A large supermarket in metropolitan Melbourne, Australia.

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Abstract

To assess the nutrient profile of yoghurts and dairy desserts in Australia.

Consumer: are they becoming less healthy?

Yoghurt and dairy snacks presented for sale to an Australian consumer: are they becoming less healthy?

Keywords

Yoghurt, Dessert, Food label, Nutrient profiling

Yoghurt consumption may improve absorption of micronutrients such as Zn(5), reduce the duration of diarrhoeal infection(6) and improve cellular immune function(7). Mediterranean diets, well known for their health benefits(8), commonly include plain natural yoghurt daily(9). Yoghurt, moreover, has been promoted in Australia as one of the healthiest convenience foods(3). Certainly, traditional natural yoghurt manufactured with cultures of Lactobacilus bulgaricus and Streptococcus thermophilis is clean in nutrient terms compared with many other yoghurts(10), and some traditional brands are low in added sugars(11). We have previously reported on the nutrient content of yoghurts targeted at children(1).

However, in recent years sales of yoghurt have risen steadily. In 2007, sales were $AU 982 million(1).

Consumption of yoghurt and dairy desserts in Australia is rising significantly (P<0.05). The proportion of full-fat yoghurts(7) has increased while protein decreased (all P<0.001). In yoghurts, median energy and total fat content also increased from milk with perhaps salt (displaying four 'green traffic lights'), while 21% (2005) or 28% (2008) were 'healthy' (i.e. displaying four 'green traffic lights') for high fat, saturated fat, salt and sugar content) rose from 12% in 2005 to 23% in 2008. Only 1–2% could be deemed 'healthy' by the most stringent criterion (displaying four 'green traffic lights').

In total, 248 and 140 dairy snacks (yoghurt, fromage frais or dairy desserts) were surveyed in 2005 and 2008 and nutrients analysed by two nutrient profiling systems. Nutrition information panels and product labels on yoghurts and dairy desserts offered for sale were surveyed in 2005 and 2008 and nutrients analysed by a nutrient profiling system that included a score for protein. Sucrose, the most common sweetener, was found in levels up to 29 g/100 g. Claims on packaging by a nutrient profiling system that included a score for protein. Sucrose, the most common sweetener, was found in levels up to 29 g/100 g. Claims on packaging

Conclusions:

The deterioration in nutrient quality of yoghurts needs to be redressed.
Experimental methods

Data collection
The Australian food supply is dominated by two supermarket chains controlling around 80% of all food sales. In 2005 and 2008, surveys were undertaken to record information given on the nutrition information panel (NIP), and elsewhere on the packaging, of all yoghurts and dairy desserts presented for sale in a single large supermarket in metropolitan Melbourne. Data were collected and recorded on standardised entry sheets as described elsewhere. In 2008, information in the ingredient list was also noted with codes translated according to the Australian Food Additives Code. Yoghurt is defined by Standard 2.5.3 of the Australia New Zealand Food Standards Code (ANZFSC) as a milk product fermented by lactic acid-producing microorganisms to which other food (such as fruit) can be added. Yoghurt drinks were not surveyed. Fromage frais comprised products marketed in Australia as FrucheTM, while dairy desserts included custards and crème caramel, mousse, dairy rice puddings and cheesecakes often consumed in Australia as snacks. In accordance with the Code of Practice on Nutrient Claims in Food Labels and in Advertising (CoPoNC), yoghurt described as ‘full fat’, ‘reduced fat’ or ‘no fat’ had >3 g fat/100 g, <3 g fat/100 g or <0-01 g fat/100 g, respectively.

Data analysis
Data were analysed using the SPSS for Windows statistical software package version 15.0.1 (SPSS Inc., Chicago, IL, USA). Items in each category were assessed as the sum of products and product varieties (flavour alternatives). Due to non-symmetrical distribution of data, aggregates are presented as the median and interquartile range (IQR). Dairy snacks were assessed using the green/amber (low/medium content) or amber/red (medium/high) boundaries of the UK ‘traffic light’ system. As ‘added sugar’ was not listed on the NIP, the amber/red boundary for sugar was determined as ‘total sugars’ minus 4:8 g/100 g. an average sugar content for natural yoghurt as reported by Australian Food Composition Tables. The OFcom nutrient profiling system was also used with foods assessed according to both positive criteria (% fruit, AOAC fibre, protein g/100 g) and negative criteria (kJ, saturated fat, total sugar and Na per 100 g).

