SUBSTITUTE DAIRY PRODUCTS AND THEIR EFFECT ON THE CANADIAN DAIRY INDUSTRY

A Report Prepared at the Request
of The National Dairy Council of Canada
by Food Products Branch, Canada Department of Industry

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F O R E W O R D

The market for substitute dairy products, such as coffee whiteners and whipped toppings, has recently been established in Canada. Various other substitute milks and dairy products are currently being established in markets in the United States. The development of these new products has created considerable interest as to the effect these products could have on the Canadian dairy industry.

As a result of this interest, the National Dairy Council of Canada requested the Food Products Branch of the Department of Industry to make a survey of the recent trends and developments of substitute dairy products.

This report was prepared in the Dairy Section of this Branch by J.T. Hill, A.A. Hunt, J. Keay, and L.H. McMillan. The cooperation of Dr. J.A. Campbell, of the Food and Drug Directorate, in writing the chapter on the Nutritional Aspects of Filled and Imitation Milks is gratefully acknowledged.

The developments in food technology discussed in this report should be of special interest to Canadian dairy manufacturers and processors as well as to the many other groups associated with the dairy industry.

A. H. Mathieu,
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INTRODUCTION

Until recently margarine, which was introduced to Canadians in 1949, was the chief substitute dairy product available in Canada. Over the past two or three years substitute dairy products such as coffee whiteners, toppings, and desserts have been successfully introduced and are gaining a firm foothold in the market formerly available exclusively to dairy products.

Consumers have historically demonstrated that they have no particular allegiance to dairy products. Consumers are not only interested in new products but they have shown that they will purchase substitute dairy products when the quality is satisfactory and the price represents a saving over dairy products.

Developments in the United States and other countries indicate that the production of a wide variety of substitute dairy products acceptable to consumers is feasible. This is particularly relevant in the case of substitute milks which are being marketed commercially in the United States. Many anticipate that within the next few years a wide range of substitute dairy products may be introduced into Canada and the dairy industry is concerned about the effect these products will have on the industry.

However, meeting the competition from substitute dairy products will require adjustments by the dairy industry. Making adjustments will affect both dairy farmers and the dairy manufacturers. Dairy farmers will be affected since the cost of raw materials will play a major role in dictating whether dairy products or substitutes gain the dominant position in the market. Dairy processors and manufacturers, if they are to remain viable and maintain and expand their sales volume, will have to be in a position not only to manufacture these new products but also to be capable of competing with other food processors in marketing substitute dairy products.

In view of the fact that significant adjustments will be required by all facets of the dairy industry, trends in milk production, as well as trends in the production and consumption of dairy products, have been reviewed in this study.

Developments in the marketing of substitute dairy products in both Canada and the United States have been considered. Both provincial and federal legislation affecting the manufacture and marketing of these products have been reviewed.

Since the major competition to the dairy industry will probably come from the edible oil seed industry, a

comparison of the two industries has been made.

In this report the terms applied to describe groups of products designed to provide alternatives to dairy products are defined as follows:

1. Filled Dairy Products

   Filled dairy products are those manufactured from milk, the butterfat from which has been replaced with a vegetable oil.

2. Imitation Dairy Products

   Imitation dairy products are those manufactured by combining vegetable oils with food solids other than milk solids.* The resulting products are designed to resemble or take the place of dairy products.

3. Substitute is the term used to encompass both Filled and Imitation dairy products where reference is made to both products.

*Sodium Caseinate is not considered to be a milk solid.

MILK PRODUCTION

While the total production of milk has remained relatively static over the past five years at approximately 18.3 billion pounds, the number of farms shipping milk has declined from approximately 235,000 in 1963 to 185,347 in 1967. The number of farms selling milk in 1966/67 by type of market and by province is shown in Table 1, Appendix A.

Corresponding with the reduction in the number of farms selling milk, there has also been a reduction in the number of cows kept on farms for milking purposes. However, the reduction in the milking cow population has been offset by an increase in milk production per cow and the net result has been a relatively constant total production of milk, as indicated in Table 2, Appendix A.

