

A sodium loaded trap? What should schools tell students about cheese?

Robyn Pearce

Senior lecturer in nutrition, food science and health promotion, Faculty of Education, Avondale College, NSW

Abstract

This study evaluates the sodium and calcium content of convenience cheese products available for use in school lunches and the classification of such products using traffic light approaches designed to guide food selection for healthy eating. Thirty-eight convenience cheese products from NSW supermarkets were studied. Nutrition information panels provided sodium content for all products and calcium content for 35 products. It was found that a 40g serve of convenience cheese products can contribute a substantial proportion of children's calcium Estimated Average Requirements (EARs). However, the accompanying sodium levels create difficulty for keeping daily sodium intake within the Adequate Intake (AI) range for school children of all ages, particularly, younger children (4–8 year olds). Due to the sodium content, many of the cheese products, especially processed cheeses, need to be classified as 'red' foods—to be avoided or only eaten occasionally. The categorisation of the convenience cheese products as 'green', every day foods, to provide calcium conflicts with messages to choose foods low in sodium when promoting healthy eating.

Introduction

The school has many opportunities for promoting healthy eating, but there is also the potential for conflicting health promotion messages. The school canteen has an important role in modelling food choices and complementing healthy eating knowledge, skills and behaviours addressed in the curriculum (NSW Department of Education and Training, n.d.; Victorian Government Department of Education and Early Childhood Development, 2007).

Convenience cheese products are used in children's school lunches either packed from home or from school canteens. These products include individually packed portions and slices for snacks, and pre-sliced and grated products for sandwiches and wraps. Where do convenience cheese products fit in the promotion of healthy eating at school?

Cheese and canteen traffic light guides

To guide school canteens in choosing healthy food to sell to children, the majority of states in Australia have adopted a traffic light approach to food selection (Healthy Kids School Canteen Association, n.d.a). The NSW *Fresh Tastes @ School Healthy School Canteen Strategy* (NSW Department of Health & NSW Department of Education and Training, 2006) is an example of the traffic light approach. In the *Fresh Tastes Canteen Menu Planning Guide*, reduced fat dairy products have been classified as 'green' foods (to be used freely in the canteen menu), while full fat dairy products have been classified as 'amber' (to be used moderately or no more than a couple of times a week). In this case, cheese is included in the 'green' and 'amber' categories rather than the 'red' (occasional no more than twice a term) despite its sodium content.

Registers of products meeting canteen guidelines or buyers guides, available from canteen associations, such as the NSW Healthy Kids School Canteen Association (n.d.a), are used by canteen staff to facilitate product selection. Currently, several reduced fat cheeses categorised as 'green', and a number of other cheeses, categorised as 'amber', are listed in the sandwich, burger, wrap and roll ingredients section of the Buyers Guide for the NSW Healthy Kids School Canteen Association (n.d.b). Another register, The Star Choice Registered Products Database, of the Western Australian School Canteens Association (n.d.) had four cheeses—grated or sliced reduced fat products—categorised as 'green'.

Canteen guideline revision and the Nutrient Reference Values (NRVs)

The guidelines for selection of foods for school canteens are being revised as part of the National Healthy School Canteens Project, and are expected to be completed in 2010 (Australian Government Department of Health and Ageing, 2009). The nutrient criteria for categorising foods are being reviewed to provide uniform national guidelines that address changes in nutrient recommendations in the NRVs (National Health and Medical Research

“The school has many opportunities for promoting healthy eating, but there is also the potential for conflicting health promotion messages”

Council, 2006). The NRVs have recommendations for energy and nutrient intakes according to age and gender. The NRVs recommend that the daily sodium intake of normally healthy individuals be within the Adequate Intake (AI) range for their age and gender group. Upper Levels of Intake (ULs) are higher than the top of the AI range. If average daily intakes are above the ULs, adverse health effects are expected. The NRV Estimated Average Requirements (EARs) are used to indicate the adequacy of calcium. EARs are the daily amounts “estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group” (National Health and Medical Research Council, 2006, p. 1).

