

Dairy *trans* fatty acids and cardiovascular disease: Implications for public health nutrition in South Africa

Abstract

Total *trans* fatty acid (TFA) intake is a risk factor for the development of cardiovascular disease. A critical review of recent studies suggests that different *trans* fatty acids (TFAs) may have different effects and that at present there is inconclusive evidence to specifically link dairy TFAs in amounts typically consumed to cardiovascular disease. From a public health nutrition perspective it is argued that in the current South African food and nutrition scenario dietary guidelines and legislation should focus on reducing intake of industrial TFAs (partially hydrogenated vegetable oils), for five inter-related reasons: (i) Dairy TFAs probably constitute a minority of total TFA intake. (ii) International experience has shown that changing food composition is an easier, short-term intervention than changing food choices. (iii) Malnutrition in South Africa includes under- and over-nutrition, often in the same household. (iv) Dairy foods and their components have mixed health effects. (v) A consistent nutrition message is needed for the nation.

Introduction

According to the South African Comparative Risk Assessment project about 59% of national ischaemic heart disease and 29% of ischaemic stroke burden in adult males and females of all population groups in the year 2000 could be attributed to hypercholesterolaemia.¹ Much international research has conclusively documented a relationship between diet on the one hand, and hypercholesterolaemia and cardiovascular disease on the other.¹ Amongst the major dietary factors that adversely affect serum cholesterol profiles are *trans*-fatty acids (TFAs), which also have adverse non-lipid effects like systemic inflammation, endothelial effects, adiposity and insulin resistance. The health effects of TFAs have been extensively reviewed.^{2,3-11} Many health authorities and professional societies have thus formulated positions on *trans* fatty acid (TFA) intake¹¹⁻¹³ and in many countries, including South Africa, legislation, regulations or guidelines in this regard have been published.¹⁴

Geometric isomerism in unsaturated fatty acid chains depends on the orientation of radicals around the axis of double bonds. If the radicals are on the same side of the bond, the compound is called "*cis*"; if on opposite sides, "*trans*", e.g. there are two isomeric forms of 9-octadecenoic acid: Oleic acid, the *cis* form, and elaidic acid, the *trans* form. In polyunsaturated fatty acids more than one geometric isomer is possible. TFAs are thus a group of unsaturated fatty acids with at least one carbon-carbon double bond in the *trans* configuration.^{5,8,12,13}

TFAs arise either from industrial hydrogenation or from natural biohydrogenation and/or isomerisation of *cis*-unsaturated fatty acids, with bacteria as catalysts, in the rumen of polygastric animals (cattle, sheep, goats) (hence "ruminant" TFA). Overall, ruminant TFAs are considered to be natural and have been part of the human diet as dairy or meat for thousands of years, as opposed to industrially produced TFAs, which are mainly derived from partially hydrogenated vegetable oils (PHVO). Amongst the fatty acids of relevance to human nutrition the C18:1 cluster is quantitatively the most important. Vaccenic acid (C18:1 t11) is the predominant TFA in milk and meat, whilst elaidic acid (C18:1 t9) is the major TFA produced through partial hydrogenation of vegetable oils.^{5,11,12,14} Whilst the predominant TFAs are clear, there is also considerable overlap of TFAs in fats occurring in natural (ruminant animal) origin and in PHVO.¹⁵

The aim of this review is firstly to critically evaluate recent studies investigating the relationship between ruminant (with special emphasis on dairy) TFAs and cardiovascular disease and risk factors, and secondly to argue why in South Africa dairy TFAs should be distinguished from industrially produced TFAs, thus supporting the notion that until more conclusive evidence to the contrary is available, health recommendations and legislation should focus on the latter.

