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Understanding the link between cheese and health



Introduction

Cheese is an ancient food with archaeological evidence of its production predating recorded history (before 4000 BC). The origins of modern-day cheeses such as cheddar, parmesan and camembert date back to the middle ages with the first industrial production of cheese beginning in a Swiss factory in 1815.

Today, Europe is at the heart of both the production and consumption of this popular food, with more than 1,000 varieties available. Our love for cheese is unquestioned and the export value of Irish cheese grew by around 5% to more than €175 million last year. With increasing choice and availability, consumer demand for taste, value, convenience, safety and nutrition are imperative. Regarding nutrition, cheese is an excellent source of calcium, phosphorus and protein and can make a significant contribution to a healthy and balanced diet. However, in recent years, cheese has received unfavourable attention because of its salt and fat content.

Both salt and fat are fundamental components of cheese, providing attributes such as texture, flavour and preservation. Reformulation of cheese on the basis of nutritional purposes may jeopardise other properties and, therefore, it is key to fully understand the consequences of reformulation in terms of both consumer perception and the true benefit to health.

New research is emerging that dispels concerns relating to the impact of cheese on salt and fat consumption. In addition, the concept of the 'food matrix' in dairy foods, such as cheese, is receiving considerable attention for its holistic and positive effect on health. The cheese matrix focuses on the whole food and specifically relates to the overall impact of its nutritional components working in synergy rather than focusing on individual nutrients with independent properties.

Taste alone will not determine a consumer's purchasing habits and there is an increasing market demand for more healthful food products. While communicating the health benefits of cheese to the consumer will be important on this front, product reformulation to provide choice without compromising on flavour is also an exciting area of development. In addition, research supports incremental changes in reformulating food products to gradually shift population tastes. Commenting on this area, Jens Bleiel, CEO, Food For Health Ireland (FHI) said: "Cheese is an important research area for FHI and, alongside our work to look at naturally occurring bioactives in cheese that may have a potential health benefit, we are developing a strong evidence base to support a good news story for cheese." Cheese today stands at the threshold of a turnaround that could see it re-affirmed as a natural and healthy wholefood.



EDITORIAL

Novel research on the nutritional benefits of cheese was previously explored in Volume 6 (Issue 2) of *DN Forum*. In this edition, we will follow up with an update on some new and interesting findings in the area of cheese research, with a specific focus on cheese consumption trends in the Irish population, the impact of the 'food matrix' on the nutritional properties of cheese, and consumer acceptance of novel cheese products.

This Expert Review explores cutting-edge themes in cheese research with contributions from Dr Sinéad McCarthy, Teagasc; Dr Emma Feeney, University College Dublin (UCD); Dr Áine McConnon (UCD); Dr Áine Regan, Teagasc; and Julian Mellentin, New Nutrition Business. These insights, provided from a selection of Irish based research projects including the CheeseBoard 2015 research programme, Food for Health Ireland (FHI) and Food Reformulation for Consumers (FORC), indicate that the evidence that supports the role of cheese as part of a healthy diet is set to strengthen.

We hope you enjoy this edition of *DN Forum* and look forward to any feedback or comments you wish to share: nutrition@ndc.ie

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Expert Review

You can have your cheese and eat it too!

Dr Sinéad McCarthy, Teagasc Food Research Centre, Ashtown

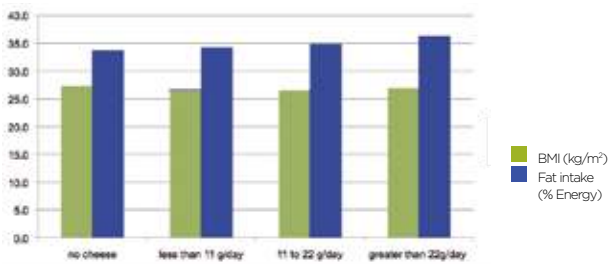


Dr Sinéad McCarthy

CheeseBoard 2015 is a major inter-institutional research project that is addressing a series of multi-pronged objectives and challenges in cheese research that are deemed critical for the future development of this food industry sector. One of these key objectives is to examine the attitudinal, motivational and behavioural drivers of cheese consumption. Findings from this research have shown favourable outcomes for cheese consumption and it outlines what motivates consumers to eat cheese. Analysis of food choice attitudes and cheese consumption in Irish adults was completed using the data from the National Adult Nutrition Survey (NANS). See: www.iuna.net for more information.