United Kingdom (UK) traffic light labelling

The UK has a traffic light scheme for labelling salt (sodium chloride) on the front of food packages (UK Food Standards Agency, 2007). Beard, Nowson and Riley (2007) converted the UK salt cut-points to sodium for discussion in the Australian context. For a sodium ‘green’ light, food needs to have less than 118mg per 100g, for ‘amber’ between 118mg and 590mg per 100g, and ‘red’ greater than 590mg per 100g of food. Traffic light approaches for front of pack labelling have been investigated in Australia (Kelly, Hughes, Chapman, Louie, Dixon & King, 2008), but are not used yet.

Cheese in health promotion material: calcium versus sodium

Health promotion materials available to teachers and students promote dairy products as good sources of calcium for healthy bones and teeth. Examples of such materials are the Fact Sheet, “Help Young Bones Grow Strong” (CSIRO, 2007), and the Australian Dietary Guidelines for Children and Adolescents (National Health and Medical Research Council, 2003). In September 2007, the Federal Government distributed material about the CSIRO Wellbeing Plan for Aussie Kids to all primary school students in Australia (Australian Science Media Centre, 2007). The CSIRO (2007) recommends two to three serves of dairy products daily, with a serve of cheese being 40g. Reduced-fat cheese is identified as suitable for daily use.

Dairy products can provide significant calcium, but serves of milk, yoghurt and cheese are not equivalent in sodium content. Sodium is added to cheese to manage growth of bacterial cultures and to aid flavour and texture (National Heart Foundation, 2009).

The Australian Dietary Guidelines for Children and Adolescents (National Health and Medical Research Council, 2003, p. xvii) recommend including “milks, yoghurts, cheese and or alternatives” and choosing “foods low in salt”.

Since salt is a major source of sodium, there is the potential for unintended high levels of sodium intake when cheese is promoted as a source of calcium.

Concerns over osteoporosis have led to increased emphasis on calcium intake in childhood and adolescence, to ensure desirable peak bone mass. The 2007 Australian National Children’s Nutrition and Physical Activity Survey (Australian Government Department of Health and Aging, 2007, p. 21) indicated that only 11% of 12–13 year old girls and 18% of 14–16 year old girls met their EAR for calcium. For boys, 50% of 12–13 year olds and 56% of 14–16 year olds met the EARs. Of the 4–8 year olds, 85% of girls, and 93% of boys, met the EARs. This same study (p. 24) found that all children exceeded the AIs for sodium for their particular age group. To promote bone health in children and adolescents, restricting salt intake is recommended along with consuming adequate calcium (Prentice et al., 2006, p. 12).

The Australian Division of World Action on Salt and Health (AWASH) (n.d.) is attempting to increase awareness of the role of sodium in the development of high blood pressure and other diseases. They are concerned about the sodium intake of children, and are implementing strategies to reduce salt consumption, and sodium in the food supply.

The current study

This study evaluates the sodium and calcium content of selected convenience cheese products in order to provide a basis for discussion regarding categorisation of the convenience cheeses as ‘red’, ‘amber’ or ‘green’ foods for school lunches.

Method

Thirty-eight convenience cheeses, from two major national supermarket chain stores on the NSW Central Coast, were included in the study conducted in September 2009. The cheese products contained 25g or less fat per 100g—approximately equivalent to the fat content of 25% reduced fat cheddar cheese—this is still a high fat content. Natural and processed cheese and cheese spread products were included. There were 25 sliced or individually portioned products, and 13 grated products.

Sodium and calcium contents in mg per 100g were obtained from product nutrient information panels. Three grated products did not list calcium content on the label.

The proportions (%) of the cheese products classified as ‘red’, ‘amber’ and ‘green’, using the UK Traffic Light Classification criteria for salt converted to milligrams of sodium (Beard et al., 2007), were determined.

For each product, the sodium content in mg per 40g serve was compared to the age appropriate

“Dairy products can provide significant calcium, but serves of milk, yoghurt and cheese are not equivalent in sodium content”

“Some of the processed portioned / sliced cheeses contributed well over the AI and nearly half of the UL for 4–8 year olds”

Als, and ULs. Calcium contents were compared to the EARs. (National Health and Medical Research Council, 2006). The mean, median, minimum and maximum percentages of these AI, UL and EAR values for the cheeses overall and the two categories of cheeses, grated cheeses and individually portioned / sliced cheeses, were calculated.

