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HEALTH INFLUENCE ON THE DEVELOPMENT OF LOW FAT DAIRY PRODUCTS

A THESIS PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PHILOSOPHY IN FOOD TECHNOLOGY AT MASSEY UNIVERSITY

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ABSTRACT

The Nutrition Taskforce (1991) recommended strategies for the food industry in order to improve the diet of New Zealanders in line with the Food and Nutrition guidelines. Recommended strategies include, to produce low fat products and to disseminate nutrition information. This thesis examines the nature of current developments in low fat products, nutrition expertise in the industry and legislative requirements related to low fat products.

Initially a survey of three supermarkets (Pak 'n' Sav, Foodtown and Woolworths) located at Palmerston North was carried out to examine the market availability of low fat dairy products and its labels. A detailed questionnaire based on product development, nutritional concerns and consumer issues was designed and mailed to 25 general food manufacturers, 11 responses (44%) were obtained. Next, a postal survey to 26 dairy companies was done and 12 companies (46%) responded. Some of the surveyed dairy companies (6) were interviewed to obtain in-depth information on survey findings.

Currently a range of dairy products with lower fat contents are available in supermarket shelves, such as low fat versions of milk, yoghurt, cream, cheese and dairy desserts. Milk with fat content ranging from 0.05% to 3.5% fat is available. Most of the surveyed food manufacturers consider the development of fat reduced products as an important area of development. Maintaining the texture and flavour in developing fat reduced products was the main quality constraint in developing low fat products. Technical information could not be obtained in the survey due to confidentiality.

The supermarket and food manufacturers surveys reveal that low fat products are targeted at women and health conscious people. However, some reduced fat products (reduced fat- milk, cheeses and dairy desserts) are most useful to consumers and some reduced fat products (reduced fat yoghurts) are less useful.

Men may benefit the most by consuming reduced fat milk, cheeses and desserts. Older women may benefit by selecting reduced fat cream in the diet. Hence it is recommended that manufacturers should identify the need and accordingly target the products. From the survey results it can be concluded that consumer demand and an increase in diet and health awareness are the driving forces behind the development of new fat reduced products.

In general, food companies view food regulations as difficult to interpret and restrictive. A standard format for labelling the additives and nutrients was not followed by the surveyed companies. Some manufacturers tend to use the labelling as a marketing advantage. Nutrition labelling was usually offered when a claim was made, however some cheese labels that made a claim did not carry nutrition labelling. Some companies claimed to be unable to offer nutrition labelling due to expense. A standard approach to labelling has been recommended by the Food Standards Committee and the proposed food regulations is hoped to eliminate consumer confusion over labels.

Mostly the surveyed food manufacturers do not employ nutritionists and rely on people from various departments for nutrition decisions. Nutrition education is of primary importance within the food industry and a greater involvement of nutritionists in food product development and food marketing would be desirable. The Dairy Advisory Bureau, the Market Milk Federation (MMF) and the Ministry of Health are the main sources of nutrition information for dairy companies. Some companies perceive that nutrition information is not easily accessible. The MMF produces some nutrition education material, such as *Milkwise snacks* which are supplied by dairy companies to schools. Some surveyed companies are producing leaflets for consumers which do not contain much nutrition information and work more as promotion material for the products. In conclusion, the role of nutrition in product development and marketing of low fat products is discussed and a series of recommendations have been constructed.

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CHAPTER 1
INTRODUCTION

The food we eat plays a major role on our physical and mental health and well being. Food can contribute towards, and protect against, illness and premature death. Many health problems are associated with food and nutrition imbalances. In New Zealand, these imbalances are commonly related to eating too much high energy food, particularly foods high in fats, and not eating enough variety of foods rich in protective factors, such as fibre. Much of current nutrition research focuses on the overconsumption of energy and balance among nutrients. Obesity, which leads to an increased risk of a number of disorders, is one of the major health problems in developed countries, including New Zealand. In 1990, heart disease was responsible for 28% of all male deaths and 25% of all female deaths in New Zealand (Ministry of Health, 1993).

A survey carried out for the Heart Foundation (1977) showed that New Zealand diet was high in fat (about 42% of energy came from fat) and low in complex carbohydrates and fibre. The Hillary Commission (1990) survey indicate that on an average New Zealanders are now eating slightly less fat (37-38% of energy intake) than before, however the changes are not significant. The WHO (World Health Organization, 1990) recommends that 25-30% of energy should come from fat. *Food for Health,* the report of the Nutrition Taskforce (1991) gives recommendations for changes in intake of energy and key nutrients in New Zealand, for example, that only 30-35% of energy should come from dietary fat.

In March 1992, the first New Zealand Food Policy was launched, which endorsed the recommendations of the Nutrition Taskforce (1991) on ways in which the New Zealand diet could be improved. One of the goals of the Food Policy is to promote healthy food choices, through collaboration with food industry, researchers, educators and nutrition experts. Strategies to meet the

goals were suggested. For example, to increase the range of fat reduced products and to disseminate nutrition information and consumer education. Improving the New Zealand diet depends on the availability of food products which are convenient, acceptable in terms of taste and which offer nutrition benefits. Developing products, such as those low in fat, offers a challenge to food technologists who must ensure that keeping qualities, taste and texture are not adversely affected by health modifications.

In recent years there has been an increase in consumer interest in nutrition and health, and this in turn has increased the use of nutrition information and messages in food marketing (Bailey and Earle, 1993). Products with *reduced fat, reduced cholesterol* and *enhanced fibre* are becoming popular. This trend is reflected in the increased markets for low fat dairy products and light soft drinks. Studies have shown that quality and taste are important factors in the selection of these products. This presents the industry with a challenge and an opportunity to develop new technologies to produce consumer acceptable low-calorie food products, while ensuring the keeping qualities, taste and texture are maintained. Although some consumers show an increased awareness of nutrition issues there are still widespread misconceptions about food, e.g., fat content of dairy foods (DAB 1993a; Shuttleworth, 1993). The increasing awareness in health and nutrition is an impetus to food manufacturers to develop new products in line with the Food and Nutrition guidelines, providing more informative labelling and other necessary information. Nutrition claims have an informative role for consumers, provided they are used appropriately (Ravussin and Swinburn, 1992).

Dairy products are an important part of the diet and one of the mainstays of New Zealand economy. Milk and dairy products are valuable sources of protein and calcium but also a major source of saturated fat. Dairy companies are extending their range of products to include reduced fat dairy products such as reduced fat cheese and dairy desserts. Hence, this study was focused on the

availability and market development of dairy products. Products from the following categories were chosen for survey: liquid milks - pasteurised and flavoured, cultured dairy products (yoghurt, sour cream), cheese, cream, ice cream and dairy desserts.

A general purpose of this study was to establish the place of *nutrition* in food development and marketing in New Zealand dairy industry. Food marketers could have a positive role in influencing and helping the consumers in making better food choices if nutrition information and claims are used responsibly. Manufacturers should be encouraged to produce low fat foods and nutrition information keeping in view the recommendations from the Nutrition Taskforce. Hence, it is necessary to investigate whether the manufacturers were trying to meet the changing consumer demands in line with the Food and Nutrition guidelines.

1.1 AIMS AND OBJECTIVES

This study aims to find out the current market for fat reduced dairy products and the place of nutrition in the development of these products. The objectives of this research are:

* to investigate the nature of developments in fat reduced dairy products, the nutritional rationale behind their development, attitudes and nutritional awareness of the dairy companies;
* to assess the nutrition expertise possessed by manufacturers, for example the knowledge about Food and Nutrition guidelines (1991);
* to examine the legislative requirements related to nutrition labelling;
* to explore the dairy companies views on the future market and the target market for the fat reduced dairy products; and
* to inquire into the technological problems, for example, flavour and texture changes in fat reduced dairy products.

CHAPTER 2
REVIEW OF LITERATURE

This chapter reviews the New Zealand diet, health, food problems, dietary recommendations and proposed changes; the availability and the importance of dairy products; existing food legislation and its affect on food industry and consumer; and consumer nutrition concerns.

2.1 The New Zealand diet

In recent years, many changes have taken place in the kinds of food eaten and when, where and why they are eaten in New Zealand. Bailey and Earle (1993) reviewed changes in food consumption from the last century and concluded that changes to eating resulted from changes in availability and production due to a complex mix of technological and sociological factors. Surveys of the food eaten by people in New Zealand are few.

2.1.1. Nutrition oriented food consumption studies

The main sources of nutrition information available on New Zealand diet are the New Zealand Year Books, National Food Balance Sheets produced by the Department of Statistics and nutrition oriented surveys conducted by Gregory *et al.* (1934), McGlaughlin and Wilson (1945), Davidson and Gilmur (1969) and the National Heart Foundation survey (Birkbeck, 1977) which suggest that bread, meat and dairy products are dominant foods consumed. Birkbeck (1980) concluded that *New Zealanders as a group eat too much* with a generally high intake of energy, fat, animal protein and sugar.

The results of most recent Hillary Commission survey in 1990 reported by Horwarth *et al.* (1991) show that the selection of foods slowly changed over the

past several decades such as fall in the consumption of butter and rise in consumption of cheese. In the 1970s cereals provided 30% of total energy intake, whereas in 1987, 21% of total intake of energy came from cereals and more energy came from fatty foods. In 1987, protein provided 11-13% of energy, fat 40% of energy (saturated fat 20% energy, monounsaturated fat 17% energy, polyunsaturated fat 3% energy), and carbohydrate 42-46% energy. The present diet consists of a low consumption of cereals and grains, and high consumption of energy and protein from meat and dairy products. These values are similar to the UK, USA and Australia. In New Zealand where farming is the main contributor to the national economy, the intake of dairy and meat products is high when compared on an international rating. The main nutritional concerns currently are that too high a proportion of energy comes from fat, while less energy comes from carbohydrate. The main sources of dietary fat in order of importance are beef, dairy products, other meats, pies and biscuits (Hillary Commission, 1990).

Other current trends in eating, such as more snacking and less traditional family meals, may result in more likelihood of nutritional problems. Because of the ready availability of cheap foods, New Zealanders tend to have high energy intake, particularly from fat, causing about 30% of people to be overweight and suffer related problems (e.g., heart disease). Excess fat consumption is one of the primary factors leading to overweight.

2.1.2 Food traditions and population distribution

The dominant food traditions in New Zealand are of British origin involving meat, wheat, cereal and potatoes. Since 1945, 85% of the New Zealand population have been born in New Zealand. Before the 1990s the population distribution was predominantly rural and in the South Island but by the 1950s it had changed to a predominantly urban, North Island population. Since the

1960s, Chinese, Indian, Italian, Greek, Dalmatian, Dutch and Pacific island food traditions have been more widely available (Bailey and Earle, 1993).

2.1.3 Trends in fat intake

The Heart Foundation survey (1977) and the Hillary Commission Study (Life in New Zealand, 1990) give an insight into the dietary intake of adult New Zealanders. The total fat intake for New Zealanders account for 37-38% of the total energy intake, which is above the recommended value of 30-33% (Nutrition Taskforce, 1991). The proportion of saturated fatty acids in the New Zealand diet is high, currently 16% of the average energy intake (Public Health Commission, 1994). The Nutrition Taskforce (1991) recommended that saturated fatty acids and trans fatty acids should provide no more than 15% of the total energy by the year 1995, and not more than 12% of the total food energy by the year 2000. Consumers should have easy access to lower fat products such as low fat milk and cheeses. These food choices may contribute towards reducing the dietary fat intake. New Zealanders are currently making more use of available low fat products. For example, 27% of New Zealand adults consume trim milk, and another 13% use reduced fat milks. Full cream milk may become a product of the past. Trim meat is available and often consumed now. Thus people are making healthier food choices, however, there is still a need for improvements in the diet of many New Zealanders (Reid, 1992).

2.1.4 Consumer beliefs about fats

Despite the fact that men and women share the same meals, men tend towards foods which are easier to prepare and often those which are higher in fat. Many studies indicate the consumer preference for fat in foods (Hillary Commission, 1990; Birch, 1992; Rolls, 1993 and Mela, 1994c). Consumers have a preference for fat in foods and reducing this preference is important to ensure compliance with

a low-fat diet. In a study by Mattes (1993) preference for fat in selected foods declined during 12 weeks on a low-fat diet, when sensory exposure to fats were absent. No change in fat preference was seen when fat mimetics were part of the low-fat diet, suggesting the preference for fat may depend on continued exposure to the properties of fat. Future nutritional strategies should emphasise ways to avoid the development of a preference for high fat foods in children.

The DAB (1993a) conducted a Food and Health Survey to monitor consumer attitudes to diet, nutrition and health issues, with a focus on dairy products. The results show that 76% of New Zealanders believe that the food affects their future health, while most people associated a high fat diet with coronary heart disease risk. People have a poor perception of the fat content of many common foods and modify their diets according to those perceptions. For example, they may believe that margarine contains less fat than butter and consequently consumers change from using butter to margarine and believe that by doing so their fat intake is reduced. Shuttleworth (1993) reported that in a survey conducted by the Australian Dairy Corporation, 30% of the surveyed population had some degree of concern relating to the consumption of dairy food, and misunderstood the fat content of regular milk. Consumers need to be educated on the fat content of milk and other dairy products. Honer (1994) reports that the market for reduced-fat foods would increase due to the healthier eating trend.

2.1.5 Diet and health in New Zealand

New Zealanders enjoy an overall high standard of living with adequate food, good education and advanced health care. However, the population still suffers significant health problems associated with diet. Some nutrients, such as total energy, fats (saturated, monounsaturated, polyunsaturated) and calcium are considered as public health issues in New Zealand. As stated earlier, there is a

high incidence of nutrition related diseases, such as coronary heart disease, high blood pressure, some cancers, diabetes mellitus and alcohol related problems in the New Zealand population (Nutrition Taskforce, 1991). The Ministry of Health (1993) report indicated that cancer was the leading cause of death for New Zealand in 1991 accounting for 26% of the total, followed by heart disease (25%) and cerebrovascular disease (10%). New Zealand has the fourth highest rate of coronary heart disease amongst western countries. Bremer (1994) promotes modification of diet for reducing cardiovascular disease; for example, reducing intakes of all fat-containing products by choosing low fat dairy products, including cheese and using small amounts of unsaturated margarine and oils for cooking instead of butter or other fats.

Table 2.1 shows the deaths for which nutrition is a factor. In 1990, these diseases accounted for 50% of all deaths in New Zealand. The Nutrition Taskforce (1991) estimated that about one-third of deaths were attributable to dietary factors. Overweight increases the risk of several major health problems, including ischaemic heart disease, diabetes, hypertension and some cancers. It is estimated that 11% of males and 13% of females are obese (Body Mass Index, BMI over 30), and 55% of male and 38% of females are considered to be overweight (BMI between 25 and 30) in New Zealand (Ministry of Health, 1994). Many health problems, although linked to lifestyle, are associated with food and nutrition imbalances, for example, eating too much high energy food, particularly foods high in fats, and not eating a variety of foods rich in protective factors.

Table 2.1: Total deaths for which nutrition is a factor, 1990 (Ministry of Health, 1994).

Cause of death	All ages Number	Percentage
Ischaemic heart disease	6907	25.6
Cerebrovascular	2600	9.8
Hypertensive disease	185	6.9
Breast cancer	635	2.4
Oesophageal cancer	178	0.7
Bowel cancer	1038	3.6
Stomach cancer	302	1.1
Diabetes mellitus	414	1.5
Alcohol related	144	0.5
Total	12303	46.0
All other causes	14221	54.0
Total	26524	100.0

Some of the population have inadequate intakes of certain nutrients, for example calcium in children. Calcium is important for maintaining health and preventing health problems such as osteoporosis. Population groups with high calcium needs are children, adolescents and pregnant women and breast feeding women (Public Health Commission, 1994). Recent studies show low calcium intakes among New Zealand school children (Brinsdon *et al.*, 1993). In general, 75% of men and women consume more than 550 and 400 mg of calcium/day, respectively, however, the recommended intake for adults is 800 mg calcium/ day (Hillary Commission, 1990).

The role of diet in health was recognised in the New Zealand health hoals and targets (Nutrition Taskforce, 1991), one of which was to reduce the incidence of dietary related health disorders by improving nutrition.

2.1.6 Dietary goals and guidelines for New Zealanders

The Nutrition Taskforce (1991) appointed by the Department of Health highlighted the key areas of nutrition, and recommended the Food and Nutrition guidelines, given in the Taskforce document *Food for Health* (1991). The Nutrition Policy launched in 1992 endorsed the recommendations of the Taskforce Report. Guidelines help individuals to make food choices. These are as follows:

* eat a variety of foods from each of the four major food groups every day;
* prepare meals with minimal added fats (especially saturated fat) and salt;
* select pre-prepared foods, drinks and snacks that are low in fat (especially saturated fat), salt and sugar;
* maintain a healthy body weight by regular physical activity and by healthy eating;
* drink plenty of liquids each day; and
* consume alcohol in moderation.

The following are the New Zealand dietary goals which are designed to be achieved by the year 2000 (Nutrition Taskforce, 1991):

Energy	all New Zealanders should maintain a healthy body weight by balancing intake with expenditure;
Fat	total fat intake should be reduced to 30-35% of the total energy, saturated fatty acids plus trans fatty acids to provide not more than 15% of total energy (range 8-15%), polyunsaturated fatty acids to provide approximately 8% of total energy (range 6-10%), monounsaturated fatty acids to provide upto 20% of the total energy (range 10-20%);

Carbohydrate	should provide 50-55% of energy;
Fibre	should be 25-30 g per day;
Sugars	provide less than 15% energy;
Alcohol	to reduce total consumption by 20%.

2.1.7 Proposed strategies for the food industry

To improve nutrition in New Zealand, Nutrition Taskforce (1991) proposed recommendations for many sectors, including the food producers, processors and retailers. It was suggested that food manufacturers need to increase knowledge on nutritional issues and their application to food production and product development. Similarly, food marketers and advertisers need to understand nutrition issues and consumer concerns about food and health. Healthy food choices should be promoted through collaboration with food industry, researchers, educators and nutrition experts; and to modify, where necessary, the foods to meet specific health and nutrient goals. Suggested strategies to meet these goals are: widespread circulation of the Food and Nutrition guidelines, dissemination of food and nutrition information, legislation for food safety and quality, research on key nutrients important to public health in New Zealand, education of children, parents, teachers, consumers, the food industry, health professionals and the community.

The following are some of the strategies suggested for the food industry (Nutrition Taskforce, 1991):

* provide clear nutrition labelling;
* produce more energy-reduced and fat-reduced foods;
* produce leaner meat;
* provide lower fat meals in restaurants;

* increase production of some cereals and maintain fibre content in milling;
* increase the range of sugar free products;
* increase education on moderate drinking;
* offer "under-salted" foods in fast food restaurants;
* continue to reduce salt in manufactured foods;
* develop foods which are consistent with Food and Nutrition guidelines.

Some strategies suggested specifically for the dairy industry include (Nutrition Taskforce, 1991):

* develop foods which are consistent with the Food and Nutrition guidelines and which maintain internal and export market competitiveness;
* undertake basic food and nutrition research;
* develop appropriate nutrition labelling;
* undertake education programmes to inform the public on food and nutrition matters;
* increase the range of low-fat cheeses, butter fat and vegetable oil mixes and low-fat dairy dessert products;
* promote dairy products as important foods in the diet;
* promote reduced total fat and in particular reduced saturated fat products;
* expand and promote low fat dairy products particularly low-fat alternatives to cheddar cheese;
* manufacture and promote a variety of attractive, palatable, low-cost, low-fat dairy snacks and products to encourage adolescents and young adults to maintain good calcium intakes;

* further develop nutrition education initiatives of the dairy industry and collaborate with health professionals and organisations;
* encourage the use of appropriate nutrition labelling practices by dairy product marketers, particularly the fat content of all milk and dairy products;
* increase the availability of single-serve items of low fat products.

2.2 Dairy products in the New Zealand diet

During the last five years, the liquid milk industry was deregulated, which resulted in changes in the distribution and marketing of dairy products in New Zealand. Major changes include; an increase in the introduction of new products (low fat), a larger range of packaging options (Tetrapack) and increasingly competitive branding and pricing. Through deregulation restrictions were removed on the operation of financial markets and companies reorganised on a more competitive basis. The dairy companies could sell milk outside their traditional areas. Many new products and promotions have focused on lowering energy and fat content, while there has also been development of luxury, premium product categories.

The dairy industry is presently responding to the changes in consumer demand and the food policy environment, e.g., nutrition education programmes are being developed in collaboration with health professionals and organisations. The Dairy Advisory Bureau (DAB), which is a part of the Dairy Board since 1989, plays a role in supplying nutrition information to consumers, health professionals, educators, and research and promotion for the New Zealand dairy industry. The DAB undertakes nutrition education by promoting dairy products as part of a balanced diet. For example recently the DAB in conjunction with the Arthritis Foundation organised an osteoporosis awareness programme.

