	No (0%)	4	4.71	0.065

n, number of data points included in the comparison; SMD, standardised mean difference. **P* value <0.05 indicates significance of the difference in composition between organic and conventional milk; †Heterogeneity and the I^2 Statistic; ‡Ln ratio = Ln(ORG/CONV × 100%).

Table S13. Results of the statistical test for publication bias reported in Table 1 of the main paper.

Parameter	Trim and fill test*		No of missing *n* in Rosenthal's Fail-safe N test†	No of missing *n* in Orwin's Fail-safe N test‡	*P* from Egger's test for funnel plot asymetry§
	No of missing *n*	funnel plot side			
Milk yield	0	right	5697	32	0.253
SFA	2	left	0	19	0.003
12:0 (lauric acid)	0	left	0	11	0.039
14:0 (myristic acid)||	0	left	96	12	<0.001
16:0 (palmitic acid)	1	left	0	14	<0.001
MUFA	2	right	0	19	0.003
OA (cis-9-18:1)	0	left	0	10	0.012
VA (trans-11-18:1)	-	-	514	12	<0.001
PUFA	0	left	211	19	0.118
CLA (total)	0	left	146	11	0.003
CLA9 (cis-9-trans-11-18:2)	0	left	416	14	0.002
CLA10 (trans-10-cis-12-18:2)	0	left	8	3	0.028
n-3 FA	0	left	492	12	<0.001
ALA (cis-9,12,15-18:3)	0	left	3146	21	<0.001
EPA (cis-5,8,11,14,17-20:5)	3	left	291	8	0.403
DPA (cis-7,10,13,16,19-22:5)	0	left	89	5	0.005
DHA (cis-4,7,10,13,16,19-22:6)	0	left	0	3	0.228
VLC n-3 PUFA¶	-	-	-	-	-
n-6 FA	0	left	0	12	0.043
LA (cis-9,12-18:2)	3	right	233	12	0.956
AA (cis-5,8,11,14-20:4)	2	right	36	5	0.002
LA/ALA ratio¶	-	-	-	-	-
n-6/n-3 ratio	0	right	138	7	0.002
n-3/n-6 ratio	0	left	94	5	0.002

SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; OA, oleic acid; VA, vaccenic acid; PUFA, polyunsaturated fatty acids; CLA, conjugated linoleic acid; FA, fatty acids; ALA, α-linolenic acid; EPA, eicosapentaenoic acid; DPA, docosapentaenoic acid; DHA, docosahexaenoic acid; VLC n-3 PUFA, very long chain n-3 PUFA (EPA+DPA+DHA); LA, linoleic acid; AA, arachidonic acid. *The method used to estimate the number of data points missing from a meta-analysis due to the suppression of the most extreme results on one side of the funnel plot; †Number of missing data points that need to be retrieved and incorporate in the meta-analysis before the results become nonsignificant; ‡Number of missing data point that need to be retrieved and incorporate in the meta-analysis before the estimated value of the standardised mean (SMD) difference reaches a specified level (here SMD/2); §*P* value <0.05 indicates funnel plot asymmetry; ||Outlying data pairs (where the MPD between ORG and CONV was over fifty times greater than the mean value including the outliers) were removed; ¶Calculated based on published fatty acids composition data.

Table S13 cont. Results of the statistical test for publication bias reported in Table 1 of the main paper.