Results

Sodium content: UK Traffic Light classification

Figure 1 shows the proportions (%) of the cheeses that were categorised as ‘red’, ‘amber’ and ‘green’ using the UK Traffic Light classification for salt converted to sodium (Beard et al., 2007). Overall, the majority of the convenience cheese products were categorised as ‘red’. A higher proportion of individ-

ually portioned / sliced than grated products were categorised as ‘red’. None of the cheese products were classified as ‘green’ for sodium content.

Sodium: % of AIs and ULs per 40g serve

The cheeses differ considerably in their contribution to the sodium AIs and ULs for each age group. The grated cheeses tended to have lower sodium levels than the portioned / sliced cheeses (see Tables 1a and 1b). Some of the processed portioned / sliced cheeses contributed well over the AI and nearly half of the UL for 4–8 year olds.

Figure 2 shows the proportions (%) of the top of range of the AI for sodium for 4 to 8 year olds (600mg) provided by a 40g serve of each of the five cheeses with the highest sodium content. These cheese products were all individually wrapped, portioned / sliced processed cheese products, convenient for adding to school lunchboxes. The second highest sodium containing product is a processed cheese stick, packaged to be appealing to young children, and has endorsement by the Australian Dental Association Ltd on the pack.

Calcium content: % of EARs per 40g serve

Table 2 shows the mean, median, minimum and maximum (%) of the calcium EARs per 40g serve for each age group. The cheeses varied widely in their contribution to the EAR for each age group. The highest and lowest calcium cheeses respectively, provided 76.5% and 26.9% of the EAR for 4 to 8 year olds, compared to 37.9% and 13.3% of the EARs for 12 to 13 and 14 to 18 year olds.

Discussion

The Dietary Guidelines for Children and Adolescents (National Health and Medical Research Council, 2003) recommend choosing low salt foods. However, there are few consistent guidelines regarding the selection of lower sodium cheeses for school lunches. There are canteen guidelines for sodium levels to be used in deciding whether certain energy dense foods such as hot foods, snacks and drinks should be classed as ‘red’ rather than ‘amber’ (NSW Department of Health & NSW Department of Education and Training 2006). Cheese does not appear to be considered a snack in these guidelines.

The Healthy Kids School Canteen Association (n.d.b), in their fact sheet on salt, recommend choosing foods with less than 120mg of sodium per 100g, and avoiding foods with more than 600mg of sodium per 100g, this is similar to the UK Traffic Light guidelines for salt converted to sodium (Beard et al., 2007). However, there are examples of cheese with more than 600mg of sodium per 100g that have been categorised as ‘amber’ rather than ‘red’, and cheeses with more than 120mg of sodium per

Figure 1: Proportions (%) of cheese products categorised as red, amber and green using the UK Traffic Light criteria for salt content converted to mg sodium per 100g (Beard, Nowson & Riley, 2007)

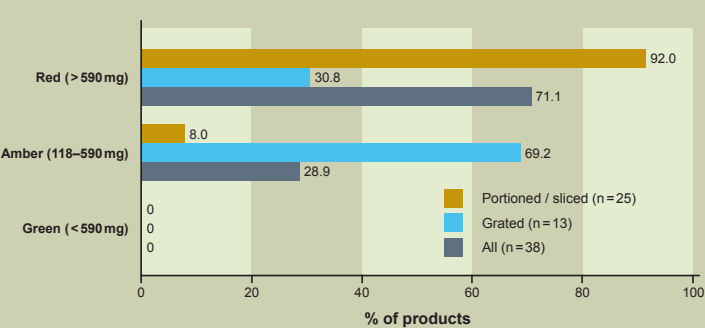
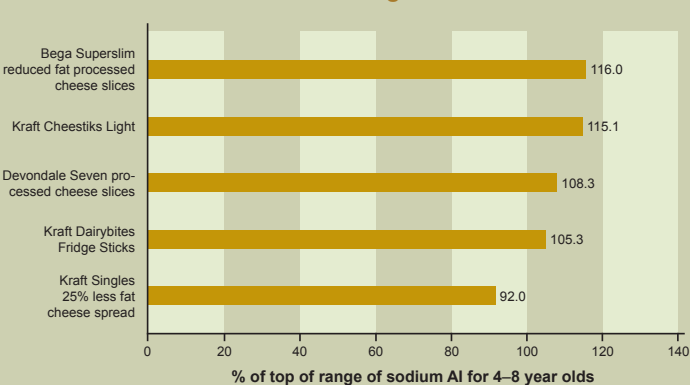


Figure 2: Proportions (%) of the top of range of the Adequate Intake (AI) for sodium for 4–8 year olds (600mg) provided by a 40g serve of each of the five cheeses with the highest sodium content



100g, that have been classified as 'green' rather than 'amber' on the NSW Healthy Kids School Canteen Association (n.d.b) Buyers Guide for sandwich, burger, wrap and roll ingredients. One of the cheeses categorised as 'green' had 600mg of sodium per 100g.