Milk, regular cheese, ice cream and yoghurt are popular dairy foods. Whole milk is more commonly used in tea and coffee than trim milk or non-fat milk. Now less energy is available from dairy products mainly due to decline in the consumption of fresh milk. Also there is a decline in butter available for consumers (Hillary Commission, 1990).

2.2.1 Liquid milk

Milk is a major contributor of energy, protein, saturated fats, riboflavin, vitamin B_{12}, and vitamin A, calcium, potassium, magnesium, zinc and iodine to the diet. The nutrient content of a specific dairy product depends on the proportions of fat to non-fat solids. The choice of milk consumption is changing, with homogenised milk as the market leader, while trim milk has extended the market for milk. For decades, standard milk, homogenised and skim milk have been available throughout New Zealand, the fat content of these products is around 4.1% for whole milk, 3.3% for standard homogenised milk, and 0.1 % for skim milk, respectively. Hillary Commission (1990) survey reveals that men tend to use whole milk rather than trim milk. Milk fat contributes a large proportion of the total fat consumed, so changing to a lower fat version represents an easy way to reduce the dietary fat content. Men, apart from other consumers will mostly benefit from the consumption of reduced fat milk.

In 1987, trim milk was introduced nationally, as a nonfat milk containing approximately 0.5% fat. This product has added non-fat milk solids, i.e., protein and lactose, which improves the mouth feel of the milk, such that the taste characteristics resemble a higher fat milk. Trim milk has increased the market for non-fat milks significantly with 16% of total milk sales in 1990. Many milk processors are marketing various types of milk in a move to strengthen their position in the market place. The new milk variants have influenced the sales, by attracting previously non-drinkers and the health conscious. A new non-fat

category has also emerged for milks with less than 0.3% fat, called super trim-milk. Table 2.2 shows the types of milk and their fat content currently available in New Zealand. At present, there is no price differential between the four major types of milk: whole milk, homogenised milk, trim milk or other reduced fat milks. These products are available at the same price, however, the complete range of new products is not available throughout the country (DAB, 1993b).

Table 2.2 Types of milk and their fat contents (DAB, 1993b)

Variety	% fat content
Whole milk	4.1
Std/homogenized milk	3.3
Reduced fat milk	2.0
Reduced fat milk	1.5-1.6
Trim milk	0.3-0.5
Super trim milk	< 0.3

2.2.2 Flavoured milk

Flavoured milks are reduced fat products, with added sugar for sweetening and flavourings, e.g., strawberry, banana or chocolate. Zap, one of the brands of flavoured sweetened milk, is a reduced fat product with a fat content of around 2.2%. In the 1990s lower fat flavoured milks were introduced, containing 1% and 2% fat, marketed under a range of brand names, e.g., Cool Fuel. Flavoured milks are mainly consumed by children, adolescents and men, and they will benefit by consuming the lower fat flavoured milk.

2.2.3 Cultured dairy products

Sour cream and yoghurt are the two main types of cultured dairy products available in New Zealand. Yoghurt has been produced commercially in New Zealand since the 1970s. It is mostly marketed in single serve pottles of 150 or 200 g and in 1 kg plastic containers for home use. Frozen-yoghurt is a new, low-fat dairy dessert. Other new products include reduced calorie yoghurts containing artificial sweeteners, and acidophilus containing products, e.g., Naturalea and Metchinhoffs (Visser *et al.*, 1991). Yoghurt is a popular dairy food and younger men and women more frequently choose yoghurt compared to older. A large number of females (aged 25-64) choose low fat yoghurt (Hillary Commission, 1990). Thus, reduced fat yoghurts may not be of much benefit to a large segment of population.

Some types of yoghurt products marketed in New Zealand are plain unsweetened and sweetened flavoured yoghurt, which contain 0.5-3% fat; sweetened fruit-flavoured yoghurt, with less than 2% fat; with added fruit and thickeners to produce a creamier textured product. Sweetened, flavoured low fat yoghurts are largely consumed as a snack product by women and health conscious people. The protein and mineral content of yoghurts are higher than in homogenised whole milk due to added milk solids. The amount of vitamin B_{12} is less than in milk but folic acid is increased due to bacterial action. The major nutrients in cultured dairy products are presented in Table 2.3. Sour cream contains a higher fat content (20 g fat/100 g) and is also a better source of vitamin A.

Table 2.3 Major nutrients in cultured dairy products (Visser *et al.*, 1991)

	Natural unsweetened yogurt	**Natural sweetened yoghurt**	**Sweetened strawberry yoghurt**	**Sour cream**
Serving size	150 g	150 g	150 g	30 g
Energy (kcal)	75	135	140	70
Nutrients % ADI				
Protein	10	10	10	-
Calcium	30	30	30	5
Thiamin	5	5	NA	NA
Vitamin B_{12}	5	10	NA	NA
Folate	10	10	NA	NA
Riboflavin	20	25	NA	NA

Note : NA- not analyzed
ADI-Adequate daily intake

2.2.4 Cheese

Cheese contains all the major milk nutrients: high quality protein, fat, vitamins and minerals. It is a rich source of readily absorbable dietary calcium. Most cheese contains moderate amounts of salt (2%). Cheeses with lower fat levels are available such as Ricotta. Mild cheddar cheese is the most widely consumed variety in New Zealand. Reduced-fat versions of cheddar cheeses are available now. The fat and energy content of some lower-fat cheeses is shown in Table 2.4.

Table 2.4 Typical fat and energy content of some lower fat chesses

Name	Serving size (g)	Fat	Energy (kJ)
Ricotta	65	2.5	320
Cottage cheese	65	3.5	260
Quark	65	6.5	270
Low fat soft cheese	30	2.5	140
Cheddar	40	14	700
Mozzarella	40	7.0	460
Camembert	40	8.5	470
Low fat processed cheese slices	40	5.5	390

Total cheese consumption is relatively static, however, there has been a significant increase in the number of different types of cheeses available and a subsequent increase in the sale of varietal cheeses. Lower fat cheeses were promoted as a group from 1989. The Food Regulations (1984) specifies the minimum fat and the maximum water content in the various types of cheese. For example, cheddar cheese contains minimum 48% fat and maximum 39% water. A reduced fat cheese must contain one-third less fat than the standard, thus has 32% fat or less. Hillary Commission Survey (1990) shows that 70% of male and females (aged 15+) consume regular cheese. However, women tend to choose low fat products to a greater extent than men. More than a quarter of New Zealand women eat cottage cheese compared to about 10% of men. Reduced fat cheese is mostly chosen by older women. Lower fat cheeses could make a substantial difference in the contribution of fat in the diet of many New Zealanders.

2.2.5 Cream and cream products

Cream is a concentrated source of milk fat obtained from milk. Standard cream contains approximately 40% milk fat, while other liquid cream products are available with a range of lower fat contents than standard cream. Whipping cream and light cream contain ingredients such as flavours and other additives that improve the functional properties of the product. Pasteurised standard and UHT whipping cream contain more than one-third fat, and contain high levels of fat-soluble vitamin A. Mostly young men and older women tend to choose cream in their diet (Hillary Commission, 1990). Types of cream with fat contents as defined in legislation are shown in Table 2.5.

Table 2.5 Types of New Zealand cream

Name	Fat content
Cream	More than 40%
Whipping cream	More than 28%
Light cream	More than 10% and less than 20%

Butter is a concentrated source of milk fat with a higher cholesterol and energy content than most of the dairy foods, when compared on an equal weight basis. Unsalted butter contains only the sodium that is naturally present (10 mg/100 g), on the other hand, standard butter contains 480 mg sodium/100 g. In New Zealand, butter is mostly salted. Cultured butter and unsalted sweet-cream butter are also available.

Margarine is chosen to include here as it is largely consumed now as an alternative to butter. The manufacture and sale of table margarine was prohibited by the Margarine Act in 1908. As a result of the concern over the

possible relationship between dairy and other animal saturated fats and heart disease the prohibitions on this product were repealed and a polyunsaturated margarine has been available as a butter substitute since 1972. Since then consumption of butter has declined. Blended products are also available as spreads (Bailey and Earle, 1993).

2.2.6 Dairy desserts

Dairy desserts include a range of products that includes frozen products such as ice creams, frozen yoghurt and non frozen dairy desserts such as pudding and dairy food. These are discussed below.

2.2.6.1 Ice creams

Ice cream is a popular and the most consumed dairy dessert, although consumption is influenced by factors such as diet and weight consciousness and the current *trend* to natural products. Alternatives to ice cream, such as frozen yoghurt are now produced with modified fat and sugar content and are consumed both as a snack and as a dessert. Ice cream contains 10% milk fat, while premium ice cream products with a higher fat content (15%) are also available. Now, low fat ice cream substitutes are available with reduced levels of fat as compared to standard ice cream, e.g., Tip Top Light Dairy Desserts. Generally, men choose desserts, while older women more frequently choose custards and milk puddings and older men milk puddings. Mostly young men and women choose ice cream. Hence, low fat versions of ice cream and other dairy desserts could be beneficial to all consumers.

2.2.6.2 Other dairy desserts

Novel dairy desserts are soft milk-puddings packaged in pottles similar to yoghurt. These are made from milk and sugar with added flavouring, colouring agents and starch as a thickener. Typical flavours include strawberry, banana or chocolate and these products are mostly consumed by children. Dairy desserts are relatively low in fat (2%) and energy. The amount of sugar is approximately the same as that in sweetened yoghurt, but less than ice cream.

2.3 Fat substitutes

The growing market for low fat and no fat products is encouraging technologists all over the world to develop alternative ingredients that function and taste like fat. The industry's efforts to develop fat substitutes are due largely to the nutritional concerns about excessive fat intake and calorie consumption (Hassel, 1993 and Hewitt, 1993).

The fat substitutes are broadly grouped into lipid-based, protein-based, or carbohydrate materials, representing a wide range of chemical sources with diverse sensory and functional properties. For example, *Olestra*^{R} (a subset of sucrose polyesters) is a non-caloric, cholesterol-free fat replacement not digested or absorbed by the body. The physical and chemical properties are similar to those of full-calorie fats, giving the taste and texture of conventional fats. Olestra is used in a variety of foods, such as cakes, candy, margarine and ice cream (Hassel, 1993). Substitutes, such as Olestra and other similar other products are not approved for use in New Zealand. However, certain components, such as gums and modified starches which replace food fat and achieve similar textural characteristics are allowed. For example, *Litesse* is being used in New Zealand which is a polydextrose.

If the various fat substitutes are allowed for use in New Zealand it would lead to greater availability of processed reduced-fat products for consumers. Consumers should be educated on the appropriate use and acceptable intakes of food with fat replacers. Food labels should specify the fat replacers and the nutrient details of the products. However, many researchers feel that the effect on the use of fat substitutes is not significant and total dietary benefit may not be possible as people generally compensate for dilutions in food energy increasing the amount of food eaten to reach a similar caloric intake, thus encouraging poorer eating habits (Drewnowski, 1992; Mattes and Caputo, 1993; DAB, 1993 and Mela, 1994c). The impact of such fat manipulations on food preferences and intake is not well understood.

2.4 Food and nutrition legislation

Food legislation prescribes standards for food, food hygiene, additives, labelling and advertising. The goal for food legislation is therefore, *to produce, manufacture, store and consume food that is safe and wholesome, and labelled to enable consumers to make informed food choices*. The food regulations 1984 and 8 amendments, and the Dietary Supplement Regulations 1985, are regulations made under the Food Act 1981, which governs the composition and labelling of all food sold in New Zealand. Amendments to the regulations are made to keep up with technological changes in the food industry, to harmonise food regulations between Australia and New Zealand, and to comply with international standards, in particular standards developed by the Codex Alimentarius Commission of WHO/FAO. However, Food Regulations have mostly lagged behind technological changes possibly due to the time taken to process amendments through the legislative process. It is essential that regulations are current and appropriate to support the recommendations aimed to improve the nutritional wellbeing of all New Zealanders.

2.4.1 Ingredient lists

The New Zealand Food Regulations (1984) require information on the ingredients in standard foods and a complete declaration of all ingredients for foods on the labels, for which there is no prescribed standard at present. Amendment 5 requires new food additive identification for the purposes of the ingredient list. Food additives other than vitamins and minerals, cultures, modified starches and flavouring substances (other than flavour enhancers), must be declared in the list of ingredients using the class name followed by the code number or the specific name of the additive, e.g., colour (102, 110) or colour (tartrazine, sunset yellow FCF). The list of code numbers is given in the 12th schedule in the food regulations.

2.4.2 Nutrition labelling

Nutrition labels are numerical statements of the nutrient content of a food, intended to provide nutrition information to consumers make informed food choices. Currently, New Zealand allows voluntary nutrition labelling. Legislation introduced in 1991 lays down regulations for label formats if nutrition labelling is provided. When a nutrition claim is made on the label of any food, the label on each package of the food should contain a declaration of the nutrients in the food (Regulation 13A). Information on the amount of nutrients must be provided per serving and per 100 ml or 100 g along with the weight or volume of a serving of the food. The nutrients must be declared in the following order: energy; protein, fat and carbohydrate, which may be declared in any order; any other nutrient for which a claim is made; any other nutrient.

Nutrition labelling is common on packaged foods and 40% of New Zealand packaged foods contain some nutrition information (Nutrition Taskforce, 1991). As noted in the Nutrition Taskforce (1991) report most labels contravene the

nutrition labelling legislation. Nutrition labelling is more common internationally, although varied in the amount and presentation of information provided. There remains confusion over the most appropriate nutrition labelling to aid consumer understanding and food choice.

2.4.3 Nutrition claims

A nutrition claim is any statement suggesting or implying that a food has particular nutritional properties, including representations relating to energy, protein, carbohydrate, vitamins and minerals. They also include negative claims about the presence or the absence of salt, sugar or sweetening, e.g., *low salt*. Nutrition claims are used on product labels, advertising, product promotion or educational material. Controls on nutrition claims are stated in the Fifth Amendment to the Food Regulations (1991). Regulation 13B and 13C cover claims for *low*, *high* or *reduced*. The criteria that apply depend on whether the food is naturally high or low in the claimed nutrient (13B) or whether the composition of food has been modified to increase or decrease a particular nutrient (13C). The requirements are that a claim of *reduced* or *low* may only be made on those foods that contain one-third less of that particular nutrient or energy compared with their normal counterpart. The name of the normal counterpart must be given on the label with a comparison of the difference in that nutrient or energy. In addition to this a claim of *low* must also meet a specific requirement. For example, a claim of *reduced fat* would require the product to have one third less fat than its normal counterpart whereas a claim of *low fat* would not only require one third less fat but that less than 10% of the energy of the food be derived from fat. A claim of *high* may only be made on those foods that contain one third more of that particular nutrient or energy compared with their normal counterpart and contain more than a specific level of that nutrient or energy.

2.4.4 Misleading descriptions

The food regulations, from 1995 regulates the use of the words *pure and real or genuine* to avoid misleading statements, for example, the word *pure* can be used to describe a single ingredient food or a mixture of foods that are of the same type. For example, a fruit juice with added sugar cannot be described as *pure*. The words *mineral enriched, mineral fortified* are not permitted, also claims that a food is high in or enriched with a mineral permitted. The word *lite* or *light* used on its own without qualification is considered to be a claim about the energy content of the food and mean *diet*.

2.4.5 Nutrition labelling and the consumer

Many consumers are interested in and aware of nutrition labelling. Earlier the practical use of nutrition labels was limited because consumers do not understand the numerical concepts and the terminology (Gurr, 1989; Nutrition Taskforce, 1991; and Worsley, 1993). In order to increase the effectiveness of nutrition labels the present format of labels were derived which is likely to be understood by the consumers by positively influencing consumer nutritional awareness. Good, consistent labelling on food products is useful to consumers as they are intended to provide key nutrition characteristics which can help consumers make informed food choices. Nutritional claims could have an important educational role if used appropriately as they help expand and interpret data in nutrition labelling. However, education programmes are needed to ensure that consumers are able to make full use of nutrition labels.

2.4.6 Nutrition labelling and the industry

The food industry's concerns in providing nutrition labelling are primarily the high costs of labelling. Some food manufacturing companies may feel that it is

the responsibility of the Government and educational institutions to teach the public about nutrition and also that food labels are used and understood by only a minority of shoppers. Further, some food manufacturing companies may feel that specificity of information on labels deprives the food processors of flexibility to change the order of ingredients or substitute different kinds of constituents.

There are potential benefits for the food industry in providing good nutrition labelling. Labelling may enhance the products image and add value to the product. Nutrition information on labels is seen as an incentive for food companies to improve the nutritional qualities of food. Nutrition labelling is increasingly being used as a marketing tool and many new products have claims like *reduced fat* or *reduced calories* in the UK and the US (Heasman, 1993; Ruxton and Kirk, 1993). By the use of nutrition claims, marketers can create or enhance the impact of nutrition issues either appropriately or inappropriately. Claims should therefore be monitored to protect the consumer.

2.5 Nutrition and food marketing

Some food manufacturers have responded to consumer concerns about diet and health, for example, by including nutrition labelling. Foods based on fats and sugars have declined, while *freshness* and *wholesomeness* became important requirements in foods, further additives are avoided by some companies. Lite food and drinks are being produced. Nutrition claims are widely being used as a means of differentiating products. Many foods are marketed for some nutrition benefit. The producers and marketers of dairy products aim to improve demand by emphasising the nutritional value, such as: calcium in the female diet; whey proteins and disease-immune defence and cancer prevention; fats-heart disease and cancer; fermented products and natural health products. Food manufacturers believe nutrition to be a factor in food choice, hence nutrition has always featured in food marketing. Thus companies are focusing on satisfying

the needs of consumers. Corporate interest in nutrition has also increased in recent years. Many researchers in the Australia, UK and the USA (Slavin, 1990; Nesheim, 1991; Senauer *et al.*, 1991; Beaumont, 1993; Gambrill, 1993; and McVicker, 1994) have reported similar observations.

The food industry has an important role to play in encouraging healthful eating by product development, marketing and consumer education. The industry can be a good source of nutrition information for consumers through labelling and nutrition education material. The food industry should market foods in line with the dietary recommendations and should provide correct information to the consumers.

2.6 Conclusions

There is widespread concern about high levels of nutrition-associated disease in New Zealand. The Nutrition Taskforce (1991) recommended dietary guidelines, for example eat less fat, especially saturated fat. It also suggested strategies for the food industry to help achieve the dietary goals, for example, to provide nutrition information to the consumers and produce fat reduced foods. The recent changes in food regulations specifies the requirements for nutrition claims and nutrition labelling. Consumer confusion over the food labels is hoped to be eliminated. Some food companies are responding to consumer concerns, for example, by including nutrition labelling. Hence, the availability of low fat products and the labels were examined in the supermarkets. Further food manufacturers views on nutrition labelling, consumer issues and nutrition expertise in the food companies were explored. Food manufacturers should positively influence consumers health by producing useful products and providing nutrition information. Thus, this study investigated the place of nutrition in product development, marketing and whether the manufacturers were changing consumer demands in line with the Food and Nutrition guidelines.

CHAPTER 3
METHODOLOGY

3.1 Introduction

This chapter outlines the methodology used to obtain the information on fat reduced products available in New Zealand. The study consisted of three main sections, discussed below.

3.2 Survey method

* supermarket survey,
* questionnaire to general food manufacturer's,
* questionnaire to dairy companies and interview. The survey methods used are described in detail below.

3.2.1 Observation in supermarket

In order to determine the market development and the availability of fat reduced dairy products, a supermarket survey was done in Palmerston North. It was aimed to find information on nutrition labelling, nutrition claims and the possible target market by observing the labels and graphic designs on the product packaging. The survey of these products was done in three supermarkets (Foodtown, Pak 'n' Sav and Woolworths). The nutritional information, nutrition claims on labels and the packaging of the products were observed, and are discussed in the results chapters. This gave a clear picture of fat reduced products available in Palmerston North. It is recognised that a slightly wider range might be available in larger cities.

3.2.2 Questionnaire design

A questionnaire was prepared for the food manufacturers which was a pre-formulated written set of questions to which respondents recorded their answers, within closely defined alternatives (Appendix 1 and 3). Designing the questionnaire was focused mainly on two areas. The first related to the content and the wording of the questions. The second pertained to the general appearance of the questionnaire. Several factors were taken into consideration when designing the questionnaire. For example, ensuring questions were not ambiguous or confusing, or would not lead subjects in their responses (e.g., section 2, Question 4). In addition, the questions were clearly laid out, and for open-ended questions, an idea of a likely response was used (e.g., section 3, Question 3). The questionnaire was as short as possible.

To help meet the objectives of this project the questionnaire was divided into three sections, each intended to illicit information about different aspects of the study. The questionnaire content covered the areas of product development, nutritional concerns and consumer issues.

Section 1

The first section requested information about the products, their fat contents, the Food technologists perception of the company's attitude to the production of low fat products, the proportion of production in the company, views on the future market for low fat products and the trends in the production and marketing and the problems encountered in the production of fat reduced products. There were 10 questions in Section 1.

Section 2

This section dealt with the company's views and knowledge in nutrition issues and regarding the labelling regulations governing fat reduced products. This section contained 9 questions.