Dairy TFAs and cardiovascular disease

As stated above, total TFA intake has been implicated as a risk factor for cardiovascular disease. Driven by the international quest for evidence-based clinical practice, Booker and Mann¹⁶ critically examined the evidence base relating intakes of TFAs directly and indirectly to cardiovascular health. They concluded that there is sufficient evidence for a probable positive association between TFA and coronary heart disease, thereby justifying a firm recommendation to reduce total TFA intake.

The question, however, arises whether this association is equally true for industrially produced TFAs and for ruminant TFAs. A number of observational, prospective epidemiological studies that included large sample sizes over extended periods of time could not find a positive association between intake of ruminant TFAs (either as absolute or energy-controlled intakes) and cardiovascular disease risk. In fact, in some of these studies a trend towards the reverse (that is a protective association) was noted, for example amongst women.^{8,17}

The above observational research has been supplemented by randomised, double-blind, placebo-controlled, cross-over intervention trials to determine specifically whether industrially produced TFAs differ from ruminant TFAs. Tricon *et al*¹⁸ concluded from their study on 32



healthy men that intakes for 6 weeks of full-fat dairy products enriched with vaccenic acid at levels of about 1.6% of energy intake had no effect on most cardiovascular risk factors. Chardigny et al¹⁹ found in the TRANSFACT study (n=40) that industrially produced TFAs had different effects than ruminant TFAs on cardiovascular disease risk factors in women (but not in men), when about 5% of energy (11-12 g/day) was given as TFAs: the natural sources of TFAs significantly increased high-density (HDL) and low-density lipoprotein (LDL) cholesterol. Furthermore, the HDL-lowering effect was mainly associated with industrial TFAs.

In another investigation Motard-Belanger et al²⁰ concluded after a four-week trial on 38 healthy men that “whereas a high dietary intake of TFA from ruminants may adversely affect cholesterol homeostasis, moderate intakes of ruminant TFA that are well above the upper limit of current human consumption have neutral effects...”. The “high” intakes in this study referred to 3.7% of energy (about 13.3 g/day), whilst the “moderate” intake contributed 1.5% of energy (about 5.6 g/day).

The ruminant TFA intakes in the latter two studies were considerably higher than usual intake (see also later in this paper). Furthermore, the short duration of these trials remains a cause for concern. The type, selection and number of participants, composition of the experimental diets (e.g. saturated fatty acid content) and the statistical power of the studies may be additional limitations.^{10,21} Jacobsen et al²² also warns that in some of the earlier studies the comparisons between ruminant TFAs and industrially produced TFAs were based on quintiles of intake, which implies that the associations between the two sources of TFAs and the risk of CHD were described across different ranges of intake: for ruminant TFAs the quintiles covered intakes ranges from 0.5 to 2.5 g per day, whereas for industrially produced TFAs intakes ranged from 0.1 to 5.1 g per day. Another unresolved issue is whether the risk between TFA and coronary heart disease is related to absolute or energy adjusted intake of TFA.²²

In view of the above controversy, Brouwer et al²³ conducted a quantitative review of 39 carefully selected original studies that attempted to differentiate the effect of animal and industrial fatty acids on HDL- and LDL-cholesterol levels in humans. They state that “published data suggests that all fatty acids with a double bond in the trans configuration raise the ratio of plasma LDL to HDL cholesterol” in a linear fashion. They do, however, recommend and refer to ongoing investigations in this regard. The critical difference between industrially produced TFAs and ruminant TFAs at this stage seems to be the amount consumed.¹¹ The structural difference of the major ruminant TFA, and the fact that vaccenic acid is a precursor of conjugated linoleic acid, which may possibly in itself beneficially affect cardiovascular health,^{25,25} could also potentially explain the difference in biological effect between ruminant and industrially produced TFAs²² even though research in this regard is also inconclusive or contradictory.^{25,26} The effect of vaccenic acid on cardiovascular disease thus remains to be clarified.