Results
In 2005, 248 dairy snacks were surveyed while 140 were surveyed in 2008. Yoghurts constituted about two-thirds of these foods (Table 1). Between 2005 and 2008, packet size rose from (median (IQR)) 200 (300) g to 350 (250) g (P<0.001). This reflected an increase in the size of individual tubs rather than an increase in the proportion of family-sized tubs of similar composition (sold as 1 kg or 6 × 200 g; data not shown).

Table 1 indicates the nutrient content of surveyed items. For yoghurt, median energy and total fat content increased significantly between 2005 and 2008 (both P<0.05) while median protein content decreased (P<0.01). For fromage frais, the median content of carbohydrate (P<0.001), sugars (P<0.01) and Na (P<0.001) rose over the same period. For dairy desserts the median levels of total and saturated fat also rose significantly (both P<0.05).

In 2005, 36% of yoghurts and dairy desserts were ‘full fat’ (>3 g fat/100 g). By 2008 this proportion had risen to 46% (P<0.05). The contribution of sugars to total energy content in ‘reduced-fat’ yoghurts was notable (Table 2). Indeed, of all ‘reduced-fat’ yoghurts surveyed in 2008, 7% had energy content above the median for ‘full-fat’ products (Fig. 1). The lowest energy content found among ‘full-fat’ products was in a European-style natural yoghurt (3 g fat/100 g). The majority (90%) of ‘reduced-fat’ yoghurts contained more energy than this ‘full-fat’ product.
As seen in Table 2, the median carbohydrate content of ‘full-fat’ yoghurt increased by 2008 ($P < 0.001$) while median Na level decreased ($P < 0.05$). In ‘reduced-fat’ yoghurt over the same time, total fat and saturated fat content increased ($P < 0.001$ and $P < 0.05$, respectively) while protein content decreased ($P < 0.001$). Figure 2 examines the energy density of dairy snacks in relation to fat and sugar content. There was not only a strong relationship between fat content and energy density ($r = 0.820$, $P < 0.001$) but also a strong relationship between sugar content and energy density ($r = 0.690$, $P < 0.001$).

Table 3 assesses yoghurts and dairy desserts against UK ‘traffic light’ criteria for the ‘green’ labels that indicate a low content of fat, saturated fat, total sugars and salt. Although all yoghurts and dairy desserts met the relevant criterion for salt content, very few met either the criterion set for sugar or all four criteria. Moreover, the proportion meeting four ‘green’ criteria declined between 2005 and 2008, while the proportion that would receive one or more ‘red light’ labels (indicating a high fat, saturated fat, sugar or salt content) increased significantly from 12% to 23% ($P < 0.01$). When yoghurts and dairy desserts were categorised according to a nutrient profiling model that included a score for protein content, only 21% (in 2005) or 28% (in 2008) were deemed ‘healthy’.