Commercial shipments of milk and cream account for approximately ninety per cent of the total production of milk with about ten per cent of production utilized as feed on farms or consumed in farm homes. The total commercial utilization of milk has also remained relatively constant for the past five years. There has been a decline in the amount of milk utilized for the production of butter but this has been compensated for by a similar increase in the amount of milk utilized for cheese and ice cream production, as shown in Table 3, Appendix A.

In contrast to the decline in the number of dairy farms, milk cows, and the static milk production volumes, farm cash income from the sale of milk has increased substantially. This increase is due not only to increasing milk values but also to the payment of direct milk subsidies by the Federal Government.

Due to the rising costs of milk production, the Federal Government has responded to requests from manufacturing milk and cream producers for increased subsidies. Federal milk subsidies paid directly to farmers for manufacturing milk and farm separated cream have increased from an average payment of 20¢ per hundredweight in 1965 to the current subsidy rate of $1.31 per hundredweight. For milk producers receiving Federal subsidies, the subsidy represents a major source of their income from milk and cream shipments. For manufacturing milk shippers the subsidy is equal to 33 per cent of their commercial receipts from the sale of manufacturing milk and in the case of farm separated cream shippers, the subsidy is equal to 58 per cent of the commercial value of their cream shipments.

Farm cash receipts from the commercial sale of milk and cream in 1967 amounted to $629 million, which is 23.6 per cent higher than in 1963. Federal subsidy payments for manufacturing milk and cream in 1967 amounted to $103 million

with the gross farm cash receipts (commercial sales plus Federal subsidy) from the sale of milk and cream amounting to $732 million, as shown in Table 4, Appendix A. This is 43.7 per cent higher than the farm cash receipts from the sale of milk and cream in 1963.

DAIRY PROCESSING AND MANUFACTURING PRODUCTION TRENDS

During the past several years there has been an accelerated reduction in the number of dairy processing and manufacturing plants in Canada. The number of plants has declined from 1710 in 1961 to 1308 in 1966 for a drop of 402 plants (Table 1, Appendix B). This trend continued in 1967 and it is estimated that an additional 100 plants have closed.

One of the reasons for the decline in the number of plants is the constantly rising costs of supplies, overhead, and labour, while the total domestic sales of dairy products are remaining relatively static. This situation has made it difficult for many plants to operate profitably.

In spite of the fact that the total milk production for the past five years has remained constant at approximately 18.3 billion pounds, there have been some significant changes or shifts in the production of dairy products (Table 2, Appendix B). Creamery butter and evaporated whole milk production has declined, total fluid milk and cream sales have increased only slightly while the production of skim milk powder, cheddar cheese, and ice cream has increased substantially. The sharp increase in skim milk powder production from 176 million pounds in 1963 to 316 million pounds in 1967 is due to milk producers converting from shipping separated cream to whole milk.

The production of dairy products is related to the domestic demand except for butter, skim milk powder, and to a lesser extent cheddar cheese. The surplus production of these three products is purchased by the Federal Government under the dairy support program. To understand some of the reasons for the changes in the production volumes of the various dairy products over the past five years, it is necessary to review the per capita consumption trends of these products (Table 3, Appendix B).

In spite of a buoyant economy, the per capita consumption of dairy products is declining except for ice cream and cheese, which have shown steady increases. Increased per capita consumption of these products is largely due to sales promotion and product innovation. Both the ice cream and cheese industries have highly successful national promotional programs sponsored by the National Dairy Council, and these promotional programs have contributed substantially to the increased per capita consumption of these products.

New product development and innovation are important aspects of increased consumption. It is of interest to note that as shown in Table 4, Appendix B, the increase in cheese consumption is attributed to process and specialty cheese where there is new product development, while cheddar cheese consumption has remained relatively constant.

Due to the declining per capita consumption of most dairy products, a number of dairy manufacturers and processors have indicated an interest in marketing new filled and imitation dairy products. To remain viable, these companies recognize that they require new products if they are to maintain and increase their sales volume as well as their profit margins, and thus be in a position to meet future increases in operating costs and labour demands.