Section 3

In the third and final section an attempt was made to find out about the company's views and concerns on consumer issues. Specifically, it was to learn about the target markets for the products, nutrition education for consumers and nutrition labelling. There were 6 questions in this section.

3.2.2.1 Questionnaire administration-general manufacturers

The food manufacturers addresses (Appendix 2) were obtained from the Nutrition Database, Crop and Food Research, Palmerston North and from the supermarket survey. The questionnaires were posted to 25 selected food manufacturer's producing various products, along with a covering letter explaining the purpose of this survey. The questionnaire was addressed to the food technologists in the company. The questionnaire was mailed covering a wide geographical area and the respondents completed it at their convenience. Self-addressed stamped envelopes were provided to return the questionnaire. Follow-up letters were sent three weeks after initial posting. A response of 44% was obtained from this survey. This survey was used as a pretest for further study.

3.2.2.2 Questionnaire administration-dairy manufacturers

Dairy companies were chosen as the target of this survey because, the supermarket survey indicated that most low fat products were dairy products.

Also, dairy products have an important place in the New Zealand way of life, being important sources of protein and calcium. Marketing milk is also a major industry in New Zealand. The Dairy Advisory Bureau (DAB) was interested and supportive of this study and provided the addresses of the dairy companies in New Zealand (Appendix 4). The previous questionnaire was further modified specifically to suit manufacturers of dairy products. The questionnaires were addressed to food technologists in each company. A copy of the questionnaire used is included in Appendix 3.

Twenty six questionnaires were posted out to the dairy companies in New Zealand in the months of Aug-Sept 1993, and 12 companies (46%) responded. Five companies sent a letter expressing reasons for not filling out the questionnaire. One of the dairy companies did not have the resources to complete the questionnaire as it was a small company. Another company was producing dairy ingredients, such as casein, caseinate and whey protein concentrates which were used in fat reduced products by other customers, and so felt the questionnaire to be inappropriate for them. Three other companies were carrying out product development work on low fat products and the products were yet to be introduced into the market. The 12 companies (46%) who responded were manufacturing and marketing low fat products.

3.2.3 Interview

In an effort to obtain further information on some areas of the study, such as nutrition knowledge, manufacturing details, technological problems, some representatives of dairy companies were interviewed. They were asked to indicate in the questionnaire if they were willing to be interviewed either by telephone or personal interview. The companies that agreed to be interviewed were grouped according to geographical location. For convenience some companies were visited for personal interviews while others were interviewed on telephone.

The same person was contacted who answered the questionnaire. The interviewee was called ahead of time to set up a mutually convenient time. The interview duration was 15-20 minutes. The interview was structured with open-ended questions and sometimes follow-up questions were asked. During interviewing there was friendly atmosphere and the rapport was maintained. Written notes of responses were compiled by the interviewer during the interview.

The results and the discussion of this study are given in the following three chapters namely; the supermarket survey, the general manufacturer's survey and the dairy manufacturer's survey. Conclusions drawn from the study, the limitations and potential for further study has been documented.

CHAPTER 4
SUPERMARKET SURVEY

4.1 Introduction

This Chapter presents the results of survey of fat reduced dairy products at Pak 'n' Sav, Foodtown and Woolworths supermarkets located in Palmerston North. The data collected on various products are examined and discussed here.

The main objectives were to:

* survey the fat reduced products available for consumers in the supermarkets at Palmerston North;
* explore apparent target market for the fat reduced products by observing the product labels, graphic designs on the packaging and other relevant information;
* find information on nutrition labelling, nutrition claims and compare with the current food regulations;
* compile the addresses of the fat reduced product manufacturers for additional information required.

The Hillary Commission (1990) survey gives an indication of the state of over-nutrition and provides insights into food choices, for example, men have less knowledge of fat in foods than women and their food choices are frequently higher in fat. Hence, the Nutrition Taskforce (1991) suggests strategies for the food industry, such as to produce low fat products and educate the consumers about the nutritional value of the products. Thus, in order to improve the New Zealand diet, it is important to study the availability of food products, and whom the products are targeted by the manufacturers and to further find out if they are providing any nutritional information (nutrition labelling).

In discussing the nutrition labelling on the product labels, comparisons are made with current food regulations, the *New Zealand Food Regulations 1984 and Amendments 1,2,3,4,5 and 6.* Most provisions of Amendment 5 in relation to nutrition labelling and nutrition claims came into effect on 1 January 1992, while some provisions will come into force on 1st January 1995.

4.2 Fat reduced products surveyed in the supermarkets

The following categories of products were chosen during the survey: liquid milks; cultured dairy products (yoghurt and sour cream); cheese; cream; butter; margarine; and dairy desserts.

4.2.1 Milk and flavoured milk

Milk and flavoured milk are available in the three surveyed supermarkets and are discussed below in line with the objectives outlined previously.

4.2.1.1. Product description and apparent target markets

Types of milk available are standard milk, reduced fat milk and non fat milk (Trim and Supertrim). They are differentiated by varied colour packaging. A wide range of milk with different fat contents is available under some brand names, such as Anchor and Tararua. Table 4.1 shows milk varieties of Tararua brand with the observed information on the packages. As mentioned before, apparent target market is based on observations on the graphic designs and other features on the product packaging, for example, Tararua Calci Trim milk has pictures of a young woman and a girl on the package, while the package of Tararua Balance milk contain pictures of sports people and men. There is consistency of colours across the range of milks (Tararua and Anchor). The Market Milk Federation (MMF) introduced the uniform packaging system for various types of milk.

One of the flavoured milk product is fat reduced (Cool Fuel) with 1.5% fat, while the other (Nestle Milo) contains 3.1% fat. Both are packed in one litre cartons and two litre plastic bottles.

Table 4.1 Tararua brand milk varieties with their packaging details, fat content and apparent target market

Product	Package			Fat content/ 100 ml	Apparent target market
	Sizes	Material	Colour		
Farm house, Full cream	600 ml	Carton	Pink	4.2%	Children, elderly,all
Regular, Standard	300 ml,1 L 600 ml,1 L 2 L	Carton Sachet Plastic bottle	Blue	3.5 %	Entire family
Balance, Reduced fat	1 L, 2 L	Carton Sachet Plastic bottle	Light blue	1.5 %	Sports people, health conscious
Trim, Non fat	1 L 2 L	Carton Plastic bottle	Green	0.4%	Women, Calorie conscious
Calci trim, Non fat	600 ml,1 L	Carton	Yellow	0.1%	Girls and women

It is recognised that a wider range of products are available in larger cities, such as Auckland (Pickering, 1993; and Nordmark, 1993). After the market deregulation (as discussed in Chapter 2) there is more competition, therefore, a number of varieties of milk with varying amounts of added solids are being produced and marketed. The Auckland milk market is now supplied from five sources with a range of products and it is thought that Wellington and other cities will have a similar trend in the future. Brands have become important in terms of differentiating the various products and providing value added products to the consumers. For example, Anchor have increased the range of

products by adding sub-brands (Lite-blue and Super-trim). Schelhaas (1992) and Sorensen (1992) also report that there is an increase in market segmentation and branding of products leading to more competition.

Studies show that consumption of milk has remained high and the demand for fluid milk products changed from whole milk towards semi skimmed and skimmed milks (Sorensen, 1992). Consumers are more aware of health and nutrition issues and future trends in the consumption of dairy foods in New Zealand relate to the concerns about high levels of fat, saturated fat and cholesterol (Shank and Carson, 1990; Bailey and Earle, 1993; and Nordmark, 1993). In the USA light dairy products are increasing in sales and market share compared to the standard formulations (Thompson, 1990; Barr, 1990). Market trends in UK have also shown a similar trend (Khan, 1993). Sorensen (1992) reports that in the past 20 years the international dairy industry has experienced a strong trend in consumers demands towards low fat products. The trend was especially strong in 1980s and will increase in the future.

Some modified (e.g., low fat foods) products are very useful for consumers and some are less so. In order to be useful in improving the diet a product needs to be eaten regularly and the change must be significant. For example, trim milk when substituted for whole milk will make a significant difference in the diet (Wright, 1989). The results of the present study show that a wide range of reduced fat and low fat milks are available along with the standard milks. Presumably some products will be useful and some not, which depends on availability, popularity, frequency of consumption and change in fat content. Thus, not all these products are going to be equally useful. Reduced fat flavoured milk products for example are an appropriate choice in the diet, for children, at whom these products are mostly targeted.

4.2.1.2 Nutrition labelling and claims

According to the Food Regulations (*Amendment No 5, Regulation 95, 98 and 98A, 1992*) standard milk contains between 3.25% to 3.5% milk fat, non-fat milk contains not more than 0.5% milk fat. Reduced fat milk a mixture of non-fat milk with standard milk or milk fat or cream that has been partially removed, contains between 1.5-2.5% milk fat and should carry a statement of the percentage milk fat content of the product. Flavoured milk is a fluid milk product to which any permitted flavouring substance is added and contains not less than 3% milk fat, flavoured reduced fat milk contains between 0.5-3% milk fat and flavoured non-fat milk or low-fat milk contains not more than 0.5% milk fat (*Regulation 97*).

When a nutrition claim (*Regulation 13 A*) is made on the label of any food, the label should have a declaration of the nutrients in the food, for example, the energy in kJ per 100 g (or 100 ml) and per serving, protein, fat and carbohydrate per 100 g (or 100 ml) and per serving and any other nutrient for which a nutrition claim is made. The weight or volume of a serving of the food must be specified. *Regulation 15, subclause 2,* relates to the nutrition claims as to the presence of minerals, for example, 200 ml of milk should have minimum quantity of 200 mg calcium.

Nutritional information (energy, protein, fat, carbohydrate and calcium) was provided on all the labels of reduced fat and non fat milk varieties observed in the supermarket and a comparison was shown with the standard milk. In general nutritional information was provided on these products according to the regulations. The nutrient content and claims on milk labels observed in the supermarkets survey are shown in Table 4.2.

Nutritional claims on the reduced fat and non fat milks are *reduced fat, non fat and high in calcium* and carry the statement, *not suitable as complete milk food for*

infants. The flavoured milks have nutritional information per 100 ml (and per serving) of the product and made a claim *reduced fat 1.5%*. Some information on the connection between calcium and osteoporosis is given on the labels of reduced fat and non-fat milk products as a good source of calcium. Some non fat milk product labels (e.g., Tararua Calci Trim milk) contain information on adequate daily intake of calcium for healthy individuals in New Zealand, for example, children: 1000-1200 mg, 2.3 servings (of 250 ml serve each). The source indicated is the Australian Recommended Daily Allowances. This agrees with the Food Regulations *Amendment No 5* (1992), which states that if a label contains a reference to a recognised Recommended Daily Allowances (RDA), the label should also state the origin of the standard used.

Table 4.2 Nutrient content and claims on milk labels in the survey

Number of varieties	**Fat content,g /100 ml**	**Nutrient features /100 ml**	**Claims made**	**Additional information from packaging**
Standard (3)	3.3	Ca:120 mg E:260 kJ		Regular milk, whole family
Reduced fat (2)	1.5	Ca:125-140 mg E:190-212 kJ	Reduced fat	Fresh,health conscious,
Non fat trim (2) Super trim (2)	0.4-0.5 0.1	Ca:130-160 mg E:153-181 kJ Ca:205 mg E: 170 kJ	Non fat, high in calcium	Fresh,women, adolescents, Osteoporosis look after dem bones
Flavoured (2)	1.5-3.1	Ca:140 mg E:212-386 kJ	Reduced fat	Fresh, Better in flavour

Key: Ca- Calcium; E- Energy

Research on label understanding by consumers (Worsley, 1993) in Australia shows that most shoppers look at labels before purchase and many find information on ingredients, additives and storage instructions useful.

A survey conducted by DAB (1993a) on consumer attitudes shows that people's perception of fat content of various foods is inaccurate and that 81% of respondents are concerned about fat in their diet. Thus, nutritional labelling on the products is useful to educate consumers on the nutritive value of the products and to facilitate the right food choices. Most milk products in this survey carried comprehensive nutrition labelling.

4.2.2 Cultured dairy products

Yoghurt and sour cream are the main types of cultured products observed in the three surveyed supermarkets.

4.2.2.1 Product description and apparent target markets

Yoghurt is a coagulated milk product obtained by fermenting pasteurized milk products, with cultures of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* or with other cultures suitable for lactic acid production. According to the Regulations 119 yoghurt contains 3% milk fat, fat reduced yoghurt contains between 0.5% and 3% milk fat and the package should contain the words *fat reduced* followed by a declaration of the fat content of the product. Skimmed or low fat yoghurt contains 0.5% milk fat and similarly the package must contain the word *skimmed* or the words *low fat*. Yoghurt may contain any carbohydrate sweetener, such as sucrose, honey and so on specified in *Regulation 147 (1)* and any stabiliser, such as carrageenan, gelatin and so on specified in regulation 253 (2). Flavoured yoghurt is yoghurt (of whatever kind) that contains added foodstuffs intended to flavour the product. It may contain any carbohydrate sweetener specified and/or the artificial sweetener Aspartame (*Regulation 119).*

Nutrient content and claims on yoghurt labels observed in the supermarkets are shown in Table 4.3. Unsweetened and sweetened yoghurts were observed in the supermarket, stored at 4 °C. A variety of flavoured, sweetened yoghurts are

available, that have become popular and important foods (Bailey and Earle, 1993). Flavoured yoghurts are the most common, widely marketed in convenient packages, including multipacks of 4-6 single (150-200 g) serve pottles. Bigger resealable plastic containers of 500 g, 1 Kg and paper cartons in various sizes are also available for home use. Some yoghurts are artificially sweetened by aspartame, which is usually referred to on the product labels by its trade name *Nutrasweet*^{R}. The market is segmented by branding the products and increased number of yoghurt brands are available which is mainly to increase the sales, thus supermarket shelves show an evidence of increasing market fragmentation.

Regular (plain unsweetened) yoghurt observed in the supermarket contains 3.3% milk fat, while many sweetened fruit flavoured yoghurts contain 1.0-0.1% fat. The addition of sugar and fruit to yoghurt made it a popular snack and a dessert product. The names of a selection of these; Yoplait Light, Slimmer's Choice, Weight Watcher's, Dewinkel Simply Slim, Silhouette Low Fat suggest that they are targeted at slimmers, dieters, health conscious people and women. Thus, many light products are targeted at people, especially women who want to lose weight and are diet and shape conscious. Men are at high risk due to high fat intakes (Hillary Commission, 1990) hence, it may be useful, if the low fat products are targeted at a wider range of consumers. As reported in DAB (1993b) yoghurt is a low fat dairy product and a wide variety of reduced and low fat products are available since the 1980's. Younger men and women more frequently choose yoghurt than older. While older women tend to choose low fat yoghurt. However, products such as fat reduced yoghurt may not help much to reduce the dietary fat, as yoghurt which claims to be reduced fat is only marginally lower than standard yoghurt.

Some flavoured yoghurts with cartoon pictures on the package are targeted at children for example, Cool Crew fruit flavoured yoghurt contains 1.4% fat. This product is designed to appeal to children using cartoon characters. Yoghurt from New Zealand Milk Corporation is marketed for young children with its range

of Disney characters. A yoghurt product marketed for babies and toddlers, contains 2% fat and claims *no artificial colour, flavour, salt and gluten free.* However, yoghurt does not normally contain salt and gluten, the claim on salt is confusing and it must list a sodium and potassium content to be legal.

Table 4.3 Nutrient content and claims on yoghurt labels in the survey

Number of varieties	Fat content, g /100 g	Nutrient features,/ 100 g	Claims made	Additional information from packaging
Plain unsweetened (1)	3.3	E:292 kJ		For family
Flavoured (3)	2.2-1.7	E:381-398 kJ	Real fruit, 40 % extra fruit, reduced fat	For children, health conscious
Reduced fat (1)	1.5	E:321 kJ Ca:160 mg	Low fat Bulgarian culinary yoghurt	
Sweetened flavoured (6) reduced fat	1.4-0.1	E:189-357 kJ, Ca:144-156 mg	Low fat, fruit, flavoured, light, Nutrasweet^{R}	For dieters
Unsweetened, flavoured, Reduced fat	0.2	E:174-336 kJ Ca:138-160 mg	Slim yoghurt, no artificial colours, Slimmers choice, low fat, natural, fresh, diet	For slimmers, dieters
Mild yoghurt	1.8	E:380 kJ, Ca:126 mg	Smooth fruit puree, reduced fat 2%, flavoured yogurt, no artificial flavouring, no added colour, salt, gluten free	For 6 month infant
Organic (3)			Natural, no stabilizer, aids lactose digestion, high Ca availability, additive free, low in calories	Active cultures-acidophilus and bifidus

Studies have shown that milk products have *protective* roles and an ability to protect against ill diseases and promote good health (Gurr, 1989; Speckmann,

1987). Some yoghurts (Naturalea Acidophilus, Metchnikoff and Dewinkel Acidophilus) with active cultures are targeted at the health conscious consumers, emphasising on medical benefits, for example, enhancing gastrointestinal health. Functional foods also known as *neutraceuticals, novel foods and foods for specified health* are any food that can positively influence a person's health or state of mind, designed to be medically beneficial, regulating bodily functions to protect against diseases (Ministry of Health, 1991; and Nordmark, 1993). Thus, acidophilus yoghurts are included in this group of products and research is needed to see if the products are really beneficial to consumers.

Sour cream is obtained from milk or cream, containing milk fat with or without the addition of milk or skim milk, soured by the addition of any acidity regulator specified in regulation. It contains between 20 and 40% milk fat (*Regulation 102*). Sour cream is marketed in plastic pottles and cartons of 150 ml. The composition of a sour cream product (Country Goodness brand) is cream, whole milk, non fat milk solids, stabiliser, gelatine, modified starch and culture, while reduced fat sour cream has more milk and less cream. Table 4.4 shows the nutrient content and claims on sour cream labels observed in the supermarket survey.

Table 4.4 Nutrient content and claims on sour cream labels in the survey

Number of varieties	Fat content, g/100 g	Nutrient features, /100 g	Claims	Additional information from packaging
Regular sour cream (2)	21.8-22.1	E:950-977 kJ		
Light sour cream (2)	12	E:616 kJ	Reduced fat	

4.2.2.2. Nutrition labelling and claims

Some yoghurt product labels specify the fat and protein content (e.g., Naturelea Plain Unsweetened). Most yoghurts (flavoured sweetened) carry nutrition labels and nutrients included are energy, protein, fat, carbohydrate and calcium. Some others (e.g., Metchnikoff Acidophilus) carry no nutrition label, while an organic yoghurt (Naturelea) with whole milk and active cultures (Acidophilus and Bifidus) carries a nutrition label and claims *natural, high calcium availability, additive free, low in calories and aid lactose digestion.* A low fat flavoured yoghurt (Yoplait) contains 0.1 g of fat in 150 g of product and claims *reduced fat.* The yoghurt products targeted at kids (e.g., Cool Crew) contain nutrition labels, while Cartoons Fromage Frais do not contain any nutrition information. Most of the reduced fat yoghurts that made a claim carried nutrition information. Nutrition information on the products is helpful in making useful food choices. Hence, it is necessary that all products should carry nutrient details on label. Sour cream product carries nutrition information (per 100 g) and the nutrients specified are: energy, fat, protein and carbohydrate, while the reduced fat sour cream with 12% fat, carries nutrition information and claims *reduced fat.*

4.2.3 Cheese

The types of cheeses available including the low fat versions are categorised and discussed under the following sections.

4.2.3.1 Product description and apparent target markets

Cheese is a fresh or matured solid or semi-solid product and *Regulation 113* of the food regulations specifies the moisture and minimum fat content of various types of cheese, for example, minimum fat for cheddar cheese is 48%, camembert 45%, cheshire 48%, colby 48%, cream 70%, edam 40%, feta 42%, gouda 48%, mozzarella 40% and parmesan 32%. Cottage cheese contains a

maximum of 80% water. A *low* or *reduced* fat cheese must contain one-third less fat compared to its normal counterpart and the label must show the name of the normal counterpart and the amount of the fat. Also when a low fat claim is made, only 10% of the energy of the food should be derived from fat (*Regulation, 13 B, 13 c in force 1 January, 1995*).

The nutrient content and claims on cheese labels observed in the supermarkets survey are shown in Table 4.5. More cheddar type cheese varieties were available compared to other types. Low fat versions of a small number of cheeses were observed, for example, low fat cottage cheese, cream cheese, processed cheese and cheddar type cheese.