### Table 2 Nutrient content of yoghurts surveyed in a large supermarket in metropolitan Melbourne, Australia

<table>
<thead>
<tr>
<th></th>
<th>Full fat</th>
<th>Reduced fat</th>
<th>No fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of items</td>
<td>59</td>
<td>41</td>
<td>74</td>
</tr>
<tr>
<td>Energy (kJ/100 g)</td>
<td>Median</td>
<td>IQR</td>
<td>Median</td>
</tr>
<tr>
<td></td>
<td>475</td>
<td>69</td>
<td>510</td>
</tr>
<tr>
<td>Protein (g/100 g)</td>
<td>4.7</td>
<td>1.2</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>4.5***</td>
<td>0.2</td>
<td>4.5***</td>
</tr>
<tr>
<td></td>
<td>3.7***</td>
<td>0.2</td>
<td>3.7***</td>
</tr>
<tr>
<td>Total fat (g/100 g)</td>
<td>3.4</td>
<td>1.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Saturated fat (g/100 g)</td>
<td>2.2</td>
<td>0.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Carbohydrate (g/100 g)</td>
<td>14.9</td>
<td>4.8</td>
<td>16.2**</td>
</tr>
<tr>
<td>Sugars (g/100 g)</td>
<td>13.8</td>
<td>5.1</td>
<td>14.7</td>
</tr>
<tr>
<td>Na (mg/100 g)</td>
<td>63</td>
<td>19</td>
<td>57*</td>
</tr>
<tr>
<td>Ca (mg/100 g)</td>
<td>160</td>
<td>46</td>
<td>138</td>
</tr>
</tbody>
</table>

IQR, interquartile range.
Median values were significantly different from those in 2005: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$. 

### Fig. 1 Energy content of ‘full-fat’ compared with ‘reduced-fat’ yoghurts offered for sale in a large supermarket in metropolitan Melbourne, Australia (combined data from 2005 and 2008; horizontal lines indicate the median)

### Fig. 2 Energy density of dairy snacks offered for sale in a large supermarket in metropolitan Melbourne, Australia in 2008 as related to (a) fat content per 100 g ($r = 0.690$) and (b) sugar content per 100 g ($r = 0.820$)
In 2008 ingredients for yoghurts and dairy desserts were also surveyed (Table 4). Products had up to fifteen separate additives, 50% had six or more added ingredients. In yoghurts, modified starch, gelatine, pectin, agar and locust or carob bean gum were common thickeners. Fromage frais were more often thickened with modified starch while dairy desserts were more often thickened with carrageenan. About half the yoghurts contained acidity regulators (sodium citrate and/or sorbic and citric acids). Few yoghurts were fortified with micronutrients, n-3 fatty acids or inulin, in contrast to dairy desserts where 17% contained added vitamins and/or minerals and 10% contained inulin. Fromage frais remained unfortified. Main colourings used were cochineal and annatto.

Sugar (sucrose) was the most common sweetener, found in levels up to 29 g/100 g. In yoghurt, the most common alternative/additional nutritive sweeteners were honey, fruit juice concentrate and glucose. In fromage frais, sweetening with apple/fruit juice was common while glucose was often added to dairy desserts. Nearly 20% of yoghurts and 10% of dairy desserts contained non-nutritive sweeteners (acesulphane K or aspartame). A few dairy desserts contained sorbitol. Sucralose was used rarely.

Although few dairy snacks could be described as ‘healthy’, a great many made nutrition-related claims (Table 5), many of these directed towards parents with children. The most common related to Ca, protein or fat.
We previously reported that 91% of snack foods would carry at least one ‘red’ label indicating a high content of fat, saturated fat, salt or sugar as judged by UK traffic light criteria\(^{(14)}\). Yoghurts and dairy desserts compare favourably with non-dairy snacks: only 23% in 2008 passed one or more criteria for a ‘red traffic light’ label. Nevertheless, the proportion of ‘less healthy’ yoghurts and dairy desserts overall is substantial and appears to be growing. We have also applied the Ofcom model\(^{(19)}\) that scores a wider range of nutrients although its primary focus is children’s foods. Using this model, the proportion of ‘less healthy’ yoghurts and dairy desserts becomes even higher.

A clear interpretive front-of-pack nutrition label on dairy snacks can greatly help identify optimal choices and many Australians therefore support the introduction of a ‘traffic light’ system\(^{(17)}\). Yet while better selection of snacks has potential to improve diets, in making their choice, people often place taste and price above nutrition-related criteria\(^{(20)}\) or are more concerned about additives than nutrients\(^{(27)}\). Regrettably, those with less healthy intakes are least likely to consult an NIP\(^{(20)}\). There is therefore a need for reformulation of many dairy foods so that healthy choices constitute a larger proportion of the snacks available and the healthy choice may be more probable\(^{(26)}\). Such change may occur when consumers become educated to demand more nutritious choices and when governments support and encourage food reformulation\(^{(26)}\). While some manufacturers may be willing to voluntarily self-regulate or change product formulation, market pressures and adverse retailer influence may make government legislation necessary to ensure that beneficial change is uniformly implemented. Governments can also legislate to restrict imprecise claims, to ensure optimal food labelling, to control food advertising to children, and to define school canteen policies. Taxation can also be used to improve consumer choice\(^{(18)}\). Taxes on high-fat and/or high-sugar foods have been proposed but not adopted in Australia\(^{(29)}\). Yet since reducing the price of healthier food options can increase their purchase\(^{(28)}\), taxes gained from ‘less healthy’ foods might also usefully subsidise healthy food choices and support health promotion.