A current intervention study by Gebauer et al²⁷ is specifically designed to address the above lack of conclusive evidence: their objective is to determine if there are differential effects of isomers from industrial TFA and ruminant TFA on risk factors for cardiovascular disease within a highly controlled, large scale feeding study. The base diet had 34% of energy from fat and was low in TFA providing about 0.1% energy from mixed TFA. This was compared to three other diets: Base diet with 3.0% of energy from vaccenic acid, base diet with 3% of energy from mixed isomers of PHVO, and base diet with 1% of energy from

cis-9, trans 11 CLA (rumenic acid). The added energy from TFAs iso-calorically replaced energy from stearic acid.

In a recent investigation into the food sources of ten different specific plasma biomarkers of TFAs in 3330 free-living people Micha et al²⁸ showed that “...individual plasma phospholipid TFA isomers have differing relations with each other and with specific food sources, thus highlighting the importance of a separate consideration of health effects, related underlying mechanisms, and policy implications of different TFA isomers”. The trend that was observed is that the t-18:1 plasma isomers were the most abundant, they were inter-related, and were similarly derived from numerous PHVO-containing foods (bakery foods, fried foods eaten away from home, biscuits, salty snacks, and margarine). The t-16:1 isomers were found in small amounts, they were not inter-related, and each was associated with very different dietary sources. Surprisingly, t-16:1n-7 (and not t-18:1n-7) turned out to be a specific marker of ruminant fat intake. The c/t 18:2n isomers were inter-related and related to the t-18:1 isomers and to bakery foods, but these foods accounted for only a very small percentage of the variation of total t-18:2.28 All of the above clearly highlights the complexity, points to gaps in current knowledge, and supports the idea that investigations into the effect of TFAs on health requires differentiation of the different TFA isomers.

International health and nutrition organisations as well as researchers thus increasingly limit their discussion of adverse health impacts explicitly to industrially produced TFAs.^{8,11} The World Health Organization Scientific Update on TFAs goes as far as specifying that “there is convincing evidence that TFA from commercial partially hydrogenated vegetable oils increase coronary heart disease risk factors and coronary heart disease events”, but for ruminant TFA more research is needed.^{9,14,16,22,28-30}

WHY SOUTH AFRICAN PUBLIC HEALTH NUTRITION ADVICE SHOULD PRIMARILY FOCUS ON INDUSTRIALLY PRODUCED TFA

1. Dairy TFAs are a minority TFA

Estimates of individual TFA intake rely on detailed dietary assessment methodology and food composition data, either from tables or analyses. Similarly, population-based intake studies are also complicated by methodological problems. This results in hugely varying estimates of the TFA content of diets among countries and sub-populations within countries,³¹ exacerbated by continuing changes in production and processing techniques due to the insights of adverse health effects of TFAs, regulatory pressure and consumer demand.

As a consequence of the above, in many European countries total TFA intakes have dropped considerably and are estimated to be close to the internationally recommended maximum of 1% of energy intake (about 1-3 g/day) with ruminant TFAs becoming the major TFA.^{14,32} This makes older intake data redundant, even though major differences among countries persist.^{14,31,32} Furthermore, certain sub-populations within countries may still have excessively high intakes.³³ These researchers also compared (between 2005 and 2008) in several countries the TFA content of three index foods: a large serving nuggets (160 g) or French fries (171 g); 100 g biscuits/cakes/wafers; and 100 g microwave popcorn. For South Africa the percentage TFA of total fats for the three foods was 28, 34 and 50 respectively, amounting to about 28 g of TFA in such a “high TFA menu”. For Denmark (in 2005) and the USA the respective amounts were 0g and 45 g. Overall, Filip et al¹² reason that at present TFAs appear to be a problem particularly affecting



developing countries for example India and Iran. In developing countries TFAs have been calculated to contribute 4% or more of energy intake (Micha & Mozaffarian, 2008).⁸

Total TFA intake in SA is unknown, but as a developing country or a country in transition where regulations in this regard have only been published in 2011, it is assumed to come primarily from industrially produced TFA. The intake of ruminant TFA would thus contribute a small absolute and percentage of total energy intake, as was also concluded by Micha and Mozaffarian.⁸ The distribution of ruminant TFA intake depends on national and individual food practices. In Denmark, for example, 85% of ruminant TFA intake comes from dairy products and 15% from ruminant meat, making high-fat dairy products the main determinant of total ruminant TFA intake.³³

Dairy intake: Many factors influence dairy consumption. On population level, aspects such as the current economic climate in a country are important, whereas household food insecurity and food preferences may determine the intake of milk and dairy products on the household and individual level, respectively.