Table 4.5 Nutrient content and claims on cheese labels in the survey

Number of varieties	**Fat content, g/100 g**	**Nutrient features, /100 g**	**Claims made**	**Additional information from packaging**
Cheddar mild	35.2	Ca:720 mg E:1750 kJ		
Reduced fat Cheddar type cheeses (3)	17-29	Ca:930 mg E:381-1540 kJ	Reduced fat, 25% less fat than cheddar	Litestyle, natural cheddar style
Reduced fat Cream cheese (2)	16-16.5	Ca:100 mg E:405-788 kJ	Light, fresh, low fat, 80% less fat than margarine	
Reduced fat Processed cheese(3)	14-20	Ca:570 mg E:1000-1011 kJ	Light and trim, reduced 20% average fat, natural	For dieters
Reduced fat Cottage cheese (2)	1.0 -1.1	E:315 kJ	Reduced fat, light, extra low fat, natural	
Edam (2)	24		Reduced fat, 25% less fat than cheddar per serving	

The predominant cheese variety manufactured in New Zealand is cheddar or cheddar types, although the manufacture of specialty cheese types has recently shown considerable growth (New Zealand Year Book, 1994). Many reduced fat cheeses give a fat comparison with cheddar cheese. Full cream milk is used to produce cheddar, lower fat milk is used to produce edam cheese, skim milk is used to produce cottage cheese, while a mixture of milk and cream produces cream cheese.

Studies show that cheese sales are up both in New Zealand and overseas (DAB, July 1994). The local market has grown (now worth $147 million) by increased sales of cheddar cheese, processed cheese and other cheese varieties (source AC Neilsen Retail Scanning Data). Speciality cheese is the fastest growing segment in New Zealand, with Edam accounting for the largest dollar sales. Despite the growing interest in speciality cheeses, cheddar remains one of the largest categories (DAB, 1994). Schelhaas (1992) also reports that the demand for cheese with a reduced fat content will rise. Thus, the growth in sales and popularity of lower fat versions of cheeses indicate that consumers are benefitting from these products, according to the Hillary Commission (1990), the greater availability of low fat versions of traditional foods contributed in decreasing the proportion of energy coming from fat in New Zealanders. However, some reduced fat cheese, such as Slimmers Choice Natural Cottage cheese, Tararua Slimiz, Litestyle Natural Cheddar Style cheese suggest that they are targeted at health conscious, calorie conscious and especially women. This type of targeting may reduce their appeal to other groups of consumers and may so limit the products usefulness, for example, for men and for children.

4.2.3.2 Nutrition labelling and claims

Most cheese labels do not carry nutritional information. The reduced fat varieties of cheese, for example, Country Goodness Light Cottage Cheese, Slimmer's

Choice Natural Cottage Cheese, make claims about fat content and carry nutrition information (energy, fat, protein, carbohydrate). Some reduced fat cheese such as Tararua Slimiz make a nutrition claim but do not have nutrition information, while some other cheese labels, such as New Zealand Mainland Litestyle, Anchor Reduced Fat cheese, have an unclear message about fat level i.e., *25% less fat than cheddar per serving* with no nutrition label. Most of the reduced fat cheese varieties carry claims about the fat content, such as *reduced fat*, one-third less fat than the normal counterpart (cheddar). Thus, some cheese nutrition labels and claims do not conform to the Food Regulations. Descriptions such as, *low fat* must be able to be proven and comparative statements should be supported by information on nutritional content. Authentic nutrition information needs to be provided on products, such as lower fat cheese.

4.2.4 Butter, margarine and cream

Butter, margarine and cream products observed in the three surveyed supermarkets are discussed below.

4.2.4.1 Product description and apparent target markets

Butter contains 80% milk fat and not more than 16% water *(Regulation 111)* and is produced by churning milk or cream. Salted, unsalted and reduced salt varieties of butter are available (for example, within the range of Tararua brand butter). Mostly 500 g of butter packed in parchment paper is available. Semi-soft butter is available in plastic tubs, which is produced by additional churning during its manufacture, resulting in a softer butter.

Margarine contains 80% fat and not more than 16% water *(Regulation 88)*, and is produced principally from edible fats and edible oils, including milk fat . The type and amount of ingredients and additives that go into margarine are controlled by the food regulations. It may contain salt, any carbohydrate

sweetener specified in regulation, suitable protein sources, colouring substances, flavouring, emulsifiers, antioxidants, acidity regulators, lactic acid cultures, water, vitamin A and D. Reduced fat spreads or margarine have a fat content between 30-50%. Eleven varieties of margarine and a product that is a blend of butter and margarine are available in 500 g plastic containers, 1 kg containers for bulk use. All these products are chilled at 4 °C. The names of a selection of margarine, such as Slimarine and Miracle, suggest that they are targeted at women and health conscious people. Table 4.6 shows nutrient content and claims on labels of butter and margarine observed in supermarket survey.

Table 4.6 Nutrient content and claims on labels of butter and margarine in the survey

Number of varieties	Fat content g/100 g	Nutrient features /100 g	Claims made	Additional information from packaging
Margarine (11)	60-85	E:2220-3100 kJ	Fewer calories, free of animal fats, no cholesterol, reduced fat, polyunsaturated, low in saturated fat, 40% reduced fat, light	Slimarine, Gold n Light, Miracle, for dieters, health conscious people
50/50 Butter Margarine blend				
Reduced salt butter(2)			Reduced salt	100% natural
Butter (4)	80			Natural

Table margarine as a substitute for butter has been permitted since 1970 and in the recent years butter consumption has fallen due to the concerns about saturated fat and heart disease (Hillary Commission, 1990; Brown, 1991; and Bailey and Earle, 1993). Similar trends were observed in the U.S., spreads consumption in 1990 show 70% margarine and 30% butter, as people have

changed their eating habits to lower their cholesterol level (Schroder and Baer, 1991). The DAB (1993a) Food and Health Survey revealed that consumers perceive butter as a fattier food than margarine, in fact, it has an equal fat content, but differs in fatty acid content. Butter contains more saturated fat (66%), while margarine contain less saturated fat and much more polyunsaturated fatty acids. However, recent research (Willett, 1993) indicates that the unsaturated trans fatty acids present in margarine have similar effects to saturated fats in affecting cholesterol levels. Unpublished data show that levels of trans fatty acids are close to 13% in New Zealand margarine (Dialogue, 1994). However, further research is required to make useful food choice and the key should be to use both products sparingly. The Heart Foundation of New Zealand still supports the use of polyunsaturated margarine as an alternative to butter.

Cream is a concentrated source of the milk fat from milk. Standard cream contains 40% fat, available in 1 L carton, 300 ml cartons and plastic bottles. Whipping cream, containing 28% fat and light cream containing between 10-20% fat, are available in 150 ml, 300 ml cartons and plastic bottles. Whipping cream is also packed in aerosol cans for convenience. For example, Quality Farm Light cream with 70% less fat than standard cream and whipping cream with 30% fat are available. Table 4.7 shows nutrient content and claims on labels of cream observed in supermarkets survey. Young men and older women tend to choose cream more often compared to other people (Hillary Commission, 1990). Low fat creams are not, in themselves low fat, but are only lower in fat than standard cream. They may be unlikely to contribute significantly to lower fat intake in the diet, as cream is to most people, an occasional luxury, rather than a regular item.

Table 4.7 Nutrient content and claims on cream labels in the survey

Number of varieties	Fat content g/100 g	Nutrient features /100 g	Claims made	Additional information from packaging
Standard cream (2)	40			
Whipping cream (1)	20		Reduced fat	
Light cream (1)	20		Reduced fat	

4.2.4.2 Nutrition labelling and claims

Some butters use the claim *natural* as compared to some margarines which claim *no cholesterol, fewer calories, light and 40% reduced fat*. Margarine with 40% of the total fatty acids as polyunsaturated fatty acids, and 20% of the total fatty acids as saturated fatty acids may be referred as *polyunsaturated*. For a low cholesterol claim to be made the specified serving of food should have less than 20 mg cholesterol. Nutrient content and claims on labels of butter and margarine are shown in Table 4.6. Reduced salt butter carries a claim on the product, *reduced salt* and nutrient information on sodium and magnesium were not given in the label. Butter labels do not carry nutrient information. However, considering the high levels of consumer confusion about butter and margarine. it may be useful if butter labels carry nutrient information (fat, energy). Nutrition information is present on labels for some brands of margarine, such as Slimarine, Gold n Light, Country Crock, Miracle, Meadow-lea and Praise Canola, however, levels of trans fatty acids are not shown in these labels. Others like Foodtown, Greenmount, Miracle reduced fat margarine, do not carry nutrition information, although claims on fat are made on these products. Thus, nutrition information on margarine labels is not uniform across the brands and does not always conform

to the labelling regulations. Such lack of consistency may be confusing to consumers and choosing a healthier version will make no difference.

4.2.5 Dairy desserts

Dairy desserts include a number of products, such as ice cream, frozen dairy dessert, frozen yoghurt, mousse and dairy food (pudding) which are as discussed below.

4.2.5.1 Product description and apparent target markets

Ice cream is a frozen product, made from milk, cream or butter, sugar and other ingredients, such as eggs, fruit, flavouring, colouring agents, stabilisers. Standard ice cream contains 10% (Tip Top and New American) fat and is marketed in single-serve pre-packed ice cream bars, one litre and two litre plastic containers and five litre cardboard cartons for bulk buying. All are stored at -18 °C. Some premium varieties of ice cream (Movenpick) are used occasionally, while reduced fat versions of ice cream are also available, such as Weight Watchers, Lite Licks and Tip Top Frozen Dairy Desserts with fat between 0.3-3.2%. A variety of Tip Top ice cream is available, which claims to be natural and marketed for those people concerned about artificial additives in foods; it contains full cream concentrate, non fat milk, raw sugar, glucose, egg yolk, natural gums and natural flavour. A frozen shake product, New American brand and Kiwi brand, is apparently marketed for children, using cartoon pictures on the package. Frozen confectionery similar to ice cream, for example, New American Super Vanilla shake is also targeted at children as the label says *fun pack*. Frozen yoghurts (e.g., Tip Top frozen yoghurt) are increasing in popularity as a dairy dessert option, targeted at the health conscious consumers (Visser *et al.*, 1991). These are lower in fat compared to standard ice cream.

Another category of dairy desserts is a non-frozen product, stored in the same chiller cabinet as yoghurt, for example Yoplait Milkshake Flavour Dairy Food which is marketed to children. It is a type of sweetened milk-pudding, made from milk, sugar, flavourings, colouring agents, starch as a thickener; it is packed in 200 g pottles and is low in fat (2%) and energy compared to standard ice cream. Mousse is a dairy dessert, available in 150 ml cartons (Swissmaid) with 4.6 g fat and also in cans and spray, aerosols, at 3.3% fat per 100 ml. Also, Cartoon dairy dessert is available in flavours such as milk shake and banana fudge which is targeted at children. These dairy desserts are popular with youngsters due to the added flavourings and sugar. Table 4.8 shows the nutrient content and claims on labels of dairy desserts observed in the supermarket survey.

Table 4.8 Nutrient content and claims on labels of dairy desserts in the survey

Number of varieties	Fat content g/100 g	Nutritional features /100 g	Claims made	Additional information from packaging
Standard ice cream (4)	10.5	E:1551 kJ,		
Reduced fat frozen dairy dessert,ice cream (3)	3.2-0.3,< 1	E:300,466,630 kJ	< 3.5% fat, reduced fat, 99% fat free	lite slice
Natural ice cream			Natural, nothing artificial	
Shake frozen confection			Thick shakes	Fun pack, children
Milkshake flavour dairy food (3)	5.1	E:567 kJ, Ca:165 mg	Good source of protein and mineral Ca&K, energy	children, R.D.I-Energy for 7-11 years FAO, WHO, UNU, 1985
Mousse (2)	3.3-4.6	E:175		
Frozen yoghurt (2)				

Ice cream is the most popular kind of dairy dessert and studies show that ice cream consumption has increased (Guest, 1991; Bailey and Earle, 1993). Sorensen (1992) reports that milk usage patterns and demographic changes influence future consumption trends. In the next decade most developed countries will have decreasing percentage of children and a rise in the percentage of adults aged 35 and older. This will slow down the yoghurt market for children, but increase the sales of high processed luxury products for adults. Future market trends indicate stable or slightly declining whole milk sales (partly due to increased sale of semi-skimmed milk) decreasing sales of butter, increasing sales of cheese, yoghurt and fresh products. Guest (1991) also reports that the trend of low fat products will grow due to increased concerns about fat and cholesterol. However, the introduction of new products could be slow due to the costs of new product development and introduction.

4.2.5.2 Nutrition labelling and claims

Some brands, for example, Foodtown ice cream have ingredients and nutritional information (10.5 g fat/100 g) specified on the label. Reduced fat versions of ice creams for example, Tip Top Light Frozen Dairy Dessert (0.3 g fat/100 g), New American Liteslice Reduced Fat (<1 g fat/100 g), make claims about the low fat content of the product and carry nutrition information. However, the premium ice cream variety (Movenpick) does not carry any nutritional information. Yoplait dairy food claims to be a good source of protein, minerals (calcium and potassium), energy, and the product label carries nutrition information per 100g. Most of the products that made a claim carried nutrition information on the label, however, it is essential that all products should contain nutrition labels that comply with the law.

4.3 Summary

The supermarket survey elucidated the availability, the nutrition labelling and the apparent target markets for fat reduced products. One of the limitations in this survey was finding out the target markets for the products by observation only, as this interpretation may not be the same as the manufacturer's. Based on this survey a questionnaire was developed to study the views of manufacturers (discussed in chapters 5 and 6) producing low fat products. The main results of the supermarket survey are summarised below:

* a considerable range of low fat dairy products was available along with the standard products in the supermarket. Increased branding of products and market segmentation is noticeable;
* different colour packagings are used to differentiate the fat contents of the milk products, which appears to be consistent among the surveyed products;
* nutrition labelling and claims for milks conformed with the food regulations; most of the cheese labels that made a claim did not carry nutrition information; low fat yoghurts made a claim about fat, while most carry nutrient information, some did not; few products in the dairy dessert section carried nutrition information; protein and fat are the main nutrients shown in the labels; it may be useful if nutrient information is included on all the products;
* many low fat products are targeted at health conscious women, dieters and slimmers, whereas some low fat products (reduced fat milk and cheeses) could be useful for all consumers in reducing their dietary fat intake;
* some dairy products claim to be lower in cholesterol but are still high in saturated fat (e.g., margarine), such claims are confusing to consumers.

CHAPTER 5
GENERAL MANUFACTURERS SURVEY

5.1 Introduction

A general manufacturers survey for fat reduced products was carried out to investigate the areas of product development, nutrition issues and constraints in line with the objectives laid out in Chapter 1. The food manufacturer's addresses were obtained through the supermarket survey (chapter 4) and from the Nutrition Database (CRI, Palmerston North). Of the 25 questionnaires distributed 11 responses (44%) were obtained, 9 of which were from companies producing and marketing dairy products. Hence, these results were used as a pilot study for focusing the next survey questionnaire, which is exclusively for dairy companies. The questionnaire sent to the manufacturers is given in Appendix 1. All the surveyed companies are located in the North Island of New Zealand, the addresses are given in Appendix 2. The survey questionnaires were originally addressed to the Food Technologists in the company, however, Marketing Managers (5), Research and Development (R&D) Managers (3), Quality and Operations manager (1) and Food Technologists (2) have answered. The results in this chapter are discussed under the sections: current developments; nutritional concerns; consumer issues; and constraints in developing fat reduced products.

5.2 Company's views on current developments of fat reduced products

Nine out of the eleven companies (82%) that responded were producing and marketing fat reduced products. Table 5.1 shows the categories of fat reduced products being produced and marketed by these companies. One of the respondent companies was not producing any fat reduced products and another

company had previously been producing and marketing these products, but was no longer.

In the questionnaire, manufacturers were asked to state how important it was for the company to produce fat reduced products. Eighteen percent (2) of the surveyed manufacturers regarded it as very important and seventy three percent (8) of the companies considered it moderately important to develop reduced fat products. The company that had stopped making the fat reduced products judged it not important to develop reduced fat products. Overall, most (91%) of the manufacturers felt it was important for them to produce low fat products. The fat reduced products of eight companies (73%) are sold in New Zealand. Two companies are marketing in New Zealand and Australia, while two others are also selling in Europe, USA and Asia.

Table 5.1 Fat reduced products produced by surveyed food companies

Products	Number of companies
Instant skim milk powder	1
Trim and semi trim milk	5
Fat reduced table spread	2
Reduced fat frozen dairy desserts	2
Reduced fat yoghurt	2
Reduced fat cheese	3
Reduced fat salad dressing	1
Reduced fat pate	1

5.2.1 Target market for fat reduced products

It was intended to find out the companies' views on the target market for their low fat products. Figure 5.1 shows the market for low fat products targeted by

the surveyed manufacturers. It is evident that most (9) of the companies considered that the purchasers of low fat products were women buying for themselves and health conscious women. Other purchasers were thought to be slimmers (8) and women buying for their family (6); men were considered less likely to buy these products.

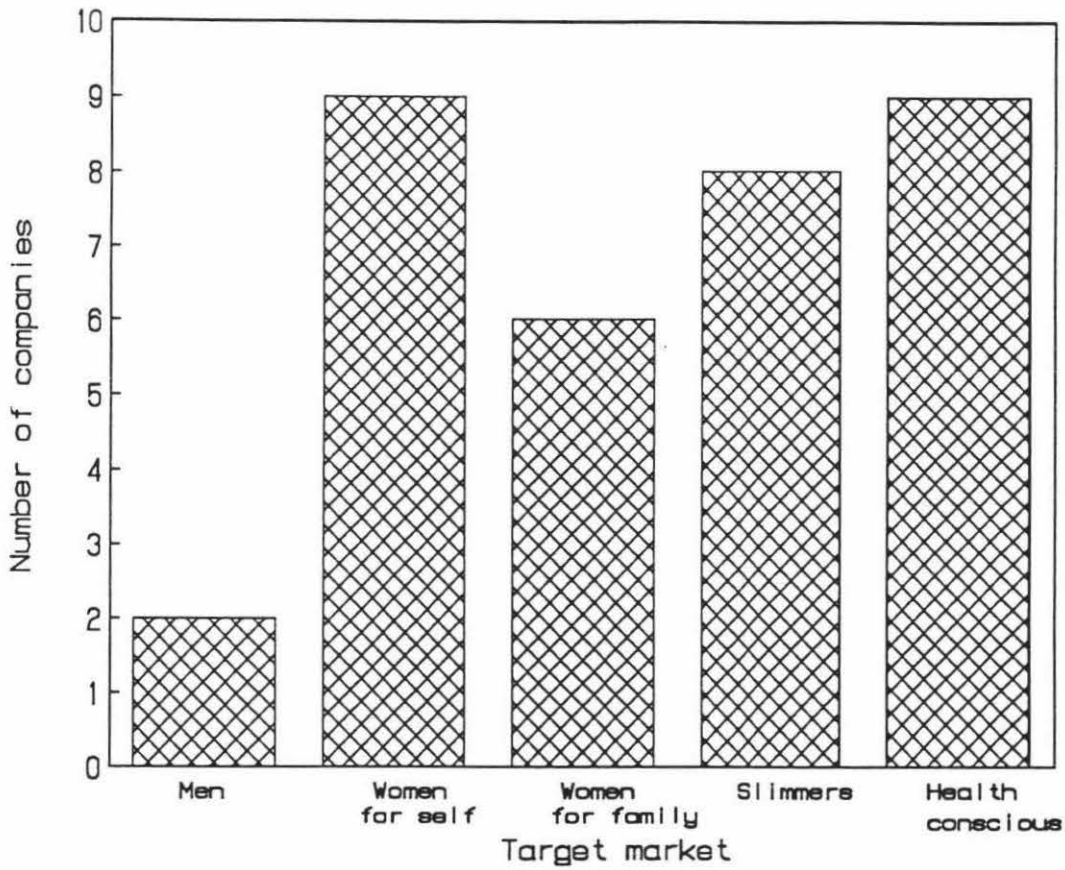

Figure 5.1: Target market for the fat reduced products as considered by the surveyed companies

The above results demonstrate that women are the main target market for fat reduced products. However, fat reduced products (reduced fat milk, reduced fat cheeses) may be useful to other groups of consumers such as men in order to reduce their dietary fat intake even though these products are not targeted specifically at men. Studies on food choices (Hillary Commission, 1990) indicate that men are eating more high fat foods, therefore, it might be nutritionally useful if manufacturers extended the fat reduced products to market to a wider group of consumers. This could be done by either producing products with a general 'across the board' appeal or by specific targeting for example for men or teenagers or sports people.

5.2.2 Future market for fat reduced products

More than half (59%) the companies believed that the low fat market would increase in the future. Four (36%) thought that the market would remain at the present level, while only one company thought that it would decrease. The reasons cited for increasing market demand for fat reduced products are:

* increased health consciousness;
* consumer awareness of fat in the diet;
* increased media attention;
* demand driving the development of new products;
* products becoming more effective in quality and cost thus becoming a standard food in the diet.

The studies of Barr (1990), Heasman (1993), Khan (1993) and Somerset (1991) support this belief. Trends in the USA and UK indicate a market growth in fat reduced foods and a similar increase in demand for these products is evident in New Zealand as consumers become more diet and health conscious (DAB, 1993a). This is the driving force behind the increase in the market for low fat foods.

One company had stopped making fat reduced products as the sales was low, while another company suggested that with the economic recession, fat is not an issue and hence the market would decrease. Also the small size of New Zealand market was thought to be a reason for the low market demand.