These analyses have demonstrated that consumers who are eating 22 grams of cheese per day are still staying within dietary guidelines for fat. Moreover, their fat intakes are the same as those who consume very little or no cheese at all. The people who did not consume cheese were slightly older in age, which may reflect altered dietary choices in older adults to avoid foods associated with cholesterol and blood pressure. However, regardless of the amount of cheese consumed there was no difference in body mass index (BMI) between the highest intake of cheese and those who consumed no cheese. Additionally, cheese was not among the top contributors to salt in the Irish diet. Food choice attitudes also played a role in influencing cheese consumption. Consumers who turned to food when seeking sensory satisfaction and mood enhancing properties consumed less cheese, as did consumers with good cooking skills and intentions to pursue a healthier diet. This indicates that cheese may not be the obvious food of choice when de-stressing, seeking sensory satisfaction or when planning a meal. However, cheese has great potential to offer in each of these areas and this potential needs to be more clearly and effectively communicated. Cheese is a complex product that has many health benefits, as well as offering excellent sensory satisfaction in terms of taste, texture and mouth feel. The long-established, traditional and familiar associations consumers already have with cheese can be used to promote it as satisfying food, as well as a healthy ingredient for use in cooking.

These findings support the need to clearly and effectively communicate the benefits of consuming the recommended portion of cheese and to dispel many myths associated with its consumption. Cheese is frequently displaced from the diet in favour of other foods during weight loss or healthy eating regimes. However, to remove it from the diet is to remove a valuable source of protein and many other essential nutrients, as well as health promoting bioactive compounds inherent in cheese. Opportunities exist to demonstrate and communicate the role of cheese in achieving a healthy, balanced diet. When promoting the many benefits cheese has to offer, it is important to also incorporate other significant attributes of cheese, including taste, mood, convenience and health.



▲ Figure 1: No significant differences in BMI with increasing levels of cheese consumption. Intakes of up to 22 grams per day of cheese showed no significant difference in fat intake.

Could Irish cheddar be the newest functional food?

Dr Emma Feeney, Food for Health Ireland, University College Dublin



Dr Emma Feeney

The topic of saturated fat in foods is a controversial one. For years, saturated fat has been associated with high levels of LDL-cholesterol (LDL-C)¹. LDL-C is often considered 'bad' cholesterol and is a recognised risk marker for heart disease. This association between saturated fat intake and cholesterol led to dietary guidelines that suggest we limit our intake of saturated fats (SFA) to no more than 10% of our daily energy intake². The American Heart Association recommendation is even stricter, with a maximum of 7% daily energy³. However, these guidelines may be much too broad, since they do not consider the food source. The family of SFAs can vary widely in the length of their fatty acid chains, and each may have very different functions within the body⁴. Likewise, different foods can be high in SFA, but contain very different SFA profiles. Therefore, it may not be appropriate to consider all high-SFA foods in the same way.

In fact, the food source of SFA and the 'food matrix' are an exciting new areas of interest, particularly with respect to dairy foods. Dairy fat is high in SFA – around 60% of dairy fat is saturated⁵. Yet, despite dairy foods having the same saturated fat profiles, the food matrix appears to have an important effect on how the SFA affects blood lipids. The 'matrix effect' of cheese is emerging as a current hot topic, with evidence now available from seven intervention studies showing that the saturated fat in cheese does not raise LDL-C, and may even improve the overall lipid profile. Why is it that the saturated fat in cheese does not raise LDL-C, yet SFA from other sources⁶ can? Studies are still ongoing to understand this, but the 'matrix' effect hypothesises that this is due to the combination of nutrients and bioactive compounds in cheese. These include: the calcium and the protein in cheese forming specific complexes, which limit the absorption of fat, and may increase fat excretion; potential bioactive compounds in cheese; down-regulation of the genes involved in cholesterol synthesis; and others.