MILK PRICING PROGRAM AND FORMULA

The Two-Price Milk Marketing System

Canada's present methods of pricing milk date back to the late twenties and early thirties when most provinces established Provincial Boards to control the marketing of Class 1 fluid milk. These Boards established producer prices, quotas and, in many cases, the resale prices of fluid milk products. The major consideration in pricing milk has been the consumer market for the end product and the cost of alternative products. This situation has developed into a two-price system for milk.

1. Class 1 Fluid Milk Price - This is a premium-priced milk market and only those milk producers with fluid milk quotas are permitted to sell milk to dairies for use in products such as homogenized milk, two per cent milk, skim milk, cream, and flavoured milk drinks.
2. Manufacturing or Industrial Milk Price - This includes all milk not utilized for fluid sales and is the price paid for milk by manufacturing milk plants for the production of such products as butter, milk powder, cheese, etc.

Until recently there has been no significant alternative product source for Class 1 fluid milk and the transfer of milk from manufacturing milk producers has been controlled

by marketing schemes administered by Provincial Milk Marketing or Milk Control Boards. As a result, a premium price has been established for milk utilized by dairies for fluid milk products. For example, in June 1968, the Class 1 price per hundredweight for quota fluid milk was $6.15 in Southern Ontario, $6.87 in Vancouver, B.C. area, and $6.15 in the Regina and Saskatoon areas of Saskatchewan for milk testing 3.5 per cent butterfat. In Quebec, the Class 1 milk price is $6.00 for milk testing 3.4 per cent butterfat.

In the case of manufacturing or industrial milk, there is a demonstrated elasticity of demand for some manufactured dairy products such as butter and skim milk powder. As a result, the commercial manufacturing milk price is in direct relation to the domestic market prices for products manufactured from the components of milk, e.g., butter, skim milk powder. The difficulty of selling surplus manufactured milk products on world export markets has been a further restraint on manufacturing milk prices. Hence, government support for manufactured dairy products has been set at levels so that retail prices will encourage domestic consumption and discourage the build-up of stocks of surplus dairy products. For the dairy year 1968/69, the support price per pound for 39 score butter is 62¢, skim milk powder 20¢, and the cheddar cheese support price varies from 42¢ to 47¢, depending upon whether

it is grass or fodder cheese. These prices enable manufacturing plants to pay farmers approximately $3.54 per hundredweight for manufacturing milk.

The wide spread between the commercial price of Class 1 fluid and the commercial price of manufacturing milk (currently $2.61 per cwt. in Ontario for August 1968) has been seriously critized by manufacturing milk producers.

In 1965 the Federal Government, under the Dairy Price Support Program, commenced payment of subsidies direct to milk producers in order to increase producer returns from the shipment of manufacturing milk and cream. As shown in Table 1, Appendix C, the payment of direct subsidies which commenced in 1965 has increased from 20¢ in 1965 to $1.16 per hundredweight in 1968. These subsidies, in conjunction with increased support prices for butter, skim milk powder, and cheese, have increased the producer's gross return from manufacturing milk from $2.86 in 1963 to $4.70 per hundredweight in 1968, or an increase of 64 per cent. As a result, the differential between the price of Class 1 fluid milk and the gross return from manufacturing milk has been reduced from $2.40 in 1963 to $1.45 in 1968.

It is of interest to note that in April 1967 when the Federal support level was increased to provide manufacturing milk shippers with a return of $4.64 per hundredweight

and subsidy payments were discontinued on surplus fluid milk, many fluid milk shippers voiced their dissatisfaction. The return to fluid milk shippers based on $5.75 for quota milk and only $3.54 for surplus milk provided an average return of about $5.30 per hundredweight. This did not make a sufficient spread between the returns from manufacturing and fluid milk to satisfy many fluid milk producers. To compensate for the loss of the Federal subsidy on surplus fluid milk and increase the spread between the average return from manufacturing and fluid milk, most provincial milk control agencies increased the price of Class 1 fluid milk. Fluid milk producers, while interested in the Class 1 fluid milk price and the size of their quota, are primarily interested in their gross receipts from milk and the comparison of returns to that received from comparable shipments of manufacturing milk.