5.3 Access to nutrition expertise

Only two companies surveyed had a nutrition policy, while nine (82%) did not. Seven companies (67%) agreed that more nutrition training would be useful for some employees in the company, while some companies (36%) did not see a need. More than half (7) the companies (64%) were not consulting with an outside nutritionist or nutrition organization, while a few (3) companies (27%) were consulting with the Dairy Advisory Bureau and the Food Science Department at Otago University on nutrition issues. None of the companies employed nutritionist.

Most (7) of the companies (64%) experienced difficulty in getting up-to date and reliable nutrition information, for example, information on New Zealand dietary guidelines (1991). A few (3) companies reported that nutrition information was obtained by attending conferences; one company never tried to obtain any sort of nutrition information. Thus, the majority (64%) felt that they could not easily access up to date information and did not employ or consult nutritionists.

Many of the surveyed companies were seen to have limited access to nutrition expertise. The Nutrition Taskforce (1991) suggested that food companies should market foods that meet the dietary guidelines and help consumers in food choices by providing nutrition information. In order to do this, food manufacturers would require a good knowledge of nutrition, or would need access to nutrition expertise, e.g., from consultants. It is considered important that food companies enhance their knowledge about nutrition and its application

to product development, food production and product labelling. Some companies have developed nutrition policies which identify areas in which they have shown recognition of the importance of nutrition issues in product development and marketing. The majority in this sample did not have nutrition policies. The assistance of nutritionists with developing and implementing such policies is essential. Nutrition policy in the food companies will reinforce the commitment to develop more nutritionally useful products. Nutrition expertise is also a valuable resource to identify market opportunities. Studies by Earle and Anderson (1985), Lachance (1989), Nesheim (1991) and McVicker (1994) support the above views.

5.3.1 Decision makers regarding nutrition issues

It is clear that most companies did not consult with or employ nutritionists, so companies were asked to specify who, within the company, was responsible for decision making on nutrition issues. Decisions regarding nutrition issues affecting the products and marketing were made by - Quality managers; Product development team; Marketing team; and R & D managers.

These results indicate an apparent lack of nutrition personnel and expertise in the surveyed companies. It may not be sufficient for companies just to consult outside organisations and many companies may benefit from employing nutritionists to make day to day decisions. Nutritionists can play a distinct role in the food companies in the area of food product development, marketing and liaising with consumers, by providing information about food choices. The trend in Europe and Australia shows that an increasing number of nutritionists are working at the food production level and are also employed in the supermarkets. The studies of Weaver (1990) and Somerset (1991) support the above. Based on overseas trends, New Zealand food companies may employ more nutritionists and dietitians in the coming years. One of the supermarket

chains (Countdown, Christchurch) has recently employed a dietitian to assist with the product labelling and consumer enquiries (Knight, 1994).

5.4 Manufacturers' views about nutrition labelling

Virtually all the companies claimed to know the New Zealand Food Regulations related to nutrition labelling and claims. Only three companies (27%) found the food regulations clear and concise and had no problems in understanding them. On the other hand, seven companies (64%) mentioned that the Food Regulations are either restrictive or difficult to interpret or both, while the remaining two did not express any opinion.

Manufacturers were asked to state their views on nutrition labelling by selecting one or more options provided in the questionnaire (Appendix 1). Seven companies (63%) considered that nutrition labelling was an important service to offer, while six companies believed that nutrition labelling was necessary because consumers want it. One company thought nutrition labelling was an unnecessary expense and two other companies said that they were unable to offer nutrition labelling due to expense.

Nutrition labelling helps consumers in food choices and may serve as an incentive to the food companies to improve the nutritional qualities of food and to develop products in keeping with the Food and Nutrition guidelines Nutrition Taskforce, 1991). For example the Heart Foundation's *Pick the Tick* nutrition labelling programme aims to help the consumers in improving their food choices and at the same time it is an incentive for the food companies to improve the nutritional qualities of the food (McClean and Wiseman, 1993). New Zealand legislation does not require nutrition labelling unless a claim is made. So the majority of nutrition labelling is currently provided voluntarily by manufacturers. Hence, it may be useful if all the food companies view nutrition

labelling as important for consumers. Through labelling manufacturers can play an important role in consumer nutrition education. A study by McVicker (1994) supports the above views. An Australian Food Survey (DAB, 1993) revealed that 87% of consumers believed that manufacturers should provide buyers with nutrient details, although 50% of consumers said that they didn't always believe nutritional claims on packaging. In a survey on New Zealand consumers it was shown that 97% thought that nutritional information should be provided by manufacturers (Burlingame *et al.*, 1989). Manufacturers should be aware of the widespread interest in nutrition labelling demonstrated in these recent studies.

Just over half (6) the companies (55%) in this survey have nutrition labelling on some products, for example, the light frozen dairy dessert range and all the low fat products. Three companies (27%) reported having nutrition labelling on all products. Nutrition labelling was not included at all by one company that was manufacturing ingredients, another company currently did not provide nutrition labelling but intended to in the future.

In order to determine which nutrients were considered important to be included in labels a total of 11 nutrients were listed in the questionnaire and respondents were asked to choose (Appendix 1). Ten manufacturers answered this question and the nutrients chosen as important to appear on nutrition labels by each company are shown in Table 5.2. Most of the companies considered it important to include energy, fat, protein and carbohydrate while some companies believed it important to include saturated fat, vitamins and minerals as important. Few companies thought that cholesterol and fibre were important for nutrition labelling.

Table 5.2 The nutrients considered important to include in nutrition labels by surveyed companies

Nutrients	Number of companies
Energy	9
Protein	8
Total fat	9
Saturated fat	3
Carbohydrate	8
Minerals	2
Vitamins	2
Cholesterol	2

As discussed earlier, nutrition labels on foods are intended to provide information about important nutrition characteristics for consumers to make informed food choices. Research both in New Zealand and overseas indicates that labelling can influence purchase patterns. Consumers have shown interest in gaining more information about the level of nutrients in foods. Food labelling may help to remove consumer confusion over the fat content of foods and help them to make better choices. Nutrition labelling is used more as a marketing tool by manufacturers rather than conveying actual nutritional benefits to the consumers. Thus, the manufacturers views does not always coincide with consumers interests. (Burlingame *et al.*, 1989; Wyllie *et al.*, 1990; DAB, 1993a; Public Health Commission, 1994; and Mela, 1994c). From May 1994, most foods sold in the United States require a label giving *nutritional facts* including the number of calories per serving, number of calories from fat, total and saturated fat content, cholesterol, various vitamins and minerals and a breakdown of carbohydrate content. Nutrition labelling varies in the presentation of information in different countries and in some countries the content of labels is governed by regulations. However, there remains disagreement on an

appropriate format for nutrition labelling to aid consumer understanding and food choice. Food companies mostly consider the Food Regulations as confusing and restrictive so effort should be made to change this opinion. It is essential that food legislation is current and appropriate to support important changes in food product formulation and ingredients so that the recommendations aimed at improving the well being of all New Zealanders can be carried out. There should be increased communication between the food industry, consumers and the regulatory process.

5.5 Manufacturers' views on consumer issues

Manufacturers were asked which aspects of their fat reduced products they believed to be of importance to consumers by choosing from one or more options provided (Appendix 1). Seven companies (60%) believed a low energy content and fresh, healthy image to be important to consumers, six manufacturers (54%) believed a low fat content was the most important aspect. However, five (45%) thought that different features were important for different products. In a survey on New Zealand consumers (Burlingame *et al.*, 1989) it was observed that residues were considered most hazardous and cholesterol was considered less hazardous than sugar, salt and fat for health. In more recent years the purity of foods has become an important issue for consumers and they expect food products to be convenient, healthy, varied and safe. These views are supported by the studies of Buisson (1989), Lachance (1989), Schelhaas (1992) and Wheelock, (1992b).

5.6 Supply of Nutrition information

Food manufacturers views on providing nutrition information to consumers were explored. Food industry has an important role of educating consumers by providing nutrition information as suggested by the Nutrition Taskforce (1991).

The surveyed companies were asked if they produced any nutrition education material (leaflets, videos) either for consumers, schools or health professionals. One dairy is supplying information packs to schools produced by Market Milk Federation (MMF). Another dairy company is producing product promotion material for consumers. A third company has produced promotion material on ice cream.

5.6.1 Information produced by the MMF

One dairy company is supplying information packs to schools produced by the MMF. *Milkwise snacks,* an activity book for 8-10 year old children, provides information on eating healthy food and selecting the right foods and drinks based on the food pyramid. In addition, there is information for parents showing the importance of healthy snack foods. This information appears simple and conveys the message on healthy snacking. Providing nutrition information at an early age will help in developing healthy eating habits (Honer, 1994). The MMF was formed in 1988, it promotes the interests of the milk industry by representing the milk processing companies and the milk producer associations. One of the functions of MMF is to increase the consumption of milk by New Zealanders and support and promote the interests of the market milk industry. Thus, the MMF is recognized to be playing a major role in producing nutrition information.

5.6.2 Information produced by companies

One large dairy company is producing product promotion material (leaflets) for consumers at point of sale, which contains nutrition information. They are as follows:

* nutrient information on five types of milk with varying fat content (section 4.2.1). It also shows a nutrient comparison of milk with other foods, the calcium needs of healthy New Zealanders and how the product meets the dietary requirements;
* various types of milk differentiated by colour and size of the package;
* picture of a reduced fat milk, but this does not contain any nutrition information;
* pictures of yoghurt, mild cheese (19% fat content) and cottage cheese, however, no nutrient information is included.

The leaflet with nutrient information may be useful in providing nutrient information to consumers. Other leaflets tends more towards promoting the products than providing nutrition information.

Another company produces promotion material on ice cream. A leaflet shows information on reduced fat ice creams (2/3 less fat than the standard one). This company has produced a booklet *Ice cream and frozen novelties* and their place in the diet. It contains information on ingredients but not nutritional information.

The above indicates that only two companies are providing some nutrition information to consumers in the form leaflets. The MMF produces nutrition information which is supplied by the dairy companies to schools. It is evident that the MMF has a prominent role in supplying nutrition information. Manufacturers can have an important role in providing nutrition information, which is supported by the studies of Lachance (1989), Wheelock (1992b) and McVicker (1994). Information on nutritive value of the products and it's place in the diet would be helpful to consumers in their food choices. Manufacturers can positively influence consumers in selecting a healthy diet by providing nutrition information and nutritionists in food companies could perform this function. The Nutrition Taskforce (1991) recommended strategies for the food

industry to help consumers in selecting a diet in line with the food and nutrition guidelines. Therefore, it is vital that if manufacturers produce and supply nutrition education material it is in a useful form for consumers.

5.7 Constraints in producing fat reduced products

Manufacturers reported several constraints encountered in the production of fat reduced products. Texture and flavour changes in products due to removal of fat were reported by eight companies (72%) in some fat reduced products such as yoghurt, table spreads, cottage cheese, light frozen desserts and trim milk. Difficulty in processing was reported by seven companies (64%) in producing fat reduced products such as yoghurt, cheddar cheese and table spreads. Five companies (45%) reported having implemented formulation changes such as the improvement or modification of flavouring systems and/or inclusion of a texture modifier in products, such as yoghurt, spreads, trim milk and cottage cheese. Some (27%) companies reported using fat replacers, such as Simplesse in a mild low fat cheese, frozen desserts and pate. The fat substitute, Simplesse was approved for use in frozen dessert products in the US in 1990 and in Australia and New Zealand in 1991. Simplesse is a modified protein which replaces fat and supplies 4-8 kJ/g. These ingredients with no or low energy mimic the functional, textural and organoleptic properties of dietary fats. The labelling of such products is an area of concern for consumers. In such products ingredients have to be listed correctly according to the composition and nutrients have to be specified, e.g., energy labelling of foods is important. There are many fat replacers with varying properties and nutrients being produced and consumers need to be aware and informed of them (Jehne, 1993).

Maintaining the taste and texture of low fat products are the biggest problems in developing these products. For example, in low fat cheese removal of fat and salt may cause much of the flavour to be lost and the texture to become *rubbery*.

Fat is both a source of flavour and a carrier of flavour in conventional food products. In addition, many desirable flavour compounds are oxidation products of fatty acids. These are not available in fat-free foods. An understanding of flavour-ingredient interactions is necessary to select suitable fat replacers. Lack of suitable ingredients is one of the limitations in developing fat reduced products (Kantor, 1990; Mayer 1990; Shank and Carson, 1990; Plug and Harring, 1993; and Khan, 1993).

The constraints reported by nine companies (82%) willing to develop more of these products were related to product and taste functions, the cost of the alternative ingredients (fat replacers, flavour enhancers) often being high, and the food regulations which were thought to be restrictive. The small size of the New Zealand market was also considered as a constraint by two of the companies. One company suggested that consumers want the products only if the flavour and cost were suitable. All companies encountered taste and texture problems with low fat foods, however no in-depth information was given about the nature of these problems or success in overcoming them, as this was confidential for most products.

The New Zealand Food Regulations (1984) have been amended eight times. Amendments to regulations are required regularly to keep pace with technological advances in the food industry and to provide for changing consumer needs for information on food labels. However, as reported by Wyllie *et al.*, (1990) and the Public Health Commission (1994) the reviews and updates of the Food Regulations have lagged behind technological development and change. This is in part due to the time taken to process amendments through the legislative process. This has been acknowledged to be a delaying factor in developing new low fat products in USA. Thompson (1990) reports that in US there is a regulatory restraint in developing new reduced fat dairy product as it takes long time to complete the affirmation process (regulatory issues).

5.8 Summary

This chapter discussed the product development, nutritional concerns and constraints in developing fat reduced products. The main results of this survey are summarised below:

* mostly food manufacturers considered it important to develop fat reduced products and believe that the market will grow due to increased consumer awareness of health and nutrition issues;
* most companies producing fat reduced products mainly target them at women and health conscious people, whereas men and other consumers whose food choices consist of higher fat foods need to select lower fat foods such as lower fat milk and cheese; therefore, manufacturers need to target the low fat products at a wider group of consumers;
* the surveyed companies do not employ nutritionists and rely on people from various departments for nutrition advice; nutritionists could play a more prominent role in product development, marketing and educating the consumers;
* most of the companies had difficulties in obtaining nutrition information. The DAB is the prime source of nutrition information for some dairy companies. Most companies agreed that some form of nutrition training for employees would be useful;
* most companies were offering nutrition labelling on fat reduced products, many consider it as an important service and also necessary as consumers want it. However, some were unable to offer it due to the expense;
* in general the food regulations are judged as difficult to interpret.

CHAPTER 6
DAIRY MANUFACTURERS SURVEY

6.1 Introduction

Marketing milk is a major industry in New Zealand, with retail sales in excess of $ 400 million per year (MMF, 1992). There are presently 16 co-operative dairy companies which operate 40 dairy factories for the production of dairy products in New Zealand. On an annual basis the companies convert approximately 7.5 million tonnes of milk into approximately 0.9 million tonnes of dairy products. Around 0.8 million tonnes is exported, while the balance is consumed in the relatively small domestic market (New Zealand Year Book, 1994).

Liquid whole milk can be divided into three main components, i.e., milk fat, protein and water. Milk solids are the sum of fat and protein. Traditionally milk production and milk supply are measured in terms of kilograms of fat in the milk, because until more recently the milk fat had the highest commercial value of the different components. Now the milk proteins consisting of casein and whey proteins are more important (Nordmark, 1993; Johnston, 1993). The surveyed dairy companies are categorised as large, medium and small depending on the percent supply of the total New Zealand annual milk solids. There are five large companies with a supply between 43.4-6.5%, three are medium companies with a supply between 3.4-2.0% and there are seven small companies that supply between 1.3-0.2% milk solids. Total milk solids supply for 1993-94 year is 735 million kg (Kirkpatrick, 1994).

As described in Chapter 5, many companies who responded to the general manufacturers survey are producing and marketing dairy products. This survey was specifically directed to the dairy companies with the focus being on the production of low fat dairy products. The questionnaire from the previous

survey was modified to obtain pertinent information on dairy products (Appendix 3). Dairy companies addresses were supplied by the DAB (Appendix 4), and are located throughout New Zealand. The results reported in this chapter are based on the replies received from this survey only.

Of the twenty-six questionnaires posted, seventeen replies were received. However, only the results of twelve dairy companies (46%) that are producing and marketing low fat products are incorporated here, since five companies who responded could not complete the entire questionnaire due to reasons such as company having insufficient resources and some were not producing low fat products (methods described in Chapter 3). Six representatives of the respondent dairy companies who filled in the questionnaire were later interviewed and the results obtained are also presented here. The questionnaires were originally addressed to the food technologists in the company, however, the following people have actually filled out the questionnaire: Sales Marketing Analyst (2), Marketing Manager (5), Research and Development Technologist (4), Operations and Laboratory Managers (1), and Quality Assurance Manager (1).

The results of the survey are discussed under the following sections: Dairy products produced and marketed; Nutritional concerns; Consumer issues and Constraints in developing low fat dairy products.

6.2 Types of Products produced and marketed by the surveyed companies

The different categories of dairy products produced by the surveyed dairy companies are shown in Table 6.1. The products are discussed under the following groups: milk and flavoured milk, cream, cultured products, cheese and dairy desserts.

Table 6.1 Categories of dairy products (with the fat content) produced by surveyed dairy companies

Product	Number of companies	% Fat content of the product
Standard milk	12	3.3-3.5
Reduced fat milk	11	1.5-2.0
Trim milk	10	0.4-0.5
Super trim milk	7	0.05-0.5
Flavoured milk	8	2.0-3.3
Standard cream	3	40
Reduced fat cream	2	12-20
Sour cream	1	20
Reduced fat sour cream	2	10-12
Standard yoghurt	1	3.3
Reduced fat yoghurt	3	2.5-0.1
Regular cheeses	3	3-35
Reduced fat cheeses	2	1-16
Dairy dessert	4	0.5-3.3

6.2.1 Milk and flavoured milk

There were four categories of milk being produced by surveyed dairy companies at varying fat contents as shown in Table 6.1. Standard milk was produced by all (12) surveyed companies between 3.3-3.5% fat, most (11) companies (92%) are also producing reduced fat milk between 1.5-2.0% fat. While, trim milk was produced by 10 companies (83%) between 0.4-0.5% fat, and 7 companies (58%) were producing super trim milk at <0.5% fat. Two dairy companies have a range of milk with various fat contents such as, breakfast milk (4.2%) reduced fat milk (1%), trim milk (0.5%) and super-trim milk (0.1%). One company produces reduced fat milk (2.0%) and an ultra-trim milk (0.05%).

Table 6.2 shows the types of milk with fat contents for all the companies. Additional information on the products was provided by some companies, that the fat reduced products were made using reduced fat milk with 2.1% fat.

Table 6.2 Products produced by surveyed dairy companies - Milk and Flavoured milk

Company	Standard	Reduced fat	Trim	Super Trim	Flavoured
	% fat content				
1	3.3	1.5	0.4	0.1	2.0
2	3.2	1.6	0.5	0.2	2.3
3	3.2	2.0	0.5	0.1	2.0
4	3.5	1.5	1.0	0.1	3.3
5	3.3	1.5	0.5	0.2	1.5
6	3.3	1.5	0.5	0.2	3.3
7	3.3	1.5	0.5	0.05-0.1	3.25
8	3.3	1.5	0.5		2.0
9	3.3	1.6	0.5		
10	3.25-3.5	1.5-1.7	0.5-0.8		
11	3.25	1.5			
12	3.3				

The results show that many surveyed companies are producing different types of milk, i.e., standard, reduced fat, trim and supertrim. The production and market share values of types of milk in 1992 (DAB, 1993b) as shown in Table 6.3 indicate a similar trend obtained in the present study.

Table 6.3 Types of milk with fat content and market share in 1992 (DAB, 1993b)

Milk varieties	% Fat content	% Share
Whole	4.1	7.21
Standard	3.3	70-60
Reduced fat	2.0	0.23
Reduced fat	1.5-1.6	5.07
Trim	0.3-0.5	13.62
Super trim	<0.3	3.27

Many (8) surveyed companies (67%) are producing flavoured milk with fat levels ranging from 2.0-3.3%. As shown in Table 6.2, five companies are producing flavoured milk with a reduced fat content than standard milk.

6.2.2 Cream

Standard cream and reduced fat cream products produced by the surveyed dairy companies are shown in the Table 6.4. Three companies are producing standard cream between 40-41% fat, while three companies are producing reduced fat cream between 10-20% fat. Milk with a 4.3% fat content is separated to make standard cream. Reduced fat cream may be obtained from milk or cream, however, the method of manufacture was not specified by the companies in this survey.

6.2.3 Cultured Products

Yoghurt and sour cream are the main types of cultured dairy products produced by the surveyed dairy companies. The product range and fat contents are shown in Table 6.5. A single company is producing standard yoghurt with 3.3% fat, while four companies are producing reduced fat yoghurt with fat contents

between 0.1-2.0%. Reduced fat milk is used to make a low fat yoghurt. The food regulations define the criteria for reduced fat yoghurt, the products produced by the surveyed companies comply with the specifications of food regulations. One surveyed company is producing regular sour cream (20%), while two are producing reduced fat sour cream (10-12%) in addition to the regular product.