Parameter	**Trim and fill test***		**No of missing *n* in Rosenthal's Fail-safe N test†**	**No of missing *n* in Orwin's Fail-safe N test‡**	***P* from Egger's test for funnel plot asymetry§**
	No of missing *n*	**funnel plot side**			
α-tocopherol	0	left	42	9	0.001
Carotenoids	0	left	8	5	0.485
β-carotene	0	right	0	7	0.970
Lutein	0	left	3	3	0.390
Zeaxanthin	-	-	-	-	-
Iodine (I)	0	right	101	6	0.815
Iron (Fe)	0	right	3	8	0.641
Selenium (Se)	1	left	4	4	0.857
Urea	0	right	6	7	0.192
SCC‖	9	right	122	20	0.084

SCC, somatic cell count. *The method used to estimate the number of data points missing from a meta-analysis due to the suppression of the most extreme results on one side of the funnel plot; †Number of missing data points that need to be retrieved and incorporate in the meta-analysis before the results become nonsignificant; ‡Number of missing data point that need to be retrieved and incorporate in the meta-analysis before the estimated value of the standardised mean (SMD) difference reaches a specified level (here SMD/2); §*P* value <0.05 indicates funnel plot asymmetry; ‖Outlying data pairs (where the MPD between ORG and CONV was over fifty times greater than the mean value including the outliers) were removed; ¶Calculated based on published fatty acids composition data.

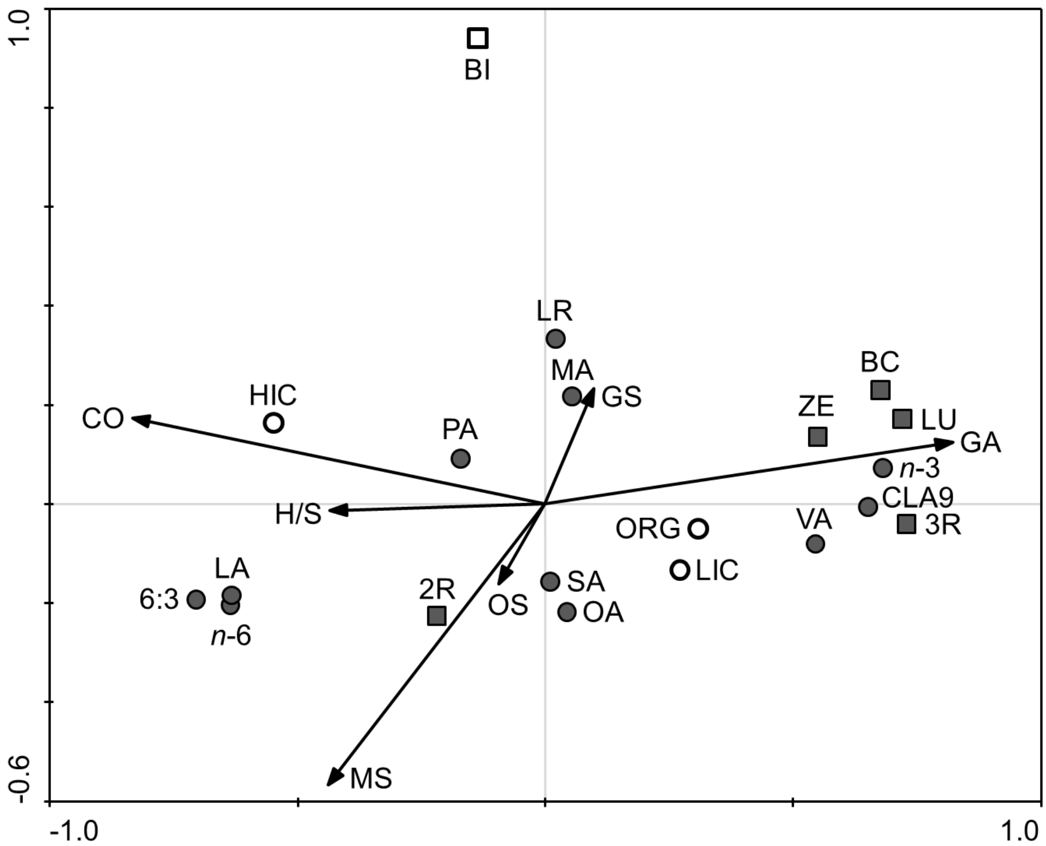
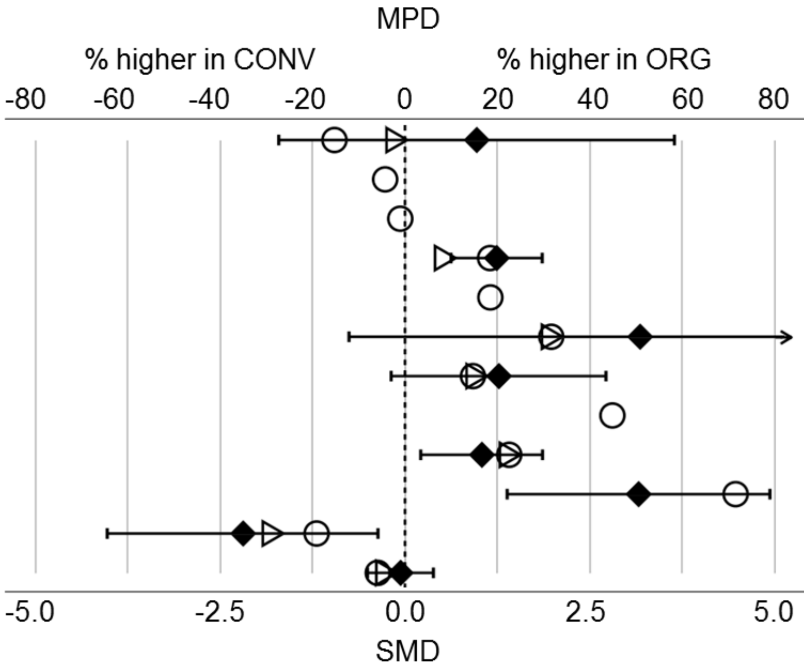