Methods used to assess food intake include consumption estimates based on market size and share information. Population level, total consumption estimates (based on production plus imports minus exports) by the South African Milk Processors Organisation (SAMPRO)³⁴ suggest that in 2008 54% of raw milk in South Africa was used in fluid form (i.e. flavoured milk; maas and buttermilk; yoghurt; ultra-high temperature [UHT] milk and sterilized milk; and pasteurised milk). The latter made up 52.7% of the total consumption. Concentrated products (i.e. butter, whey powder, buttermilk, condensed milk, cheese and milk powder) constituted 46% of the total consumption.

Speedy³⁵ reported on the global consumption of animal source foods from the Food and Agriculture Organization of the United Nations (FAO) statistical database. Milk consumption in South Africa was reported as 43.2 kg per capita per year, 7% lower compared to the global average of 46.4 kg.

In Table I milk consumption data for South Africa are given by Living Standards Measure (LSM) group.³⁶ For TFA intake, such population level assessments usually result in estimates that

are higher than estimates based on reported consumption.^{5,31} Nevertheless, Table I suggests that milk consumption is related to living standard: among the higher LSMs there are higher percentages of milk drinkers.

Table I: Estimated milk consumption of the South African population by LSM group*

LSM group*	Size of population ³⁶ group (million)	% that drinks fresh milk ³⁶
1	1092	27.9
2	2314	50.9
3	2466	54.7
4	4476	58.7
5	4782	67.9
6	6140	73.2
7	3214	80.9
8	2368	81.6
9	2668	79.4
10	1986	81.4

* Living Standards Measure, where 1 denotes the lowest and 10 the highest level

A second method of estimating TFA intake involves analysis of dietary consumption data of a representative population using food composition tables and thereby yielding crude appraisals of individual intake. According to the National Food Consumption Survey (NFCS) of 1999 about 42% (1200 out of 2868) of 1-9 year old South African children reportedly consumed whole milk on the day before, amounting to a mean intake of 167 g for the day. Milk was also listed as the 4th most commonly eaten food by these children.³⁷ A summary by Nel and Steyn³⁸ on the food consumption studies conducted in South Africa from 1983–2000, reported an average per capita milk (and milk products) consumption of persons ten years and older of 129.05 g/person/day. No single South African study assessed the food (dairy) intake of the whole nation (i.e. including older children and adults), nor focussed on TFA intakes.

It is tempting to think that estimates based on the TFA content of biological tissues (biomarkers) offer an ideal solution, but the results of Micha *et al*²⁸ highlight that there is not a direct link between specific food sources and specific plasma phospholipid TFA isomers. On the other hand, Mueller *et al*³⁹ have identified a specific isomer ratio in human milk that holds promise as an indicator of TFA intake. Intake estimates based on laboratory analysis of duplicate portions or composite diets are only used in surveys or trials with large budgets.