Since there were sliced and grated convenience

cheeses in this study with less than 590mg of sodium per 100g, it is possible to avoid high sodium cheeses in school lunches. However, there were no convenience cheeses available with less than 120mg of sodium, so even the lower sodium cheeses are not a preferred source of calcium for daily consumption. None of the cheeses in this study

“Even the lower sodium cheeses are not a preferred source of calcium for daily consumption”

Table 1a: Proportions (%) of the top of the Adequate Intake (AI) range* values for sodium for school aged children and adolescents provided by 40g serves of convenience cheeses

% of top of AI range values for sodium provided by 40g serves				
Sodium top of AI range values for age groups		Grated cheeses (n=13)	Portioned and sliced cheeses (n=25)	All cheeses (n=38)
4–8 years 600 mg	Mean %	35.8	63.6	54.0
	Median %	34.1	48.0	44.3
	Minimum %	27.8	31.3	27.8
	Maximum %	48.9	116.0	116.0
9–13 years 800 mg	Mean %	26.7	47.7	40.5
	Median %	25.6	36.0	33.2
	Minimum %	20.8	23.5	20.8
	Maximum %	36.6	87.0	87.0
14–18 years 920 mg	Mean %	23.2	41.5	35.2
	Median %	22.2	31.3	28.9
	Minimum %	18.1	20.4	18.1
	Maximum %	31.7	75.7	75.7

* It is recommended that average daily intake is within AI range for healthy individuals (National Health and Medical Research Council, 2008)

Table 1b: Proportions (%) of Upper Levels of Intake (ULs)* for sodium for school aged children and adolescents provided by 40g serves of convenience cheeses

% of ULs for sodium provided by 40g serves				
Sodium ULs for age groups		Grated cheeses (n=13)	Portioned and sliced cheeses (n=25)	All cheeses (n=38)
4–8 years 1400 mg	Mean %	15.3	27.3	23.2
	Median %	14.6	20.6	19.0
	Minimum %	11.9	13.4	11.9
	Maximum %	20.9	49.7	49.7
9–13 years 2000 mg	Mean %	10.7	19.1	16.2
	Median %	10.2	14.4	13.3
	Minimum %	8.3	9.4	8.3
	Maximum %	14.7	34.8	34.8
14–18 years 2300 mg	Mean %	9.3	16.6	14.1
	Median %	8.9	12.5	11.6
	Minimum %	7.3	8.2	7.3
	Maximum %	12.7	30.3	30.3

* Adverse health consequences are expected if average daily intake is higher than UL (National Health and Medical Research Council, 2006)

“For bone health it would be prudent to encourage sources of calcium that are lower in salt”

are recommended as ‘green’ foods, if sodium is considered important.

The Healthy Kids School Canteen Association (n.d.b) fact sheet on salt includes cheese, along with take-away meals, bread, breakfast cereal, soups and sauces, salty snacks and processed meats, as common sources of salt for children. Processed cheese sticks are listed with savoury snack foods, luncheon meats and vegemite sandwiches as major sources of salt (sodium) in the lunch box. The problem with processed cheese slices is not mentioned. Of the five cheese products with the highest sodium content in this study, three were reduced fat processed cheese slices, and two were cheese stick products (see Figure 2).

Cheeses can contribute to calcium intake (see Table 2). However, for bone health (Prentice et al., 2006, p. 12) it would be prudent to encourage sources of calcium that are lower in salt (sodium), than many of the convenience cheeses in this study.