Figure S34. Bi-plot derived from the redundancy analysis showing the relationship between milk composition parameters (fatty acids (●) and antioxidants (■)) and cows feeding and rearing parameters (categorical explanatory variables (○,□)) and quantitative explanatory variables (➔). 6:3, *n*-3/*n*-6 fatty acids ratio; 2R, synthetic isomers of α-tocopherol; 3R, natural isomers of α-tocopherol; BC, β-carotene; BI, breed index; CLA9, rumenic acid (*cis*-9,*trans*-11-18:2); CO, concentrate feeds; GA, grazing intake; GS, grass silage; HIC, high-input conventional production system; H/S, hay or straw; LA, linoleic acid (*cis*-9,12-18:2); LIC, low-input conventional production system; LU, lutein; LR, lauristic acid (12:0); MA, myristic acid (14:0); MS, maize silage; *n*-3, omega-3 fatty acids; *n*-6, omega-6 fatty acids; OA, oleic acid (*cis*-9-18:1); ORG, organic production system; OS, other silage; PA, palmitic acid (16:0); SA, stearic acid (18:0); VA, vaccenic acid (trans-11-18:1); ZE, zeaxanthin.



Parameter	Standard meta-analysis			Sensitivity analysis 1		
	n	*P**	Heterogeneity†	*n*	Ln ratio‡	*P**
Milk yield	5	0.483	Yes (98%)	14	4.47	0.010
14:0 (myristic acid)	-	-	-	3	4.56	0.122
16:0 (palmitic acid)	-	-	-	3	4.59	0.372
MUFA	3	<0.001	No (0%)	4	4.76	0.055
OA (*cis*-9-18:1)	-	-	-	3	4.76	0.258
VA (*trans*-11-18:1)	4	0.116	Yes (96%)	4	4.85	0.060
PUFA	3	0.093	Yes (72%)	4	4.74	0.067
CLA (total)	-	-	-	3	4.97	0.123
CLA9 (*cis*-9-*trans*-11-18:2)	3	0.017	Yes (34%)	3	4.79	0.250
ALA (*cis*-9,12,15-18:3)	3	0.001	Yes (57%)	4	5.06	0.128
LA (*cis*-9,12-18:2)	3	0.021	Yes (70%)	4	4.44	0.124
SCC	3	0.805	No (0%)	5	4.55	0.320