TFA composition of dairy products: The total fat content of milk is typically around 33 g per litre for full cream milk. Triacylglycerol accounts for about 95% of the lipid fraction. The remainder comes from diacylglycerol (2%), phospholipids (1%), and cholesterol and free fatty acids (each about 0.5%). Roughly half of the milk fatty acids are saturated (about 19 g/litre), of which palmitic acid is the most abundant. Oleic acid is the unsaturated fatty acids with the highest concentration (about 8 g per liter whole milk).⁵ In total, however, more than 400 different fatty acids have been detected in milk fat.⁴⁰ Commonly available food composition tables do not provide fatty acid profiles to this level. TFAs comprise a minority (typically 3–5%; range: 1–8%) of total ruminant fatty acids. Amongst the TFAs vaccenic acid predominates. Ruminant TFAs may contain up to 20% of its TFAs as C16:1, which does not occur in industrially produced TFAs from vegetable oils. Up to 25% of total TFAs in ruminant fat are conjugated linoleic acids, of which about 90% are rumenic acid (C18:2 *cis-9, trans 11*).^{5,25,33,41,42}

The numerous factors influencing fatty acid composition of dairy explain differences in the values reported. These are, however, much lower than the variations in industrially produced TFAs, where differences among brands, within a brand at different places and occasions and over time have been observed.^{10,13,33} Some of the factors that affect dairy TFA composition are

- Between and within country differences^{40,43-45}
- Seasonal influences: Total milk fat and ruminant TFA varies in autumn, spring and summer. TFA concentration may be twice as high in summer milk as in winter milk^{40,43,46,47}
- Feeding regimes and age of cows.^{40,43}

Overall there is an inverse relation between the concentration of TFAs and saturated fatty acids in milk.⁴³

O'Donnell-Megaró *et al*⁴⁵ investigated the fatty acid composition of retail milk in the USA and concluded that whilst there were statistically significant differences across seasons and regions, these were minor from a practical human nutrition perspective. Furthermore, TFA content of different dairy products (e.g. butter, cheese) from the same region showed no significant variation in fatty acid content, suggesting that processing i.e. making of butter or cheese has little or no effect on the fatty acids composition of different dairy products.^{7,40} No representative South African dairy TFA composition data are available, and the (total) TFA content of foods listed in the MRC (SA) Food Composition Tables⁴⁸ is borrowed and may well be dated.

Based on the above, the International Dairy Foods Association (IDFA)⁴⁶ data appear to be a meaningful basis for describing the TFA composition of dairy. Accordingly raw milk is taken to contain an average of 0.13 g of TFAs per 100 g milk, or 3.56 g of TFAs per 100 g milk fat. This single value is used by SAMPRO to derive a value for TFAs that represents the nutrient content of fluid milk, milk products and the dairy ingredient portion of the products such as dairy ice cream and frozen dairy desserts.

In Table II a possible TFA content of dairy foods in South Africa in typical serving sizes is given. For comparison purposes the total TFA content as published in the MRC (SA) Food Composition Tables is also added in spite of the reservations mentioned above.

Based on the limitations of dietary assessments in general and specifically in respect of dairy intake in South Africa, and the variability of the composition of the lipid fraction of dairy, it is evident that all estimates of dairy TFA consumption should be treated with great caution. Nevertheless, the available information suggests that dairy TFAs are a minority TFA in the diet of the majority of South Africans.

2. Changing food composition is more effective than changing food-related consumer behaviour

Kristal *et al*⁴⁹ have proposed that, from a consumer perspective, behaviour change for selecting low-fat diets is can be achieved through the following options:

- excluding high-fat ingredients and preparation techniques,
- modifying high-fat foods,
- substituting specially manufactured low-fat foods for their higher-fat counterparts
- replacing high-fat foods with low-fat alternatives.⁴⁹

In public health nutrition the reduction of TFA intake can be driven from the supply side and/or from a demand perspective. A supply-driven approach refers to changing the food available to the consumer and the latter means addressing the demand by consumers. In a supply-driven approach the production and processing of foods are addressed. Broadly speaking, reducing industrially produced TFAs and the use thereof in processed food products represents mainly the supply side, whereas focussing on ruminant TFAs would be more on the demand side, as it would entail empowering consumers to make behaviour changes and would refer to the above-mentioned options of Kristal *et al*.⁴⁹ It is, however, true that fat-modified dairy products are also increasingly produced through feeding or breeding on the one hand, and enzymatic and physical modification on the other hand^{30,50} especially on experimental level in industrialised countries, where dairy TFAs are gradually contributing a bigger proportion of total TFA intake.