It could be argued that categorising individual foods based on nutrient content is the wrong approach, and that guidelines should be for the nutrient content of the overall meal or menu. In the UK, new standards for school lunches have been developed with nutrient-based standards, taking an average meal approach, rather than considering individual foods (School Food Trust, n.d.). It would be difficult or impossible to remain under the UK average school lunch sodium requirements (School food Trust, n.d., p. 3.13), if 40g of some of the cheeses in this study were included in the meal.

An Australian study of food consumed at school

by 5–12 year old children, indicated that the role of school canteen food was to supplement lunch from home, rather than replace it. (Sanigorski, Bell, Kremer & Swinburn, 2005). The UK nutrient-based standards (School Food Trust, n.d.) for average meals may be less suitable in the Australian context than nutrient-based standards for food categories.

The review of the nutrient criteria for categorising foods in the National Healthy School Canteens Project (Australian Government Department of Health and Ageing, 2009) needs to address the tension between the sodium and calcium content of cheese products. It remains to be seen whether cheese will have its own higher sodium threshold, as a concession to its potential calcium contribution, permitting it to be a ‘green’ or ‘amber’ food, or whether it will become a ‘red’ occasional food.

Whatever the outcome of the National Healthy School Canteen Project, the calcium versus sodium dilemma remains in health promotion material available for use in the curriculum. Considering the calcium and sodium contents of cheeses, compared to other dairy products and non-dairy calcium sources, provides an opportunity for improving food selection.

Conclusion and recommendations

A 40g serve of convenience cheese products can contribute substantial proportions of children’s calcium EARs. However, the accompanying sodium makes keeping sodium intake for the day within the AI range difficult for school children of all ages, but particularly for younger children (4–8 year olds).

Table 2: Proportions (%) of calcium Estimated Average Requirements (EARs) provided by 40g serves of convenience cheeses

% of calcium EARs provided by 40g serves				
Calcium EARs for age groups		Grated cheeses* (n=10)	Portioned and sliced cheeses (n=25)	All cheeses (n=35)
4–8 years 520mg	Mean %	61.7	58.3	59.3
	Median %	61.5	61.5	61.5
	Minimum %	52.3	26.9	26.9
	Maximum %	72.1	76.5	76.5
9–11 years 800mg	Mean %	40.1	37.9	38.5
	Median %	40.0	40.0	40.0
	Minimum %	34.0	17.5	17.5
	Maximum %	46.8	49.8	49.8
12–13 & 14–18 years 1050mg	Mean %	30.6	28.9	29.4
	Median %	30.5	30.5	30.5
	Minimum %	25.9	13.3	13.3
	Maximum %	35.7	37.9	37.9

* For 3 of the 13 grated / shredded cheeses in the sample calcium was not on the label

For many of the individually portioned / sliced convenience cheeses in this study, the sodium content is so high that they need to be considered as 'red' or occasional foods despite their calcium content.

The convenience cheeses in this study illustrate the potential for unintended sodium intake when health promotion messages recommend cheese, as an alternative to other dairy products, to increase calcium intake.

A school that encourages healthy food choices will support increased awareness of sodium in foods such as cheese, and promote the availability and consumption of lower sodium sources of calcium. **TEACH**