## Acknowledgements

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors. No conflicts of interest are known to the authors. Each author has seen and approved the contents of this manuscript. K.Z.W. developed the study concept and contributed to data collection, data analysis, preparation of the first draft document and editing of the final text. J.W. developed the study concept and made a detailed contribution to manuscript drafts and initiation of further data analyses. She also gave detailed comments on the

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**Table 5** Claims made on packets for dairy snacks surveyed in a large supermarket in metropolitan Melbourne, Australia in 2008

<table>
<thead>
<tr>
<th>Type of claim</th>
<th>Yoghurts</th>
<th>Fromage frais</th>
<th>Dairy desserts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ca claim</td>
<td>56</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>Fat-related claim</td>
<td>43</td>
<td>78</td>
<td>29</td>
</tr>
<tr>
<td>No artificial flavours</td>
<td>36</td>
<td>22</td>
<td>34</td>
</tr>
<tr>
<td>No artificial colours</td>
<td>36</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Protein claim</td>
<td>25</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Allergy warning</td>
<td>18</td>
<td>33</td>
<td>27</td>
</tr>
<tr>
<td>Sugar claim</td>
<td>11</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>‘Contains real fruit’ claim</td>
<td>11</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>‘No lumps’/‘no bits’</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gut function claim</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>‘Contains omega-3’ claim</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No preservatives</td>
<td>8</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Gelatine-free</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dairy or milk claim</td>
<td>4</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>No artificial sweeteners</td>
<td>3</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Gluten-free</td>
<td>1</td>
<td>22</td>
<td>34</td>
</tr>
</tbody>
</table>

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Discussion

The current survey of yoghurts and dairy desserts from an Australian supermarket has shown that between 2005 and 2008, change has largely been detrimental. Packet size as well as energy, total fat, saturated fat or sugar content increased. Many ‘reduced-fat’ products supplied more energy than ‘full-fat’ products due to the high level of added sugars. The energy density of yoghurts and dairy desserts was thus related strongly to both fat and sugar content. There is no evidence for compositional change or legislative change over this time to explain these results. Overall, observed changes in yoghurts and dairy desserts contribute to deterioration in the food environment facing the consumer, particularly given the known importance of high availability of energy-dense snacks in large portion sizes\(^{(23)}\). The energy density of yoghurts and dairy desserts is therefore a need for reformulation of many dairy foods so that healthy choices constitute a larger proportion of the snacks available and the healthy choice may be more probable\(^{(26)}\). Such change may occur when consumers become educated to demand more nutritious choices and when governments support and encourage food reformulation\(^{(26)}\). While some manufacturers may be willing to voluntarily self-regulate or change product formulation, market pressures and adverse retailer influence may make government legislation necessary to ensure that beneficial change is uniformly implemented. Governments can also legislate to restrict imprecise claims, to ensure optimal food labelling, to control food advertising to children, and to define school canteen policies. Taxation can also be used to improve consumer choice\(^{(18)}\). Taxes on high-fat and/or high-sugar foods have been proposed but not adopted in Australia\(^{(29)}\). Yet since reducing the price of healthier food options can increase their purchase\(^{(28)}\), taxes gained from ‘less healthy’ foods might also usefully subsidise healthy food choices and support health promotion.

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final manuscript. J.R. contributed to data collection and made comments on the final manuscript. R.H. made a large contribution to data collection.

References