In general, in current practice, achieving behaviour change and a change in demand by reducing ruminant TFA intake is much more complex than reducing the industrially produced TFA content of foods.²² This was confirmed by the Dutch experience, where the national per capita TFA intake fell from 15 g in 1980 to 3 g per day in 2003 mainly due to actions by industry. Dairy products and meat are now the major source of TFAs in the Netherlands.³² The introduction of legislation to regulate the use of specifically industrially produced TFAs in commercially available foods, can be expected to result in a decline in the intake of TFAs. The subsequent labelling requirements should result in further decline in TFA consumption due to reformulation of products and consumer awareness.³¹

Thus, focussing on the supply and implicitly on industrially produced TFAs seems to be the recommendable immediate approach to effectively address the challenge of reducing TFA intake in South Africa.

In practice, TFAs cannot be specifically targeted for replacement, but rather (in the case of industrially produced TFAs) the PHVO must be replaced. In a quantitative meta-analysis it was pre-

Table II: Trans fatty acid content of selected dairy products per serving

Product	Total fat/100g (g)	TFA/100g* (g)	Total TFA/100 g according (g)	Illustrative serving size (g) to MRC(SA) ⁴⁸	Total fat / serving (g) ³⁴	TFA per serving ³⁴ (g)
Whole milk	3.43	0.12	0.23	250	8.58	0.31
Cheddar cheese	32.3	1.15	2.22	40	12.92	0.46
Full-cream cottage cheese	11	0.39	NA	75	8.25	0.29
Feta	27.8	0.99	NA	40	11.12	0.40
Low-fat plain yoghurt	1.86	0.07	0.07	175	3.26	0.12
Cream	39.7	1.41		50	19.85	0.71
Butter	80.4	2.86	5.26	8	6.43	0.23

* Calculations based on the ruminant TFA value of 3.56g TFA/100g milk fat obtained from IFDA⁴⁶

dicted that the greatest benefits in terms of numerous cardiovascular disease risk factors can be expected by replacing 7.5% of energy of PHVO with vegetable oils, but even replacement with butter and lard resulted in benefits.⁵¹

The focus on modifying the supply side of consumer food choice should, however, not detract from the responsibility of health care professionals to empower the South African consumer to demand the health promoting options of dairy. In respect of dietary advice regarding consumption of animal foods, adherence to guidelines for saturated fatty acid intake will almost automatically ensure low consumption of ruminant TFA.

In conclusion: Changing the composition of foods is more effective and easier than to change consumer behaviour. It is an achievable short and medium-term goal.

3. Dairy plays an important role in South Africa's double burden of disease

South Africa has a double burden of nutrition-related diseases.⁵² This means that, on the one hand, non-communicable diseases of lifestyle are rife, and, on the other hand, a major proportion of the population is affected by nutritional deficiencies: often in the same communities, households, and even in the same person.

Dairy is an important source of many nutrients that are critical for the nutritional well-being of the South African nation as a whole. It seems short sighted to support a strategy, which may inadvertently disadvantage a major segment of the population. Even for a country such as Denmark, it was considered to be more feasible to eliminate industrially produced TFAs from foods without side effects for the population.³³ Referring to ruminant TFAs in the USA context Remig *et al*¹¹ state that "it is impossible to completely eliminate trans fats from a balanced diet".