Figure S35. Results of standard meta-analysis and sensitivity analysis 1 for milk yield, fat composition and somatic cells in goat, sheep and buffalo milk. MPD, mean percent difference; CONV, conventional samples; ORG, organic samples; *n*, number of datapoints included in meta-analysis; MUFA, monounsaturated fatty acids; OA, oleic acid; VA, trans-vaccenic acid; PUFA, polyunsaturated fatty acids; CLA, conjugated linoleic acid; ALA, α-linolenic acid; LA, linoleic acid; SCC, somatic cell count; SMD, standardised mean difference. **P* value <0.05 indicates a significant difference between ORG and CONV; †Heterogeneity and the I^2 Statistic; ‡Ln ratio = Ln(ORG/CONV × 100%); ○, MPD calculated using data included in sensitivity analysis 1; ▷, MPD calculated using data included in standard meta-analysis; ◆, SMD from the standard meta-analysis with 95% confidence intervals represented by horizontal bars.

Table S14. Mean percentage differences (MPD) for individual studies (study ID in parentheses, see Table S1 for references) calculated using the data for goat, sheep and buffalo milk and cheese of composition parameters shown in Fig. 2 and 3 of the main paper.

Parameter	**goat milk**	**sheep milk**	**buffalo milk**	**buffalo cheese**
SFA	-2^{NS} (386)	-9* (456)		
12:0 (lauric acid)	-3^{NS} (386)	-20^{NS} (456)		
14:0 (myristic acid)				-6^{NS} (155)
16:0 (palmitic acid)				1^{NS} (155)
OA (cis-9-18:1)				-7* (155)
VA (trans-11-18:1)				105* (155)
CLA (total)				45** (155)
n-3 FA	200* (385)	71* (385)		
ALA (cis-9,12,15-18:3)				40.63* (155)
n-6 FA	-22^{NS} (385)	3^{NS} (385)		
LA (cis-9,12-18:2)				-48* (155)
n-6/n-3 ratio	-5.36^{NS} (385)	-53^{NS} (385)		
n-3/n-6 ratio	267^{NS} (385)	67* (385)		
Atherogenicity Index	-18* (385)	-18* (385)		
α-tocopherol			52* (155)	44* (155)
Iron (Fe)		-33^{NS} (456)		
Urea		5^{NS} (616)	10^{NR} (474)	

SFA, saturated fatty acids; OA, oleic acid; VA, vaccenic acid; CLA, conjugated linoleic acid; FA, fatty acids; ALA, α-linolenic acid; . *Indicates significant difference between organic (ORG) and conventional (CONV) samples reported by the author when $P\leq0.05$; **Indicates significant difference between ORG and CONV samples reported by the author when $P\leq0.01$; ^{NS}Indicates that no significant difference between ORG and CONV samples were detected by the author; ^{NR}Indicates that the author did not reported significance of difference between ORG and CONV samples.

Table S15. Mean percentage differences (MPD) for individual studies (study ID in parentheses, see Table S1 for references) calculated using the data for bovine dairy products of composition parameters shown in Fig. 2 and 3 of the main paper.

Parameter	fermented milk	yoghurt	cheese	curd	butter	milk+cheese +butter	desalted milk, whey
SFA	1[NR] (455)	-5* (455)	-2* (190)	1[NS] (190)			
	-1[NR] (591)	-2[NR] (591)	-7[NR] (406)				
	-6[NR] (595)		7[NS] (556)				
	-1[NR] (705)						
12:0 (lauric acid)			18[NS] (556)				
14:0 (myristic acid)			13[NS] (556)		-1[NS] (666)		
16:0 (palmitic acid)	-14[NR] (595)		6[NS] (556)		-1[NS] (666)		
MUFA	1[NR] (455)	-8* (455)	13[NR] (406)	-1[NS] (190)			
	1[NR] (591)	2[NR] (591)	-11[NS] (556)				
	15[NR] (595)						
	2[NR] (705)						
OA (cis-9-18:1)			-12[NS] (556)				
VA (trans-11-18:1)	50[NR] (591)	54[NR] (591)	41[NR] (155)	44[NS] (190)	42[NR] (155)		
	73[NR] (595)		60* (190)		27** (666)		
	73[NR] (705)		46[NR] (406)				

SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; OA, oleic acid; VA, vaccenic acid; PUFA, polyunsaturated fatty acids. *Indicates significant difference between organic (ORG) and conventional (CONV) samples reported by the author when $P \leq 0.05$; **Indicates significant difference between ORG and CONV samples reported by the author when $P \leq 0.01$; [NS]Indicates that no significant difference between ORG and CONV samples were detected by the author; [NR]Indicates that the author did not reported significance of difference between ORG and CONV samples.

Table S15 cont. Mean percentage differences (MPD) for individual studies (study ID in parentheses, see Table S1 for references) calculated using the data for bovine dairy products of composition parameters shown in Fig. 2 and 3 of the main paper.

Parameter	fermented milk	yoghurt	cheese	curd	butter	milk+cheese +butter	desalted milk, whey
PUFA	4^{NR} (455)	-9^{NS} (455)	4^{NS} (190)	-2^{NS} (190)			
	33^{NR} (591)	40^{NR} (591)	27^{NR} (406)				
	-3^{NR} (595)		-9^{NS} (556)				
	1^{NR} (705)						
CLA (total)	129^{NR} (595)		61^{NR} (155)		72^{NR} (155)		
	4^{NR} (705)		53^{NR} (406)				
			38^{NR} (674)				
CLA9 (cis-9-trans-11-18:2)			56* (190)	33^{NS} (190)	96** (666)		
			-18^{NS} (556)				
n-3 FA			28^{NR} (406)				
ALA (cis-9,12,15-18:3)	101^{NR} (591)	114^{NR} (591)	51^{NR} (155)	51^{NS} (190)	91^{NR} (155)		
	21^{NR} (595)		68* (190)		68* (666)		
	111^{NR} (705)		18^{NS} (556)				
n-6 FA			18^{NR} (406)				
LA (cis-9,12-18:2)			-40^{NR} (155)	-25^{NS} (190)	-37^{NR} (155)		
			-19* (190)		-37* (666)		
			-3^{NS} (556)				

CLA, conjugated linoleic acid; FA, fatty acids; ALA, α-linolenic acid; LA, linoleic acid. *Indicates significant difference between organic (ORG) and conventional (CONV) samples reported by the author when $P \leq 0.05$; **Indicates significant difference between ORG and CONV samples reported by the author when $P \leq 0.01$; ^{NS}Indicates that no significant difference between ORG and CONV samples were detected by the author; ^{NR}Indicates that the author did not reported significance of difference between ORG and CONV samples.

Table S15 cont. Mean percentage differences (MPD) for individual studies (study ID in parentheses, see Table S1 for references) calculated using the data for bovine dairy products of composition parameters shown in Fig. 2 and 3 of the main paper.

Parameter	fermented milk	yoghurt	cheese	curd	butter	milk+cheese +butter	desalted milk, whey
n-6/n-3 ratio			-27[NR] (406)				
			-20[NS] (556)				
n-3/n-6 ratio			27[NR] (406)				
			20[NR] (556)				
α-tocopherol			33[NR] (406)			49* (155)	
β-carotene						101* (155)	
Iron (Fe)			12[NR] (406)				
Selenium (Se)							-59* (669)
							-36*** (669)

CLA, conjugated linoleic acid; FA, fatty acids; ALA, α-linolenic acid; LA, linoleic acid. *Indicates significant difference between organic (ORG) and conventional (CONV) samples reported by the author when $P \leq 0.05$; **Indicates significant difference between ORG and CONV samples reported by the author when $P \leq 0.01$; [NS]Indicates that no significant difference between ORG and CONV samples were detected by the author; [NR]Indicates that the author did not reported significance of difference between ORG and CONV samples.