References

- Australian Division of World Action on Salt and Health (AWASH) (n.d.). *Strategic review 2007–8*. Retrieved September 16, 2009, from http://www.awash.org.au/documents/AWASH-Strategic-Review-2007_08.pdf
- Australian Government Department of Health and Ageing (2007). *2007 Australian national children's nutrition and physical activity survey: Main findings*. Retrieved from [http://www.health.gov.au/internet/main/publishing.nsf/Content/66596E8FC68FD1A3CA2574D50027DB86/\\$File/childrens-nut-phys-survey.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/66596E8FC68FD1A3CA2574D50027DB86/$File/childrens-nut-phys-survey.pdf)
- Australian Government Department of Health and Ageing (2009). *National healthy school canteens*. Retrieved September 21, 2009, from <http://www.nhsc.com.au>
- Australian Science Media Centre. (2007). *Rapid roundup: CSIRO wellbeing plan for Aussie kids—experts respond*. Retrieved from http://www.ausmc.org/CSIRO_wellbeing_plan_for_Aussie_kids.php
- Beard, T., Nowson, C., & Riley, M. (2007). Traffic light food labels. *Medical Journal of Australia*, 186 (1): 19.
- CSIRO. (2007). *Fact sheet: Help young bones grow strong*. Retrieved September 21, 2009 from <http://www.csiro.au/resources/10-steps-for-healthy-families-Dairy.html>
- Healthy Kids School Canteen Association (n.d.a). *Australian state school canteen strategies*. Retrieved September 21, 2009, from <http://www.healthy-kids.com.au/category/33/australian-state-school-canteen-strategies>
- Healthy Kids School Canteen Association. (n.d.b). *Salt: The facts*. Retrieved September 27, 2009, from <http://www.healthy-kids.com.au/content/upload/files/Salt%20in%20the%20Diet.pdf>
- Kelly, B., Hughes, C., Chapman, K., Louie, J., Dixon, H., & King, L. On behalf of a Collaboration of Public Health and Consumer Research Groups (2008). *Front-of-pack food labelling: Traffic light labelling gets the green light*. Retrieved from http://www.cancercouncil.com.au/html/prevention/healthyeating/downloads/foodlabelling_frontofpack_surveyreport.pdf
- National Health and Medical Research Council. (2003). *Dietary guidelines for children and adolescents in Australia incorporating infant feeding guidelines for health workers*. Retrieved from http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/n34.pdf
- National Health and Medical Research Council. (2006). *Nutrient reference values for Australia and New Zealand executive summary*. Retrieved from http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/n36.pdf
- National Heart Foundation (2009). *Cheese*. Retrieved from http://www.heartfoundation.org.au/sites/tick/SiteCollectionDocuments/CriteriaRelease_Cheese_8_09.pdf
- NSW Department of Education and Training (n.d.). *School canteens*. Retrieved September 21, 2009, from <http://www.schools.nsw.edu.au/studentsupport/studentwellbeing/schoolcanteen/index.php>
- NSW Department of Health & NSW Department of Education and Training. (2006). *Fresh tastes @ school: NSW healthy school canteen strategy canteen menu planning guide*. Retrieved September 21, 2009, from [http://www.schoolsweb/studentsupport/studentwellbeing/schoolcanteen/cmpguide2.pdf](http://www.schools.nsw.edu.au/media/downloads/schoolsweb/studentsupport/studentwellbeing/schoolcanteen/cmpguide2.pdf)
- NSW Healthy Kids School Canteen Association (n.d.a). *Buyers guide*. Retrieved September 11, 2009, from <http://buyersguide.healthy-kids.com.au>
- NSW Healthy Kids School Canteen Association (n.d.b). *Buyers guide sandwich, burger wrap and roll ingredients*. Retrieved September 11, 2009 from <http://buyersguide.healthy-kids.com.au/pages/product-results.aspx?pscid=23>
- Prentice, A., Schoenmakers, I., Laskey, M., de Bono, S., Ginty, F., & Goldberg, G. (2006). Nutrition and bone growth and development. *Proceedings of the Nutrition Society*, Author manuscript; available in PMC 2007 October 22: 1–23. Published in final edited form as *Proceedings of the Nutrition Society* 2006 November; 65(4): 348–360.
- Sanigorski, A., Bell, A., Kremer, P., & Swinburn, B. (2005). Lunchbox contents of Australian school children: Room for improvement. *European Journal of Clinical Nutrition*, 59, 1310–1316. doi:10.1038/sj.ejcn.1602244.
- School Food Trust (n.d.). 3. *Nutrient-based standards*. Retrieved September 21, 2009 from (http://www.schoolfoodtrust.org.uk/UploadDocs/Contents/Documents/sft_nutrition_guide_part3.pdf)
- UK Food Standards Agency, (2007). Front-of-pack traffic light signpost labelling. *Technical Guidance Issue 2* November 2007. Retrieved September 21, 2009 from <http://www.food.gov.uk/multimedia/pdfs/frontofpackguidance2.pdf>
- Victorian Government Department of Education and Early Childhood Development. (2007). *Why is healthy food in schools important?* Retrieved from <http://www.education.vic.gov.au/management/schooloperations/healthycanteen/background/schools.htm>
- Western Australian School Canteens Association (n.d.). *The star choice registered products database*. Retrieved September 11, 2009 from <http://www.waschoolcanteens.org.au/pages/starchoice/02-starchoice.php>

“The sodium content of many convenience cheeses is so high that they need to be considered as ‘red’ or occasional foods despite their calcium content”