4. Dairy refers to food with mixed effects on cardiovascular health

In the context of prevention and management of non-communicable disease, dairy may affect cardiovascular disease by various mechanisms: the diverging mechanisms suggest both positive and negative influences. On the one hand there are potentially protective macro and micro components such as whey, calcium, polar lipids, as well as processing and production techniques (e.g. fermentation) and vitamin B12, and, on the other hand, components such as the saturated fatty acids in full cream dairy may adversely affect heart health. It follows that in the final analysis of the association between dairy and cardiovascular disease the focus should be on whole foods and not on individual components.⁴⁷ This also holds true for dairy fats specifically, where the association between the fat components and cardiovascular disease may be strong, yet this may be less consistent between dairy foods and cardiovascular disease.⁵³

The above was the focus of the recent study by Soedamah-Muthu *et al*.⁵⁴ They performed a dose-response meta-analysis of 17 prospective cohort studies, investigating the association between milk and dairy consumption on the one hand, and incidence of cardiovascular diseases (coronary heart disease and stroke) and all-cause mortality on the other hand. The following was found: There was a modest inverse association between milk intake and risks of overall cardiovascular disease. The relative risk (95%CI) was 0.94 (0.89, 0.99) with a daily milk intake of 200 mL. Furthermore, milk intake was not associated with risk of coronary heart disease, stroke or total mortality. The researchers concluded that whilst "milk and dairy products

cannot be recommended to benefit cardiovascular disease", "...intake of milk and dairy products does not seem to be harmful".⁵⁴

Taking all available information into consideration the USA in its Dietary Guidelines for Americans 2010 continues to recommend daily intake of two to three servings of low-fat or skim milk as it specifically addresses shortfall nutrient intakes.⁵⁵

5. A consistent message is needed

In South Africa nutrition professionals and the government (Department of Health) have adopted a set of food-based dietary guidelines, which should be the basis for disease prevention and health promotion. For such a policy to have impact, it has to be consistently applied. From the behaviour change options explained above, the avoidance (by substitution or replacement) of dairy foods (in order to reduce ruminant TFA intake) would send out an inconsistent message, whereas excluding "fast foods" or making substitutions (in order to reduce industrially produced TFA intake) would fit into the general approach for all South Africans.

CONCLUDING REMARKS

Internationally countries have addressed the challenge of reducing TFA intake in different ways, e.g. Denmark totally banned the use of TFA, but excluded ruminant TFA from the regulation, based on analyses such as those published by Stender *et al*.³³ On the other hand the FDA of the USA included ruminant TFAs in its labelling rules for TFAs, but exempted conjugated linoleic acid. The American Dietetic Association, the (USA) Institute of Medicine, the US Dietary Guidelines, and the National Cholesterol Education Project specifically refer to limiting industrially produced TFA in their recommendations to minimize TFA.^{3,11} In the Dietary Recommendations on fat intake by the FAO/WHO Expert Consultation²⁸ the current recommendation of a mean population intake of TFA of less than 1% of energy intake is acknowledged. At the same time it is also realised that this may need to be revised as it does not fully account for the distribution of intakes within populations: certain sub-groups may have dangerously high intakes.

From the above review and critical analysis it is evident that current scientific knowledge regarding dairy TFAs in cardiovascular disease risk is not yet complete. Furthermore, based on the likelihood that dairy TFAs are minority TFAs in South Africa, the international experience that changing food composition is easier than changing consumer behaviour, the current co-existence of under- and over-nutrition in the country, the need for consistent public health nutrition messages, and the fact that dairy is a complex food where the components may have mixed health effects, it seems advisable to exclude dairy from TFA recommendations and regulations at this stage. The very recent South African regulation in this regard prohibits the sale, manufacturing and importation of oils and fats intended for human consumption in the retail trade, catering business, restaurants, institutions, bakeries etc of which the TFA exceed 2 g per 100 g fat.¹⁴

In practice, the advice to select a diet that emphasizes vegetables and fruits, whole wheat, fat-free or low-fat dairy, lean meat, poultry and fish in line with the food based dietary guidelines should remain in place.

DECLARATION

Both authors are members of the Technical Advisory Committee of the Consumer Education Project of Milk SA.

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