Is this effect seen for all types of cheese? We still don't know the answer to this. To date, most of the studies have used hard cheeses, such as gouda⁶, Norwegian samso⁷, and an Australian cheddar⁸. No studies have ever examined Irish cheddar. Cheddar is the most popular cheese in Ireland, eaten by 54% of the population⁹. Researchers at UCD are conducting a study in older Irish adults to test the matrix effect of cheese, using a regular cheddar, a reduced-fat cheddar and a dairy protein dairy-fat control, which contains all of the components of cheese separately but not within the cheese matrix.

Given that a growing number of studies suggest that cheese may have beneficial effects on blood lipids, Irish cheddar could well become Ireland's newest functional food.

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It's all about the message!

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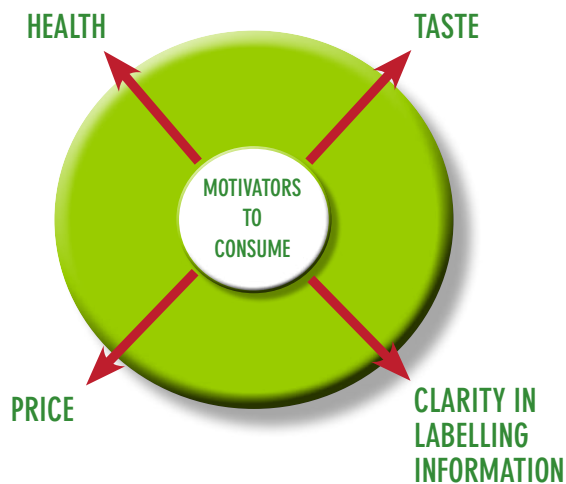
Dr Áine McConnon

The success of any new product is heavily dependent on consumer acceptance. In response to this, the Food Reformulation for Consumers (FORC) project, supported by the Department of Agriculture, Food and the Marine, surveyed 501 adults living in the Republic of Ireland to investigate Irish consumers' attitudes towards reformulated foods.

The findings revealed that Irish consumers strongly support an array of Government policies to reduce population salt intake – including voluntary and regulated food product reformulation¹⁰. In response to recent media coverage that suggests cheese is a high source of salt, the example of a reduced-salt cheddar cheese was used to examine consumers' attitudes more specifically. A belief among consumers that a reduced-salt cheddar cheese wouldn't taste as good as regular cheddar cheese meant consumers were less likely to buy it. However, consumers who viewed the reduced-salt cheddar cheese as a healthy product and those who believed it would help protect them from the risk of high blood pressure and heart disease reported that they would be more willing to buy it. Being older, being a parent of a child aged less than 17 years, and being a frequent consumer of reduced-fat cheddar cheese were all also associated with an increased willingness to purchase a reduced-salt cheddar cheese.

In a follow-up study, a novel online research software (Vizzata. See www.vizzata.com) was used to capture consumers' comments, questions and immediate reactions to reformulated food labelling. Qualitative analysis revealed the main factors identified as motivators to consume reformulated foods were health, price, taste and clarity in labelling information, while the main barriers expressed were concern about the content of reformulated foods, price, taste and lack of belief and trust in reformulated food products. The FORC study findings suggest that issues of mistrust and clarity of labelling remain a challenge for the reformulation market, however specific segments of Irish consumers are motivated to purchase reduced-salt cheese products, and this could represent a new market opportunity for the Irish dairy sector to lead the way in developing new options for health-conscious consumers.

▼ The main factors identified as motivators to consume reformulated foods (health, price, taste and clarity in labelling information).