Table 6.4 Products produced by surveyed dairy companies-cream

Dairy products	% Fat content
Standard cream	41
	40
	40
Reduced fat cream	10
	20

Table 6.5 Products produced by the surveyed dairy companies - yoghurt and sour cream

Dairy products	% Fat content
Standard yoghurt	3.3
Reduced fat yoghurt	2.0
	1.0
	0.1
	0.2
Sour cream	20
Reduced fat sour cream	10
	12

6.2.4 Cheese

The types of cheese and their fat content produced by the surveyed dairy companies are shown in Table 6.6. Three companies are producing standard regular cheese, i.e., cottage cheese at 3% fat, cream cheese at 32% fat and processed cheese at 35% fat. Lower fat cheeses are being produced by two respondent dairy companies, e.g., cottage cheese at 1% fat and cream cheese at 16% fat.

Table 6.6 Products produced by the surveyed dairy companies-cheese

Dairy Products	% Fat content
Cottage cheese	3.0
Reduced fat cottage cheese	1.0
Cream cheese	32.0
Reduced fat cream cheese	16.0
Processed cheese	15.0

6.2.5 Dairy Desserts

The dairy desserts produced by the surveyed dairy companies are shown in Table 6.7.

Table 6.7 Products produced by surveyed dairy companies-Dairy desserts

Dairy Products	% Fat Content
Dairy dessert, pudding	2.0, 1.5
Shake and Sundae	3.5, 9.0
Reduced fat ice cream	2.5
Reduced fat ice cream	3.3

These are; ice cream, a type of milk pudding and milk shake. Ice cream with lower fat contents (3.3%, 2.5%) are produced by the surveyed companies. Reduced fat versions of dairy desserts are produced by four companies. One company is producing non-frozen dairy desserts, at 1.5-2% fat level. The fat content of the dairy dessert, sundae (9%) is similar to the fat content of standard ice cream (10%). Thus, two categories of dairy desserts, the frozen (ice cream) and the non-frozen (pudding, milk shakes) are produced by the surveyed dairy companies.

6.3 Company's views on current developments of fat reduced dairy products

All the respondent dairy companies (12) considered it important to develop low fat products. Figure 6.1 shows the proportion of fat reduced products in the total production for each surveyed company. Companies were asked to indicate the proportion (%) of their total production of fat reduced products being produced or marketed by the company. The results reveal that for four companies it was between 20-25%; for two companies producing a wide range of products it was 35% and 50%; while for three dairy companies it was between 90-95%. These last three are small companies producing various types of milk. Two companies did not provide information on the proportion of fat reduced products in the company as this information was considered to be commercially sensitive.

Eleven of the dairy companies (91%) are marketing fat reduced dairy products in New Zealand. Of these, two companies (11%) are also marketing in Australia and one company is marketing in the Europe, US and Asia, in addition to New Zealand.

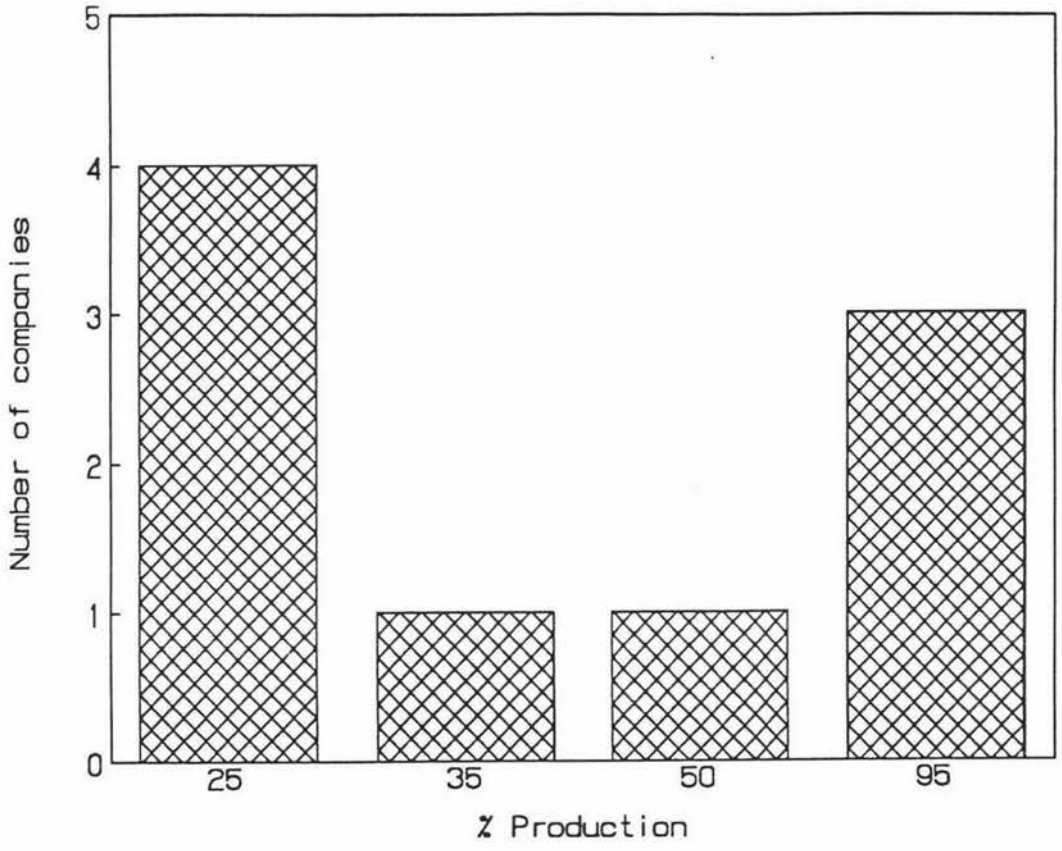

Figure 6.1: Proportion of fat reduced products in the total production for each surveyed dairy company.

6.3.1 Future trends for fat reduced dairy products

The dairy companies were asked their views on future production trends of fat reduced dairy products. Nine surveyed companies (75%) said that they would develop more fat reduced products in the future. These companies intend to develop more products with a moderate fat content and good flavour and

texture. Three companies (25%) are continuing to improve existing products, one company has plans to develop products with low fat content, while one did not want to specify the company's plan and preferred to keep it confidential. The results of this study provide evidence to suggest that more fat reduced products would be developed in the future.

6.3.2 Future market for fat reduced dairy products

Surveyed representatives stated the companies opinion on the future market for low fat dairy products. Most of the companies that responded agreed that the future market for fat reduced and low fat milks were increasing in Australia, New Zealand and USA. Six companies specifically considered that the future market for reduced fat milk, trim milk and semi trim milk was likely to be higher than its current level. One company felt that the market place would remain the same for milk in New Zealand and another company thought that the market for trim milk would remain the same. Three companies suggested that the market for low fat cheeses, low fat yoghurt and low fat cultured products (light sour cream, light cottage cheese) was increasing, a further two companies thought that the market for low fat dairy desserts was increasing.

All the dairy companies thought there was increased health consciousness in consumers and more interest in the calorie and fat content of products and concern for heart disease. The following reasons were cited for the increasing market trend:

* growing consumer awareness about calories and fat content in food;
* people more health conscious;
* taste preference in trim milk;
* increased consumer perceptions that diet should contain less fat;

* world trend, media hype;
* changing lifestyles and dietary habits of most New Zealanders.

Buisson (1989) reports that in New Zealand there is an increased concern for heart disease, cholesterol, blood pressure and digestive cancers and subsequently people have a desire for foods that are low or no sodium, low fat, high fibre, low cholesterol, no sugar and as fresh and natural as possible. Wright (1989) reports that in the U.K. dairy products became a major topic of interest as consumer concern about diet and health developed. Reduced fat milks are acceptable to those making changes to their diet in a health-conscious way. The studies of Barr (1990), Somerset (1991), Heasman (1993) and Khan (1993) also support the above results about the increasing market trend as discussed in previous chapter (section 5.2.2).

In contrast to the above trend, one company believed that the market for yoghurt, ice cream and light creams would remain the same and one company thought that the market for light cream in New Zealand might decrease. The reasons cited were that some foods are seen as a *luxury*, the reduced fat versions are not popular as consumers won't compromise on taste. Taste and texture are important factors in the selection of foods and maintaining these in the fat reduced products similar to the standard products is a problem. However, the consumption trends for milk, yoghurt and cheese, as discussed previously (sections 4.2.1, 4.2.2. and 4.2.3) show that the sales of low fat versions of these products are increasing, indicating that they are no longer a luxury product rather part of a common diet.

The future market for low fat dairy products was also an area investigated in the interviews carried out with six of the dairy companies. Five representatives of the interviewed dairy companies believed that the market for low fat dairy

products is increasing as there is an increased health consciousness in consumers and that they have more interest in the calorie and fat content of the products.

6.3.3 Future product development of fat reduced dairy products

In the questionnaire, the companies were asked which product types they believed would be promising for future product development of low fat options: two companies (12%) reported milk (UHT) and dairy desserts, while four companies (23.5%) reported that milk (fresh and flavoured), yoghurt (standard, acidophilus) and cheese (fresh, white) are promising areas of product development. However, two companies (12%) said that fat reduced variations of all dairy products are promising for product development. Three companies (17%) reported that cream cheese, sour cream and cream, while another felt that processed cheese would be most promising for product development.

The results of this study indicate that the low fat versions of all the dairy products are potential areas of future product development. Lifestyles and values are important factors influencing food product development, food marketing and consumption. Studies by Buisson (1989), Barr (1990) and Schelhaas (1992) support the above results. In recent years there has been a fall in demand for whole milk, while the demand for fresh products and fresh fermented products, yoghurts, bio-yoghurts, frozen products, ice creams, iced yoghurts, reduced fat cheeses and specialities has increased.

6.3.4 Target markets of the surveyed dairy companies

An objective of this survey was the determination of surveyed companies target markets for the fat reduced dairy products. On consultations with Mark Lloyd (CM Research) and the DAB, it was decided to group the target markets into two groups. The following options were provided for the companies to select

target markets for the dairy products in the questionnaire: *Lifestyle groups,* including Slimmers/Dieters, Calorie conscious, Health conscious and Sports oriented; and *Gender/Age groups,* including Children, Men, Woman for themselves, Woman for family, Young men and Elderly. Table 6.8 shows the target market for different types of milk.

Table 6.8 Target market for different types of milk

Target group	Number of companies			
	Standard	Reduced fat	Trim	Super trim
Slimmers/dieters	2	5	4	1
Calorie conscious	2	8	4	1
Health conscious	3	6	3	1
Sports oriented	2	4	1	1
Children	6			
Men		1		
Women for themselves	2	6	3	1
Women for family	3	4	1	
Young men		1		
Elderly	6	2		
All	4			

The twelve companies are targeting milk at various groups, six companies are targeting low fat milk at women, whereas only one is targeting men. A similar trend was observed for other products. The other feature evident from the table is that low fat, trim and supertrim milk are mostly targeted at calorie conscious, health conscious, sports oriented and women for themselves. As suggested before these products might be targeted at other consumers and would provide nutritional benefits to other groups. This was discussed in detail in previous chapters (sections 4.2.1.1 and 5.2.1). Three companies are targeting full cream

milk at children and the elderly people, while three others are targeting flavoured milk at children, women for the family and the elderly (not shown in Table 6.8).

Table 6.9 Target market for various dairy products

Target group	Number of companies			
	Yoghurt	Low fat yoghurt	Reduced fat cream	Reduced fat sour cream
Slimmers/dieters	2	1	1	1
Calorie conscious	2	1	1	1
Health conscious	2	1	1	1
Sports oriented	1			1
Children	2			1
Men	1			
Women for themselves	2	1	1	1
Women for family	2	1	1	1
Young men	2			1
Elderly	1			
All	1			

Table 6.9 shows the target markets for yoghurt, reduced fat cream and sour cream. As discussed previously (section 4.2.2) manufacturers segment the yoghurt market differentiating the lower fat products from those made with whole milk in order to increase sales (Senauer *et al.*, 1991; Wilson, 1991; and Grendale, 1992). According to the food regulations, yoghurt contains 3% fat and reduced fat yoghurt contains between 0.5% and 3% fat and low fat yoghurt contains 0.5% milk fat. There is not a large difference in the fat levels of standard yoghurt and that of reduced fat yoghurts and low fat yoghurts. It has been found that consumers do not distinguish the fat levels (DAB, 1993a). Based

on overall contribution of fat to the diets from yoghurt products, they are likely to make little difference. Hence, low fat yoghurts should be targeted at all consumers. In the survey, dairy desserts were believed to be consumed by children, sports oriented and young men. All groups of consumers were thought to be consuming cheese, aerosol cream and aerosol mousse.

Representatives of six of the surveyed companies were interviewed personally to gain additional information. The company representatives when interviewed, suggested reasons for why the products were targeted as previously described. Reasons given for selecting certain groups of consumers were as follows: increasing health concern, to look after themselves and their families, and awareness of heart disease and cholesterol levels. Thus, the results reveal that reduced fat versions of the dairy products are targeted only at the health conscious, slimmers and women for themselves. It is understood that in order to increase sales, the dairy companies target the standard products at all consumers, while the fat reduced products are targeted at some segments of consumers as discussed in the previous chapter (section 5.2.1). However, the reduced fat dairy products should be targeted at all the consumers to provide nutritional benefits to other groups.

6.4 Access to nutrition expertise

It was noted that most (10) of the surveyed dairy companies did not have a nutrition policy, however, two companies had a nutrition policy based on information supplied by the DAB, the Heart Foundation and the Cancer Society. Additional information was not provided about the nutrition policies in these companies.

The companies were asked if they consulted with an outside nutritionist or nutrition organisation. Eight companies (67%) were consulting an outside

nutritionist or nutrition organisation like the DAB (5), the Market Milk Federation (1), the Culinary Institute of New Zealand (1), the Cancer Society (1) and the Heart Foundation (1). Two of these companies were also consulting with hospital dietitians for nutrition information. The rest (4) do not consult anyone about nutrition issues. Most of the (11) companies (92%) said they found no difficulty in getting up to date and reliable nutrition information when required, only one company felt there was a lack of available nutrition information.

The sources for nutrition information for the companies were mainly the DAB, the MMF, the Department of Health and seminars by experts. Information on the New Zealand Dietary guidelines (1991) had been received by only 6 companies (50%). Two-thirds (8) of the dairy companies (67%) agreed that some form of further nutrition training (for example, newsletter, videos) would be useful for employees in the company.

Further, the company representatives were asked to specify the main Nutrition guidelines. Most representatives (8) of the companies (67%) did not answer this question. Two companies mentioned the following Nutrition guidelines:

* eat a variety of foods from each of the four major food groups each day;
* prepare meals with minimal added fat and salt;
* choose prepared foods, drinks and snacks that are low in fat, salt and sugar;
* maintain a healthy body weight;
* drink plenty of liquids each day;
* if drinking alcohol-do so moderately.

Two other companies suggested the following nutrition guidelines:

* New Zealanders must reduce intake of saturated fat and include fruits, vegetables and cereals in the diet; iron and calcium for women is a concern;
* eat less saturated fat, exercise more, eat more vegetables, fibre, moderate meat and dairy products, eat less fats and oils, follow the healthy food pyramid.

Representatives of six of the surveyed companies were interviewed personally in an effort to add depth to survey findings. All the interviewed representatives believed that the company's staff were not aware of the Nutrition guidelines recommended by the Nutrition Taskforce (1991). Difficulties in getting nutrition information was experienced by two companies. Some (4) obtained nutrition information from the DAB, nutritionists, dietitians. Four of the interviewed companies thought the information from DAB was useful and easy to understand. One dairy company had received information on cheese and fat replacers, such as Simplesse from the Dairy Research Institute (DRI). Interviewed representatives were further asked to specify what nutrition training would be useful for the company. Four dairy companies suggested that a newsletter of nutrition information would be valuable.

It appears from the survey that most of the manufactures may be unsure about the Nutrition guidelines. It would be better if the companies had a working knowledge of the guidelines which they could apply in product development and marketing. The companies need a wider understanding of nutrition, which requires employees being trained. As discussed previously (section 5.3) response of the food industry is an important component of the public health benefits that the guidelines are intended to achieve. The food industry is an important source for nutrition information through labelling, advertising and nutrition education materials. The food industry has a responsibility to consumers to provide

accurate information but not to mislead. The studies of Lachance (1989), Slavin (1990), Nesheim (1991) and McVicker (1994) focus the importance of nutrition guidelines for the food industry and conform with the results of this study.

6.4.1 Decision makers regarding nutrition issues

People in various departments of surveyed dairy companies were found to be dealing with nutrition issues that affect the products or marketing. The following personnel were dealing with nutrition issues: Marketing Manager (5), Technical and Developmental Manager (2), Quality Assurance Manager (1), Station Manager (1), Food Technologist (1) and Sales Marketing Analyst (1). One company did not provide information on the personnel dealing with the nutrition issues. The companies did not employ nutritionists, which indicates that nutrition issues are seen as something which do not require particularly qualified staff to deal with. Overseas studies indicate an increasing number of nutritionists working in the food industry involved with food marketing, product development and external relations (Weaver, 1990; Ruxton and Kirk, 1993; Somerset, 1991; and Knight, 1994). A similar trend is anticipated in New Zealand, and would benefit New Zealand consumers.

6.5 Labelling issues of fat reduced dairy products

Virtually all the surveyed dairy companies think they know the New Zealand labelling regulations governing low fat products (1991). Three companies find the food regulations clear and distinct, while nine companies (75%) find these regulations confusing and restrictive.

Regarding labelling of the additives in the product, it was found that seven companies were correctly labelling the additives in the product, i.e., three surveyed companies are labelling the additives by the code number, e.g.,

thickener (407), while four companies use both the number and the name of the additive, e.g., thickener (407) carrageenan. One company reported having incorrect labels and will change them soon. The representative of another company reported that the company does not have a standard approach to labelling. In one company the additives in the products are labelled variously, depending on what product image the company is aiming for; if the company is aiming for *natural*, it may avoid the numbering system, otherwise the numbering system was used as a standard approach. Two companies did not comment on the format of labelling for additives. Beaumont (1993) reports that additives and elements are considered to be *unnatural* by people and avoided in the diet. It is interesting that one company changes its labelling format for additives depending on the marketing motive. Manufacturers thus intend to improve demand by emphasising the *natural* aspect of the dairy products by deliberately changing the labelling. Different labelling formats within one company make it almost impossible for the consumer to understand the labels. It is considered important to have a standard approach to labelling the food additives so as not to mislead the consumers. A standard approach could be followed for labelling all additives, i.e., by its specific name only or by code numbers only.

Four companies (coded as A, B, C, D) enclosed labels of dairy products along with the questionnaire. Some examples of the labels with relevant nutrition information are included in Appendix 5. Company *A* provided labels on reduced fat ice cream (frozen dairy dessert) and made a claim about fat (< 3% fat), this product contains one third less fat than standard ice cream and the label conforms with food regulations. This label specifies the ingredients and the nutritional information (per 100 g). Company *B* provided labels on reduced fat cheddar style cheese and specifies the milk fat (27%) and the maximum moisture (39%). One Australian reduced fat cheese (available in New Zealand) label claims *23% less fat and cholesterol* than cheddar and gives nutritional information

for 20 g (fat: 5-4 g, cholesterol: 14 mg) the claims comply with the food regulations criteria, i.e., for a low cholesterol claim the product should contain less than 20 mg cholesterol per serving. Two companies (*C, D*) provided labels on various types of milk which are also included in the appendix. The varying fat content of the products is apparent by colour differentiation on the labels which is consistent. One company provided nutrition information on the milk labels. The reduced fat (1.6% fat) milk label made a claim *high in calcium* that conforms with the regulations, as this milk contains 280 mg of calcium per 200 g. Another company provided labels on milk products that did not contain nutrition information and only some labels had fat content specified on them, e.g., fat reduced milk 1.5% fat. Not all the labels with a nutrition claim carried a nutrient label. Therefore, these labels did not comply with the food regulations.

Studies in Australia, New Zealand and U.K. indicate that consumers often mistake the fat content of regular milk and have misconceptions regarding their intake and the relative contributions of different sources. The Food for Health Survey (DAB, 1993a) reveal that people overestimate the fat content of low-fat foods and incorrect knowledge may contribute to poor food choices. Therefore, they need to be educated on the fat content of milk and other dairy products. An increased awareness and information about the fat content of foods could help in successful dietary change (DAB, 1993a; Shuttleworth, 1993; and Mela, 1994a and b).