3. ADDITIONAL DISCUSSION

Three previous systematic literature reviews[1-3] used meta-analyses methods to synthesise published information on composition differences between organic and conventional milk and/or dairy products, but report contrasting results and conclusions. The main results these studies are described and discussed below.

Dangour *et al.*[1] combined data for milk, meat and eggs extracted from 25 publications (12 deemed to be of satisfactory quality) and carried out unweighted meta-analyses (T-test with "robust standard deviation"). For livestock products their published paper only reports results for total fat and ash contents which were not significantly different. However, in their report to the sponsor of their study (UK Food Standard Agency)[4] meta-analyses results for total SFA, MUFA, PUFA, *n*-3 PUFA and *n*-6 PUFA were also reported. For most of these parameters no significant difference between organic and conventional livestock products was found in meta-analysis using all available data or only data from studies the authors deemed to be satisfactory. However, significantly higher concentration (P=0.001; n=12; MPD=10) and a trend towards higher concentrations (P=0.07; n=5; MPD=11) of total PUFA in organic livestock products were detected when all available data or only data from studies the authors deemed satisfactory, were used in meta-analyses respectively. Also, a trend towards higher *n*-3 PUFA concentrations (P=0.10; n=13; MPD=67) was detected when only data from studies the authors deemed satisfactory were used in meta-analyses. The Dangour *et al.*[1] study concluded: *"On the basis of a systematic review of studies of satisfactory quality, there is no evidence for difference in nutrient quality between organic and conventionally produced foodstuffs"*.

Palupi *et al.*[2] extracted data from 14 studies published between March 2008 and April 2011 reporting data for bovine milk (13 studies) and bovine dairy products (1 study) and carried out weighted meta-analyses. Results showed significantly higher (P<0.001) concentrations of fat, protein, SFA, PUFA, *n*-3 PUFA, ALA, EPA, DPA, CLA, vaccenic acid (VA), α-tocopherol and β-carotene, but lower concentrations of MUFA, stearic acid (18:0), oleic acid (18:1), *n*-6 PUFA and LA in organic compared to non-organic milk/dairy products. Palupi *et al.*[2] concluded that *"current regulation on dairy farming indeed enables the driving of organic farming to produce organic dairy products with different nutritional quality from conventional products"*.

Smith-Spangler *et al.*[3] extracted data from 37 studies reporting data for milk (30 on raw and 7 on pasteurised milk) and carried out weighted meta-analysis. Their published paper reported results for only 2 parameters, with significantly higher concentrations of *n*-3 PUFA (P<000.1; n=5) and VA (P<0.031; n=5) found in organic milk. Meta-analysis results for other milk quality parameters are said to be available as Supplement 6 on a website (*www.annals.org*) but could not be obtained from either the website or the authors. Despite showing organic milk has significantly higher *n*-3

PUFA concentrations, which Smith-Spangler *et al*.[3] describe as "*beneficial*" they conclude: *"The published literature lacks strong evidence that organic foods are significantly more nutritious than conventional foods."* and describe *"Studies were heterogeneous and limited in number, and publication bias may be present"* as a main limitation of their study.

4. ADDITIONAL REFERENCES

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3. Smith-Spangler C, Brandeau ML, Hunter GE *et al.* (2012) Are Organic Foods Safer or Healthier Than Conventional Alternatives?A Systematic Review. *Ann Intern Med* **157**, 348-366.

4. Dangour AD, Dodhia S, Hayter A *et al.* (2009) *Comparison of composition (nutrients and other substances) of organically and conventionally produced foodstuffs: a systematic review of the available literature*. *Report for the Food Standards Agency*. Nutrition and Public Health Intervention Research Unit London School of Hygiene & Tropical Medicine.