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Fortunes of cheese at a turning point

Julian Mellentin, Director,
New Nutrition Business



Julian Mellentin

Cheese is set to embark on an era of opportunity. After 40 years being demonised for its fat and salt content, cheese today stands at the threshold of a turnaround that could see it re-established as a natural and healthy wholefood, like many other foods before it, from nuts to eggs. How quickly that happens – whether it happens at all – is dependent on the willingness of the dairy industry to:

- Use the new science to show consumers that cheese is more hero than villain
- Educate health professionals on the new and convincing research, which strengthens the evidence for the health benefits of cheese
- Be innovative with cheese and create new and convenient products that revitalise consumer interest.

Current research highlights a special opportunity to take a dairy food that has been out of favour for decades and reposition it as a nutritious and delicious food. It will be an exciting challenge for the dairy industry to accept and the following approach is suggested:

1. Don't rely on sales of commodity block cheese to increase – focus on convenient snack formats so that health-conscious consumers can incorporate cheese into their daily routine as an alternative to other less healthy snacks.
2. Engage in educating consumers and the media about the good things to be said about cheese.
3. Present the new science and the benefits of cheese at health professional conferences and actively challenge existing misconceptions surrounding health effects.

EVIDENCE TO PRACTICE

This research has a range of applications:

A. INDUSTRY

The findings from this research can be used in the development of new reformulated food products, ensuring the dairy industry works towards creating products that meet with approval from consumers and are, therefore, more likely to be successful in the marketplace.

B. HEALTH PROFESSIONALS

Emerging research is strengthening the evidence that supports the role of cheese as part of a healthy diet. This work will help in the development of targeted communication to consumers and will help to inform policymakers in the formation of food-based dietary guidelines for cheese consumption.

C. THE PUBLIC

This research may help to reassure all members of the public that cheese can be consumed as part of a healthy, balanced diet.

Key Points

- Cheese is frequently displaced from the diet during weight loss, creating a risk of losing out on valuable nutrients and bioactives. Consumers of 22g of cheese per day are staying within the guidelines for fat intake and their BMI is not significantly different to those who do not consume cheese. There is a need to reassure consumers and communicate the benefits of consuming the recommended serving of cheese.
- Categorising all saturated fats (SFAs) as the same, regardless of their impact on health may be overly simplistic and lack validity. Categorisation based on structure and function may be more appropriate. Dairy nutrients incorporated in a food matrix can produce altered properties compared to their activity when assessed in isolation, with new research indicating that the SFA in cheese does not raise cholesterol due to this food matrix effect.
- Reformulated food products could help in combatting public-health challenges related to diet. Health, price, taste and clarity in labelling information are among the main factors identified in motivating consumers to embrace reformulated foods, while the main barriers are: concern about the content of reformulated foods; price; taste; and lack of belief and trust in reformulated food products. Specific segments of Irish consumers are motivated to purchase reduced-salt cheese products.
- Convenient snack formats could help health-conscious consumers to incorporate cheese into their daily routine as an alternative to other, less healthy snacks. This could represent a new market opportunity for the Irish dairy sector.

Nutrition&You Series

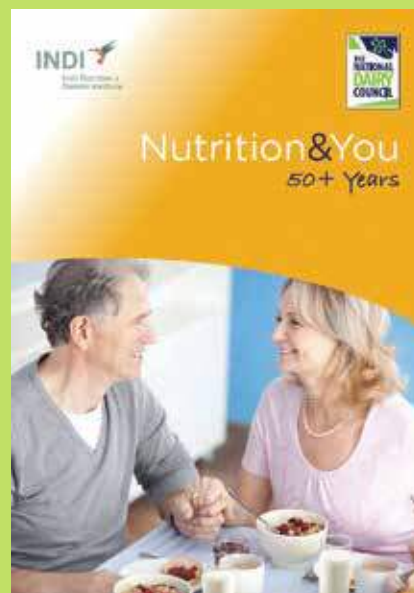
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Mission: To deliver real and unique value to Irish dairy farmers by protecting and promoting the image, quality, taste and nutritional credentials of Irish dairy produce to a wide variety of audiences in a clearly defined, focused, unique and effective manner.

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