6.5.1 Manufacturer's views on nutritional labelling

Dairy company representatives were asked to select from a list of options which best reflected the company views on nutrition labelling (they could select more than one option). Most (9 out of 11) of the companies (75%) considered nutrition labelling *an important service that they can offer* and seven companies (58%) also

considered it *necessary because consumers want it*. Five companies thought that nutrition labelling was required because they made a nutrition claim for the product. However, three companies (25%) thought that consumers did not understand nutrition labelling, they claimed to included a label because their competitors did, while one company thought that consumers did not want nutrition labelling. Further one company claimed it was unable to offer nutrition labels due to expense and limited space on label.

Six companies (50%) provide nutrition labelling on some products, while five companies (42%) had on all products. Seven of them (58%) reported to have labelling that complied with the labelling requirements provided in the New Zealand Food Regulations (*Amendment No 5*), due to come into force on first January 1995, while four companies are bringing in changes to comply with the regulations. Only one company did not have nutrition labelling on any product, but intended to have in the future.

The companies surveyed were asked to select the nutrients that they considered important to include on nutrition labelling. In the questionnaire more than one option was chosen (Appendix 3). A majority of companies believed that total energy, total fat, calcium and protein were important nutrients for nutrition labels, as shown in Figure 6.2. Relatively few of the surveyed companies thought that vitamins (3), minerals (2) and cholesterol (1) were important, while three companies suggested that the nutrients on labelling would depend on the product.

Some representatives of the surveyed companies were interviewed to gather in-depth information on the survey findings. When asked about their views on nutrition labelling, three interviewed representatives of the dairy companies thought that consumers read labels on the products, while the other three thought that consumers did not read labels. All the interviewed representatives

believed that most consumers did not understand the labels on the products. Two interviewed companies also pointed out that there was limited space on product labels to include nutrition information (e.g., cheese).

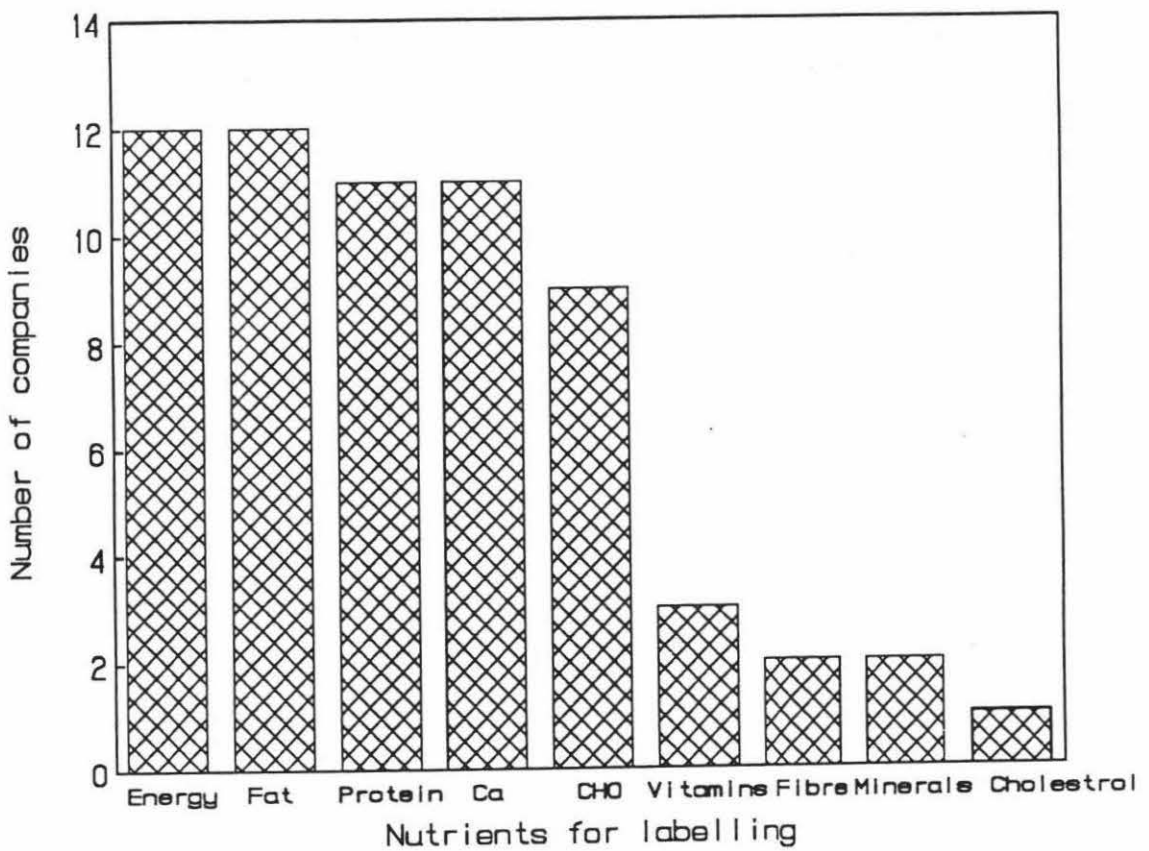

Figure 6.2: Nutrients considered important to include in nutrition labelling by dairy companies in this survey.

The above results indicate that a considerable number of companies (5) did not believe nutrition labelling to be important for consumers or thought they could not use or do not want it. However, one study on New Zealand consumers (Burlingame *et al.*, 1989) revealed that 97% of consumers wanted nutritional information to be provided by the manufacturers. Studies in the UK have shown that food labels are widely read sources of nutrition information and a valuable educational tool, especially since the Government's report on *Health of the Nation* (Department of Health, 1992) nutrition labelling has become increasingly important for consumers (Gurr, 1989; Morris, 1993). A high proportion of packaged foods now carry nutrition labelling. The United States has legislated for mandatory nutrition labelling on all foods in the Nutrition Labelling and Education Act in 1991 (Mermelstein, 1993) as it is believed that sound, reliable information about the nutrient content of food will lead consumers to choose a healthier diet. New Zealand has voluntary nutrition labelling requirements. In 1991, legislation was introduced to lay down regulations for label formats if nutrition labelling was provided. Numerical nutrition labelling helps the consumers to compare the products and to check claims. However, practical use of nutrition labels is limited because consumers do not understand the numerical concepts and the terminology of nutrition labels (Nutrition Taskforce, 1991). The problems are expected to be solved with the current standard format of labelling suggested in the food regulations, however, most people probably still would not understand. Hence, research in the area of nutrition labelling is required to have a standard format for labelling that is simple to understand.

The Public Health Commission (1994) report states that the reviews and updates of the Food Regulations lagged behind technological development and change and this is due to the time taken to process amendments through the legislative process. It is essential that food legislations is current and appropriate to support the recommendations aimed at improving the well being of all New Zealanders.

6.5.2.1 Nutrition claims

Nutrition claims are made by most (10) of the companies on fat reduced products. Two companies made no claims on the product labels. The nutrition claims on the labels of the dairy products by the surveyed companies were: *Calcium:* high calcium, extra calcium; *Protein:* high protein; *Fat*: low fat, fat reduced, non fat, lite; *Carbohydrate:* no added sugar; and *Energy:* low calories.

Nutrition labelling and health messages on food labelling have an important role in the education of consumers provided they are regulated to give correct information. Some claims emphasise and expand the nutrition message on the product and are useful to consumers, such as high calcium, reduced fat, provided these claims are accompanies with nutrient details. However some claims such as lite have varied meanings to the consumers. For example, light could mean, less calories, less fat or considered to be a claim about the energy content of food, also the product could be described as being light in weight or texture. The regulations states that use of the word light or lite means diet. Some claims are made on calories, while using kJ on the nutrition label, this would be confusing to the consumers. The New Zealand Food Regulations (1984) specify the criteria for nutrition claims to be made on any product and thus prevents manufacturers from making unsubstantiated claims. However, some claims are not clearly defined and hence tighter regulatory controls are needed to avoid misleading claims and to avoid confusion to consumers. The results reveal that most of the companies who made nutrition claims provided nutrition labelling. Nutritional information on products is becoming essential as consumers are becoming aware of the nutritional issues (Buisson, 1989). Currently, for a food described as *low fat*, the fat level must be one third less than a standard product for comparison (Food Regulations, 1984). There is a controversy about whether legislation controlling the use of health messages in food labelling should be

relaxed because of the possible value in consumer education, or made more restrictive because of the potential for misleading the consumer (Kirk, 1993).

6.6 Manufacturer's perception of consumer issues

Companies were asked which aspects of their fat reduced products they thought were most important to consumers. Companies gave their views by selecting (more than one option) from the list provided in the questionnaire (Appendix 3). As shown in Table 6.10, *fresh, healthy image* is considered important by most (91%) of the surveyed companies, while some thought that *low in fat* and *high in calcium* were important aspects for consumers in fat reduced products. Four companies thought that *safely packed, hygienic* and *free from harmful additives* were important aspects for consumers, but that people expect food to have these qualities. In addition people have negative opinions about additives in general and claims that food is free of harmful additives will lead to further confusion.

Table 6.10 Aspects of low fat products considered important for consumers by the surveyed dairy companies

Number of dairy companies	Issues of importance
11	Fresh & Healthy image
8	Low in fat
6	High in Calcium
4	Safely packed hygienic
4	Free from harmful additives
2	Low in energy
2	Low in cholesterol

Some representatives of the surveyed companies were interviewed to get additional information about the survey findings. The representatives were asked if the low fat products would help consumers achieve the recommended dietary changes, only one of six interviewed companies believes so, while the others were not sure about it. Also, most representatives (4) thought that consumers would not pay more to buy the low fat dairy products, whereas two thought that consumers would pay more for low fat products provided the taste and quality of the product was same as the original product.

The food manufacturers have a crucial role in influencing the consumers diet in the way they promote the products and respond to the consumer concerns. It is the responsibility of all food manufacturers to promote health. Consumers demand food that is healthy, convenient, varied, safe and pure (Buisson, 1989; Lachance, 1989; Schelhaas, 1992; and Wheelock, 1992b).

6.7 Supply of nutrition information

The companies were asked if they were producing any nutrition education material for general distribution. The Nutrition Taskforce (1991) suggested strategies for the food industry to help the consumers in meeting the food and nutrition guidelines (section 5.6.2) including providing nutrition education material to consumers. So it was important to find out food companies views and to explore any efforts being made by them in this respect. Many companies were supplying information packs to schools produced by the MMF. Some companies were providing leaflets of product information for consumers and for supermarket displays.

6.7.1 Information produced by the MMF

The Market Milk Federation was producing nutrition education material for consumers. The various education material produced by the MMF were:

* nutrition education kit for schools entitled *Milkwise snacks;*
* six nutrition guides entitled: *healthy food for life; healthy food for children; healthy food for teenagers; healthy food for pregnancy and breast feeding; healthy food for strong bones; healthy food for healthy heart.* Nutrition guides on healthy food selections for people of different stages in life;
* a consumer guide to maintaining weight loss, *dieting dilemma;*
* a booklet entitled *Milk from the farm to your family* was a project resource on the market milk industry. It shows life on a farm, milk processing and importance of milk in the diet and contains an activities sheet for children.

Nine surveyed companies were supplying nutrition information packs *Milkwise Snacks* to schools. Two dairy companies were supplying *Nutrition Guides* to people in different stages of life. Four companies were supplying nutrition information to health professionals obtained from the MMF. Thus, MMF carries on a nutrition campaign and plays a prominent role in promoting dairy products (section 5.6.1).

6.7.2 Information produced by the DAB

The Arthritis Foundation of New Zealand began an osteoporosis awareness campaign in 1994. In support of this campaign the DAB published a booklet *look after dem bones* (in conjunction with health and education professionals) containing information on health and osteoporosis, prevention, the importance

of calcium, calcium sources in food products and the dietary requirements for calcium. Also, a leaflet has been produced by the Department of Health on osteoporosis- risks, exercise, diet and dietary calcium requirements.

The MMF and the DAB have a prominent role in supplying the nutrition information for consumers in the form of leaflets and booklets. Dairy companies have taken an opportunity to work with health agencies, where they are seen to promote the same message. However, the dairy companies do not work with all organisations, for example, the Heart Foundation as they do not promote the same message. As discussed previously, people have misconceptions about the fat content of dairy products and the amounts they should consume. The dairy companies educate the consumers in making informed food choices and at the same time promote the products. Some companies are not providing any nutrition information to consumers. It is interesting to note that some surveyed companies that reported problems in access to nutrition information as discussed previously (section 6.4) were also supplying nutrition information, e.g., *Milkwise education kit* to schools. This indicates that the surveyed dairy companies intend to use the nutrition information for promoting the products.

6.7.3 Product information for consumers by the dairy manufacturers

Seven companies said that they produce leaflets on product information for consumers and at supermarket displays, although detailed information was not provided by the companies in the survey. For example, one company has a brochure for customers with information on various types of cheese. The company thought that since many people were becoming conscious of what they eat, they were looking for more information about the foods they buy. Another dairy company provided a leaflet that contains pictures of reduced fat milks, indicated by the package colour. It gives the nutrient information; fat: 1.6 g per 100 g and shows a comparison with standard milk, fat: 3.3 g per 100 g. Different

colour of packages indicate the fat content of milk which is consistent across the surveyed companies. Such a brochure may provide a suitable vehicle for incorporating nutrition information.

6.8 Constraints in producing fat reduced products reported by the surveyed dairy companies

Generally, the surveyed dairy companies were unwilling to provide details on technological problems associated with the development of fat reduced products and considered them confidential. From this survey, it is clear that most of the dairy companies experienced some texture and flavour changes in food while producing these products. Six surveyed companies (50%) also experienced difficulties in processing resulting from fat removal in the dairy products, however, no information was provided.

While producing fat reduced products formulation changes were undertaken by 10 dairy companies (83%), e.g., inclusion of a texture modifier (e.g., starch to improve texture) and modifications of flavouring systems were reported by eight companies (67%). Two companies made use of a fat replacement system, where fat lost is replaced with other material to keep overall solids high; addition of extra milk solids was done by two companies and one of the companies preferred not to discuss this. Certain components such as gums and modified starches which replace food fat and achieve similar textural characteristics are allowed for use in New Zealand.

Thus, flavour and texture problems in developing reduced fat products were observed by all the surveyed companies. Technology has been developed to overcome these problems, for example, low fat cheese technology developed to produce new types of cheese. Levels of fat in cheese have an impact on acceptability, flavour and physical properties (Olson and Johnson, 1990). A

common constraint reported by all companies was meeting the requirements of the food regulations related to the low fat dairy products. The companies thought that the food regulations hindered the development of low fat products and also the labelling regulations changed often making them difficult to keep track of. The Food Regulations originally gazetted in 1984, have been amended eight times. However, the regulations relating to the format of nutrition labelling and claims (e.g., low fat foods) were introduced only in 1991. The amendments to regulations are required regularly to keep pace with technological advances in the food industry and to provide for changing consumer needs for information on food labels. However, the Public Health Commission report (1994) stated that the reviews and updates of the Food Regulations lagged behind technological development and change, this is due to the time taken to process amendments through the legislative process. It is essential that food legislation is current and appropriate to support the recommendations aimed at improving the well being of all New Zealanders. There should be increased communication and involvement of the food industry in the regulatory process.

Constraints stated by the dairy companies for furthering the sales of fat reduced dairy products were the following:

* development of products as tasty as regular products;
* cost of production and education to consumers;
* limited sales volume/small market size;
* selling price;
* long term changes in consumer perceptions of fat content.

Taste, family dislike, expense, availability and *texture* are the barriers in the consumer purchase of reduced fat cheese (Barr, 1990). Consumers want good taste, low calories, low fat, and no cholesterol. Additional costs were incurred by 10 dairy companies (83%) in producing fat reduced products. Reasons given for the increased costs include small production runs, extra equipment,

processing changes, additional solids, the cost of fat replacers higher than the value of cream removed and also that cream is a byproduct which does not fetch a good price, the high cost of milk powder and blending cost. In contrast, two companies felt that there are minimal additional expenses in producing the fat reduced products, depending on the product range in the company. Problems in developing the same or better quality low fat products were also expressed by all the interviewed representatives of the company, for example, in low fat yoghurt starch is added to improve texture. One company suggested that time is a constraint in developing low fat products due to product development.

6.9 Summary

This chapter described a detailed survey carried out on the fat reduced dairy products produced and marketed by New Zealand dairy companies. The results of this survey are summarised below:

* many surveyed dairy companies are producing reduced fat and low fat milk. Lower fat versions of dairy products, such as yoghurt, cheese, cream, sour cream, dairy desserts (frozen and non-frozen) desserts are produced;
* all the companies considered it important to develop low fat products and intend to develop more in the future. The companies consider that the market for low fat products will grow due to increased health consciousness among consumers;
* surveyed companies are mostly targeting the low fat versions of dairy products at the health conscious, dieters, slimmers, and calorie conscious, however, some lower fat products (such as reduced fat milk, lower fat cheeses) may be useful for other group of consumers;

* *fresh, healthy image* were considered important label information for consumers, while only few thought that *safely packed, hygienic were important label information* because it was an expectation;
* the DAB, the MMF and the Department of Health are the main sources of nutrition information to the dairy companies. Some companies do not have easy access to nutrition information;
* some form of nutrition training would be useful for the companies;
* many companies find the food regulations confusing and restrictive, nutrition labelling is provided by many companies when a claim is made on the product. Energy, total fat, calcium, protein and carbohydrate are the main nutrients selected for nutrition labelling;
* nutrition education is mainly provided by the MMF and the DAB. Some companies produce leaflets on product and nutrition information for consumers.

CHAPTER 7
CONCLUSIONS

The main feature of this thesis was the study of nutritional rationale in the development of low fat dairy products. Specifically the aim of this study was to find out the availability of fat reduced dairy products, nutrition labelling on the products, target market for fat reduced products, nutrition expertise possessed by the manufacturers and the place of nutrition in product development and marketing. From the three surveys, supermarket, general manufacturers and dairy companies the following conclusions can be drawn:

* the development of fat reduced products is considered an important area for most of the surveyed food manufacturers, the market for these products will increase and more products will be developed in future due to increased consumer awareness in health and nutrition issues;
* currently a considerable range of dairy products with lower fat contents are available in supermarket shelves, the lower fat versions of the dairy products available are milk, yoghurt, cream, cheese and dairy desserts. Milk with fat contents ranging from 0.05 to 3.5% is available and are differentiated by the colour of the pack. Some of the current developments are helpful to consumers in changing their diets. For example reduced fat milk, reduced fat cheeses and reduced fat dairy desserts are most useful and some products are less useful such as reduced fat- yoghurt and cream;
* through the graphic designs on the package and from the manufacturers survey it was concluded that the low fat products are targeted at women and health conscious people and a similar trend was observed for other products. However, the reduced fat products (lower fat milk and lower fat cheese) are useful to other consumers. In order to ensure that the developments benefit more consumers, food manufacturers should target

the products at other consumers, men may benefit the most by choosing lower fat- cheeses, milk and dairy desserts. Older women more frequently choose cream and may benefit by consuming low fat versions of the product;

* nutrition labelling was provided for low fat products when a claim is made. However, some low fat cheese, yoghurt and dairy desserts made a claim and did not contain nutrition information, so do not conform with the food regulations. The nutrition claims on cheese and margarine are confusing to the consumers. The manufacturers should ensure compliance with the food regulations, Food claims should be kept under review;
* in general, food regulations are judged as difficult to interpret and restrictive, a standard format for labelling the additives and nutrients were not followed by the food companies. A standard approach to labelling has been recommended which is thought to help consumers in improving their food choices, hence the manufacturers should adhere to a standard format of labelling so as to convey useful nutrition information to consumers;
* the surveyed food manufacturers do not employ nutritionists and rely on people from various departments for nutrition decisions, some companies perceive that nutrition information is not easily accessible. A greater involvement of nutritionists in food product development and marketing would be desirable;
* the supply of nutrition information is from the MMF, the DAB and the Department of Health. Few dairy companies are producing leaflets for consumer information which do not contain much nutrition information and may not be of much use. Nutrition education is important and some form of training to the employees can make a significant difference, nutritionists could enhance the impact of manufacturers efforts in providing nutrition information to consumers;

* maintaining the texture and flavour in developing fat reduced products are the main product quality constraints, in depth technical information was not obtained in the survey due to confidentiality.

In conclusion this study has illustrated the importance of fat reduced products, the availability, manufacturers knowledge and attitudes to nutrition and labelling issues.

Limitations

* the questionnaire as designed to obtain detailed information, however people other than food technologists and nutritionists have completed them. Due to this the information obtained in the survey is restricted.
* in some instances, respondents may have given their personal views in the questionnaire instead of the company's views.
* information on the technological problems could not be obtained in depth as it was mostly considered confidential.

Ideas for further study

* to examine if available low fat dairy foods will actually aid the reduction of fat intake to meet current and target market recommendations.
* to research into the appropriate nutrition labelling needs of consumers to suggest an easy and comprehensible format.
* to develop some form of nutrition training programme for the food companies. Development of a pamphlet outlining thee current issues in nutrition, nutrition guidelines and other pertinent information for the food companies.

APPENDIX 1

Dear Sir/Madam,

Re: Survey of the development of fat modified food products

I am a researcher at the Department of Food Technology, Massey University. I am undertaking a survey of food products which are fat reduced and fat modified. The survey includes questions on product development and nutrition. The objectives of this research is to see how New Zealander's nutrition concerns are influencing the developments of food products.

I understand from a supermarket survey that your company markets the following products:

I would appreciate any additional information about the above products. For example: ingredients list, nutrition labels, advertising materials.

I would be very glad if you could also complete the enclosed survey or pass it in to the most appropriate person in your company. Send replies in the enclosed self addressed envelope.

The survey results will be treated in strict confidence. If you have any queries please contact me.

Thank you for your cooperation.

Yours sincerely

Gayatri Susarla

FOOD MANUFACTURER'S SURVEY
DEPARTMENT OF FOOD TECHNOLOGY
MASSEY UNIVERSITY

CONFIDENTIAL

Dr Juliet Wiseman
Ms Gayatri Susarla

DEPARTMENT OF FOOD TECHNOLOGY
MASSEY UNIVERSITY
PALMERSTON NORTH
NEW ZEALAND

QUESTIONNAIRE

SECTION ONE: INFORMATION ABOUT YOUR PRODUCTS

1. Does your company produce/market any products which you consider to be fat reduced or have a fat modified content? (fat modified - a product from which a part of the fat is removed and/or substituted by fat replacer or a less saturated fat).

   Yes/No

   If yes, please give examples of products which are fat reduced:

   Please give examples of products which are fat modified:

2. Which of these statements reflects your company's attitude to production of low fat products.

   a. It is the major focus of our product development
   b. An important line
   c. A minor part of our business.
   d. None of the above
   e. Any other

3. In producing fat reduced or modified foods, did you encounter which, if any of the following problems:

   a. Texture changes in the food resulting from fat removal
      eg.

   b. Flavour changes resulting from fat removal
      eg.

   c. Difficulties in processing resulting from fat removal
      eg.

4. In producing these foods which, if any of the following formulation changes were undertaken:

   a. Inclusion of a texture modifier, (eg. starch to improve texture)
   b. Improvement or modification of flavouring system
   c. Make use of fat replacement system, (eg. Olestra, Simplesse etc.)

5. Are your fat reduced/modified foods:

   a. Sold in New Zealand
   b. Sold in New Zealand and Australia
   c. Sold in Europe, USA and or Asia

6. How do you see the future market for fat reduced/modified products?

   a. Increasing
   b. Remain at present level
   c. Decreasing

   Could you please explain what you feel the reasons for this are?

7. What do you see the future trends in the development of fat reduced /modified products?

   a. Develop more products
   b. Do not develop more products
   c. Continued improvement of existing products
   d. None of the above
   e. Any other

   Reasons or constraints if any?

SECTION TWO: NUTRITION INFORMATION

1. Does your company have a nutrition policy?

   Yes/No

   If yes, is there a written document?
   (If you can please enclose a copy on returning this questionnaire)

2. Have you (your company) received information about the recently published (1991) New Zealand dietary guidelines?

   Yes/No

   2a. If yes, how did you receive this information?

   2b. What are the main New Zealand nutrition guidelines?

3. Who within your company deals with nutrition issues as they affect your products or your marketing?

4. Do you consult with an outside nutritionist or nutrition organization?

   Yes/No

   If yes, who?

5. In general, do you feel that you have experienced difficulty in getting up to date and reliable information about nutrition issues?

   Yes/No

6. Would any form of nutrition training eg. short courses, correspondence courses, videos, be of use for employees in your company?

Yes/No

If yes, which would you prefer?

a. Correspondence course
b. Short course, in house
c. Video
d. Newsletter

7. Are you aware of New Zealand labelling regulations governing low fat products (1991).

Yes/No

7a. Do you find these regulations

a. Too vague
b. Too restrictive
c. Confusing
d. Clear and distinct
e. None of these

SECTION THREE: CONSUMER ISSUES

1. Which groups of consumers, does your company believe, are most likely to buy fat reduced/modified products (you may circle more than one option)

a. Children
b. Men
c. Woman for themselves
d. Women for family
e. Slimmers
f. Health conscious
g. Other, please specify

2. Do any of your products carry a nutrition label?

   a. Yes, all products
   b. Yes, some products, for example (name up to three)
   c. No, no products, but intend to have in the future
   d. No, no products, no intend to add in the future

3. Which of these statements reflect your company views about nutrition labelling?
   (you may circle more than one option)

   a. It is necessary because consumers want it
   b. It is an important service we can offer
   c. It is an unnecessary expense
   d. Consumers do not want nutritional labelling
   e. Consumers do not understand nutritional labelling
   f. It is something we would like to offer, but are unable due to expense or other reasons

4. If you do offer nutrition labelling on your products which of these nutrients do you think it is important to include:

   a. Total energy (calories/kilojoules)
   b. Protein
   c. Cholesterol
   d. Total fat
   e. Saturated fat
   f. Polyunsaturated fat
   g. Monounsaturated fat
   h. Carbohydrate
   i. Fibre
   j. Vitamins
   k. Calcium
   k. Other minerals
   l. Varies (depends on products)
   m. Other

4a. How do you label the additives in the product? eg. thickener (407) or carrageenan.

5. Which of these aspects of your fat reduced or modified products do you think is most important to your customers: (i.e. which has most consumer appeal)

a. Fresh, healthy image
b. Safely packed and hygienic
c. Free from harmful additives
d. Low in fat
e. Low in energy (calories/kilojoules)
f. High in calcium
g. Inexpensive and filling
h. Depends on product, different features important for different products, (give examples).

6. Do you produce any nutrition education material, ex.

a. Information packs for schools
b. Leaflets of product information
c. Educational videos
d. Information for health professionals

Please give details (examples of leaflets would be much appreciated).

Would you, or someone else within your company be prepared to discuss the technological problems associated with development of fat reduced/modified foods - either by telephone or by personal interview?

(This type of information is essential to this study, but very difficult to do justice to in a brief written questionnaire).

Can I contact you/someone else (Interview maximum 30 minutes) Name:

Telephone/personal Telephone number:

Thank you for your time and effort in answering this questionnaire. Please return this questionnaire to us in the reply paid envelope provided.

APPENDIX 2

ADDRESSES OF MANUFACTURERS PRODUCING FAT REDUCED PRODUCTS

Abels Ltd.,
101 Carlton Gore Road
New Market
AUCKLAND

Anchor Foods Ltd.,
AUCKLAND

Aspak Industries
PO Box 51213
East Tamaki
AUCKLAND

Aspak Industries
92-98 Harris Road
AUCKLAND

Capital Dairy Foods Ltd.,
PO Box 6108
WELLINGTON

Cerebos Greggs' Ltd.,
PO Box 58095
East Tamaki
AUCKLAND

East-Tamaki Co-operative Dairy Co. Ltd.,
330 Great South Road
Manurewa
AUCKLAND

ETA Foods Ltd.,
PO Box 76072
Manukau City
AUCKLAND

Tui
375 Tremaine Avenue
PALMERSTON NORTH

Mainland Products Ltd.,
MaCandrew
DUNEDIN

Healthiers of NZ Ltd.,
PO Box 11201
Ellerslie
AUCKLAND

Horleys Health Ltd.,
PO Box 11131
Mt. Wellington
AUCKLAND

Quark Dairy Products Ltd.,
C/- Unit 1
86 Elizabeth Knox Place
Panmure
AUCKLAND

Tasti Products Ltd.,
PO Box 45013
Te Atatu
AUCKLAND

The Eltham Rennett Co. Ltd.,
The Cheese Factory
PO Box 12325
Penrose
AUCKLAND

Tip-Top Ice Cream Co. Ltd.,
PO Box 722
Mt. Wellington
AUCKLAND

United Diary Foods NZ Ltd.,
PO Box 22601
AUCKLAND

Bean Supreme Ltd.,
PO Box 12082
AUCKLAND

Safeway Traders Ltd.,
Kiln St.,
Silverstream
PO Box 38896
WELLINGTON

Puhoi Valley Cheese Co.,
Ahuroa Road
PUHOI

Kapiti Chesses Ltd.,
PO Box 376
PARAPARAUMU

Yopliat NZ Ltd.,
100 Highbury St.,
PALMERSTON NORTH

NZ Milk Co-operative Ltd.,
160 Rockfield Road
AUCKLAND

De Winkel Natural Foods Ltd.,
PO Box 42
Manurewa
AUCKLAND

Craft General Foods NZ Ltd.,
11 Dal gety Drive
Manurewa
AUCKLAND

La Bonne Cuisine Ltd.,
42 Kerwyn Av.,
East Tamaki
AUCKLAND

APPENDIX 3

Dear Sir/Madam,

Re: Survey of the development of fat modified Dairy products

I am a researcher at the Department of Food Technology, Massey University, and undertaking a survey of food products which are fat reduced and fat modified. The objectives of this research is to see how New Zealander's nutrition concerns are influencing the development of food products. The survey includes questions on product processing and nutrition.

I would be very glad if you could please complete the enclosed survey or pass it on to the most appropriate person in your company. Please send replies in the enclosed self addressed envelope.

In addition, I would appreciate any additional information about your company's fat reduced and fat modified products. For example: ingredients list, nutrition labels, advertising materials.

This research is of interest to the Dairy Advisory Bureau and is supported by them. The information received and the results of this survey will be treated in the strictest confidence. No company name or brands will be disclosed.

If you have any queries please contact myself or Dr.Juliet Wiseman, Lecturer in Nutrition, ph (06)3569099 ext. 7450 or Fax (06) 3505655.

Thank you for your cooperation.

Yours sincerely

Gayatri Susarla

FOOD MANUFACTURER'S SURVEY
DEPARTMENT OF FOOD TECHNOLOGY
MASSEY UNIVERSITY

STRICTLY CONFIDENTIAL

Ms Gayatri Susarla
Dr Juliet Wiseman

DEPARTMENT OF FOOD TECHNOLOGY
MASSEY UNIVERSITY
PALMERSTON NORTH
NEW ZEALAND

QUESTIONNAIRE

SECTION ONE: INFORMATION ABOUT YOUR PRODUCTS

1. Does your company produce/market any Dairy products and Dairy foods which you consider to be fat reduced or have a fat modified content?

   [Definitions: Fat reduced: fat content is lower than the standard product due to removal of fat ("this includes both low and reduced fat product types".) :Fat modified: part of the fat is removed and/or substituted by fat replacer or a less saturated fat]

   Yes/No

   Please state all such products and their fat content:

Dairy product and Dairy Food	Fat content of original product	% Fat Reduction	% Fat Modification
Milk (fresh) Milk (UHT) Milk (flavoured)			
Yoghurt			
Cheese (fresh white) Cheese (natural hard) Cheese (processed)			
Cultured products			
Dairy desserts			
Cream			
Others			

1a. What proportion of your total production or marketing do fat reduced or fat modified Dairy foods constitute? (eg. 5% cheese, 25% Milk etc.)

2. Which of these statements reflects your company's attitude to production of low fat Dairy products.

   a. It is the major focus of our product development
   b. An important line
   c. A minor part of our business.
   d. Any other "please specify"

3. In producing fat reduced or modified Dairy foods, did you encounter any of the following problems:

   a. Texture changes in the food resulting from fat removal eg.

   b. Flavour changes in the food resulting from fat removal eg.

   c. Difficulties in processing resulting from fat removal eg.

4. In producing these foods which of the following formulation changes were undertaken

   a. Inclusion of a texture modifier, (eg. starch to improve texture)

   b. Improvement or modification of flavouring system

   c. Use of fat replacement system, (eg. Olestra, Simplesse etc.)

   d. Other formulation changes, "please specify"

5. Are your fat reduced/modified Dairy foods

   a. Sold in New Zealand
   b. Sold in Australia
   c. Sold in Europe, USA and/or Asia

6. How do you see the future market for fat reduced/modified Dairy products?
(Please select the options below)

Dairy product	1) Increasing	Where (Please specify eg.NZ, Australia, Europe, USA etc.	2) Decreasing	3) Remain at present level

6a. Could you please explain what you feel the reasons for this are?

7. What do you see the future trends in the development of fat reduced /modified Dairy products?

a. Develop more products
b. Do not develop more products
c. Continued improvement of existing products
d. Develop products with increasingly lower fat
e. Develop products with moderate fat content and good flavour/physical profile
f. Other "please specify"

7a. Reasons or constraints for further increase in sales of fat reduced/modified dairy products

7b. Are there any additional costs involved in producing these fat reduced/modified products?

7c. Which product area do you think is most promising for fat reduced /fat modified product development eg.

Milk (fresh)
Milk (UHT)
Milk (flavoured)
Yoghurt (standard, acidophilus)
Cheese (fresh, white)
Cheese (natural/hard)
Cheese processed
Cream cheese/sour cream
Dairy desserts
Cream
Any other -please specify.

SECTION TWO : NUTRITION INFORMATION

1. Does your company have a nutrition policy?

Yes/No

If yes, is there a written document?
(If you can, please enclose a copy on returning this questionnaire)

2. Have you (your company) received information about the recently published (1991) New Zealand dietary guidelines?

Yes/No

2a. If yes, from whom did you receive this information?

2b. What are the main New Zealand nutrition guidelines?

3. Who within your company deals with nutrition issues as they affect your products or your marketing?

4. Do you consult with an outside nutritionist or nutrition organization?

   Yes/No

   If yes, who?

5. In general, do you feel that you have experienced difficulty in getting up to date and reliable information about nutrition issues?

   Yes/No

   Please describe the difficulties

6. Would any form of nutrition training eg. short courses, correspondence courses, videos, be of use for employees in your company?

   Yes/No

   If yes, which would you prefer?

   a. Correspondence course
   b. Short course, in house
   c. Video
   d. Newsletter

7. Are you aware of New Zealand labelling regulations governing low fat products (1991).

   Yes/No

7a. Do you find these regulations

a. Too vague
b. Too restrictive
c. Confusing
d. Clear and distinct
e. Other

SECTION THREE: CONSUMER ISSUES

1. Which group of consumers are your Dairy products and Dairy foods targeted at or you think are most likely to buy?

Please select the options from below to fill in the table

Lifestyle groups	Gender groups
1. slimmers/dieters	5. children
2. calorie conscious	6. men
3. health conscious	7. woman for themselves
4. sports oriented	8. woman for family
	9. young men
	10. elderly

Dairy product	Target groups

2. Do any of your products carry a nutrition label?

   a. Yes, all products
   b. Yes, some products
   c. No, no products, but intend to have in the future
   d. No, no products, no intend to add in the future

   If yes do they currently comply with the labelling requirements due to come into force on 1st January 1995?

3. Which of these statements reflect your company views about nutrition labelling?
   (you may circle more than one option)

   a. It is necessary because consumers want it
   b. It is an important service we can offer
   c. It is an unnecessary expense
   d. Consumers do not want nutritional labelling
   e. Consumers do not understand nutritional labelling
   f. It is something we would like to offer, but are unable due to expense or other reasons
   g. It is required because we make a nutrition claim for the product
   h. We include a label because our competitors do

4. If you do offer nutrition labelling on your products which of these nutrients do you think it is important to include:

   a. Total energy (calories/kilojoules)
   b. Potassium
   c. Vitamins
   d. Total fat
   e. Saturated fat
   f. Polyunsaturated fat
   g. Monounsaturated fat
   h. Carbohydrate
   i. Fibre
   j. Cholesterol
   k. Calcium
   l. Sodium
   m. Protein
   n. Other minerals
   o. Varies (depends on products)
   p. Other

4a. How do you label the additives in the product? eg. thickener (407) or carrageenan.

5. Which of these aspects of your fat reduced or modified products do you think is most important to your customers: (i.e. which has most consumer appeal)

a. Fresh, healthy image
b. Safely packed and hygienic
c. Free from harmful additives
d. Low in fat
e. Low in energy (calories/kilojoules)
f. High in calcium
g. Low in cholesterol
h. Low in saturated fat
i. Inexpensive and filling
h. Depends on product, different features important for different products, (give examples).

5a. Do your Dairy products and Dairy foods make any claims on the labels?

Yes/ No

If yes, please specify.

6. Do you produce any nutrition education material, eg.

a. Information packs for schools.
b. Leaflets of product information for consumers, supermarket displays.
c. Educational videos
d. Information for health professionals

Please give details (examples of leaflets would be much appreciated).

7. Would you, or someone else within your company be prepared to discuss the technological problems associated with development of fat reduced/modified foods - either by telephone or by personal interview?

   (This type of information is essential to this study, but very difficult to do justice to in a brief written questionnaire).

Name:
Telephone Number:

Thank you for your time and effort in answering this questionnaire. Please return this questionnaire to us in the reply paid envelope provided. Information provided in this survey will be treated in strict confidence.

APPENDIX 4

ADDRESSES OF DAIRY MANUFACTURERS

TopMilk Ltd.,
PO Box 2
KAITAIA

Capital Dairy Foods
PO Box 6108
WELLINGTON

Marlborough Cheese Co Ltd.,
PO Box 542
BLENHEIM

Tatua Co-op Dairy Co.,
Main Road
TATUANUI

NZ Dairy Group Ltd.,
PO Box 459
HAMILTON

South Island Dairy Farmers
PO Box 6027
Upper Riccarton
CHRISTCHURCH

Otago Co-op Dairy Co Ltd.,
PO Box 430
DUNEDIN

Intermilk Ltd.,
PO Box 10052
Mt MAUNGANUI

Marlborough Milk
109B Redwood St.,
BLENHEIM

Mainland Products Ltd.,
PO Box 397
DUNEDIN

Timaru Milk Company
PO Box 540
TIMARU

Gisborne Milk Industries Ltd.,
PO Box 541
GISBORNE

Tui Foods
PO Box 56040
TAWA

Kiwi Co-op Dairies Ltd.,
PO Box 444
HAWERA

Kaikoura Co-op Dairy Co.,
PO Box 66
KAIKOURA

NZ Dairy- Foods Division
Private Bag
Manurewa
AUCKLAND

Bay Milk Products
Private Bag
EDGECUMBE

Hawkes Bay Milk Corp
PO Box 142
HASTINGS

New Zealand Dairy Foods Division
Private bag 806
Manurewa
AUCKLAND

Southland Dairy Co-op Ltd.,
PO Box 20
EDENDALE

Southern Fresh Milk Co.,
PO Box 16111
INVERCARGILL

King Country Milk
Bell Road
TAUMARUNUI

Nelson Coop Milk Producers Assn Ltd.,
PO Box 386
NELSON

Westland Dairy Co-op Dairy Co.,
PO Box 96
HOKITIKA

Northland Dairy Products Ltd.,
PO Box 5111, Regent
WHANGAREI

Scenicland Milk & Cream
Whall St.,
GREYMOUTH

NZ Rennett Co.,
Po Box 122
ELTHAM

Alpine dairy Products
PO Box 33
TEMUKA

APPENDIX 5

PRODUCT LABEL INFORMATION PROVIDED BY SURVEYED COMPANIES

Company A

Product	Ingredients	Nutritional information/100 g
Light Frozen dairy dessert (apricot), < 3% fat	Non fat milk, sugar, glucose, apricots, milk fat, maltodextrin, emulsifier (E472 (B)), stabilizers (E410, E407), food acids (E330, E296), flavours, natural colour (E160 (B))	Energy 670 kJ, protein 4.5 g, fat 2.5 g, carbohydrate 30.1 g, carbohydrate sugars 22.4 g, calcium 140 mg.

Company B

Product	Ingredients	Nutritional information/100 g
Standard pasteurized fresh milk, blue top, natural nutrition, homogenized	standard milk	Energy 258 kJ, Protein 3.3 g, carbohydrate 4.7 g, calcium 115 mg, phosphorous 85 mg.
Reduced fat, pasteurized milk, light blue, fresh milk, 1.6% fat, high in calcium.	standardized milk, non fat milk, non fat milk solids.	Energy 224 kJ, protein 4 g, fat 1.6 g, carbohydrate 140 mg, phosphorous 110 mg.
Trim fresh milk, non fat pasteurized milk.	non fat milk, non fat milk solids.	Energy 187 kJ, protein 4.1 g, fat 0.5 g, carbohydrate 5.8 g, calcium 145 mg, phosphorous 110 mg.

Company C

1. Standard milk: pasteurized, homogenized, 3.3% fat.
2. Lite milk: pasteurized, fat reduced milk, 1.5 % fat, added skim milk powder.
3. Trim milk: pasteurized non fat < 0.5% fat, added skim milk powder.
4. Trim milk (non fat): Foil caps on glass bottles.
5. Fresh milk: strawberry flavour, 3.3% fat pasteurized milk, sugar, colour, flavour.
6. Non fat pasteurized milk: <0.5% fat, added skim milk powder, non fat milk, non fat milk solids.

Company D

1. Lifestyle cheese: made in natural cheddar style.
2. Lifestyle cheese: 40% FDM milk fat 27%, maximum moisture 395.
3. Light 'n' natural (Australian): 23% less fat and cholesterol.
4. Reduced fat cheddar cheese (Australian): moisture maximum 39%, contains not more than 28% fat, pasteurized milk, salt, cultures, rennet.

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