Manufacturing Milk Pricing

The commercial manufacturing milk price is directly related to the prices received for the products derived from that milk. Hence, the manufacturing milk price is established on the basis of the price of butterfat and milk solids-not-fat. The approximate yield from one hundred pounds of milk is 4.2 pounds of butter and 8 pounds of skim milk powder. The current manufacturing milk price of $3.54 is based on the market price of 62¢ butter and 20¢ skim milk powder, and manufacturing costs of 66¢ per hundredweight of milk.

CALCULATION OF MANUFACTURING MILK PRICE

Butter	4.2 lb. at 62¢	- $2.60
Skim Milk Powder	8 lb. at 20¢	- 1.60
Total		- $4.20
Less manufacturing cost allowance		- .66
Manufacturing milk price per 100 lbs.		- $3.54

Class 1 Fluid Milk Pricing

In contrast to the pricing of manufacturing milk, which is directly related to the market price of butterfat and solids-not-fat, Class 1 fluid milk is priced by the hundredweight with no relation to the price of solids-not-fat. The butterfat content is only used as a guide or benchmark to adjust milk prices in relation to a standard butterfat content. For example, in Southern Ontario, Class 1 fluid milk is priced at $6.15 per hundredweight for milk containing 3.5 per cent butterfat. There is a differential of 6¢ for each tenth per cent butterfat content above or below 3.5 per cent. In the Vancouver area of British Columbia, the Class 1 fluid milk is $6.87 per hundred pounds with a 7.6¢ butterfat differential.

The history of fluid milk pricing in all provinces indicates that prices and quotas were established to bring about orderly marketing of fluid milk and to assure adequate supplies of good quality milk on a year-round basis, especially

during the low production winter months. Fluid milk prices were established at a level to avoid seasonal fluctuations in the price of milk and compensate producers for the additional cost of producing milk in the winter months. This method of equalizing the cost of producing milk on an annual basis permits dairies to sell milk at a uniform price year round, and thus avoid the confusion created when milk prices were constantly altered to compensate for seasonal fluctuations in production costs.

The method of determining changes in the price of Class 1 fluid milk varies slightly from province to province. However, price changes are usually determined either from a set of price indices for commodities and services used by farmers or from evidence submitted by producers indicating current changes in their costs and hence a need for revision in the price of milk. This method of revising the producer price of fluid milk has become traditional in the dairy industry and as a result there is no relation between the price of Class 1 fluid milk and the value of the butterfat and solids-not-fat components of milk.

Milk Marketing or Milk Control Boards have been able to use this traditional method of establishing Class 1 fluid milk prices since there has been no significant alternative product source, and the transfer of lower priced manufacturing

milk to Class 1 fluid markets has been effectively controlled.

Alternative Pricing Proposals for Class 1 Fluid Milk

For the past 20 years there have been frequent suggestions that all milk should be purchased on a butterfat and solids-not-fat basis. As previously noted, manufacturing milk prices are established on the basis of the market value of butter and skim milk powder, whereas there is no correlation between the value of these milk components and fluid milk prices.

The introduction of filled and imitation milk focuses attention on the method of pricing and the necessity for a realistic reappraisal of milk pricing methods.

One proposal has been made which would relate the price of Class 1 fluid milk to the value of the two main components (butterfat and solids-not-fat) e.g., when the Class 1 fluid milk price is $6.15 per hundredweight for milk testing 3.5 per cent butterfat, the total butterfat value is $2.21 based on butterfat at 63¢ per pound. This places a value of $3.94 on the fluid solids-not-fat which is equivalent to a skim milk powder value of 45.8¢ per pound based on milk containing 8.6 pounds of solids-not-fat per hundredweight. Variations to this proposal by reducing the price of butterfat to 30¢ or 40¢ have been made. This would make butterfat more competitive with vegetable fat but would further increase the

price of non-fat-solids to 55¢ per pound.

Another proposal has been put forward to classify filled milk as Class 1 fluid milk for pricing purposes. This is the method being used in the State of Arizona to price filled milk. Under this proposal, filled milks must be manufactured from Grade A milk ingredients which may be either Class 1 fluid skim or first grade skim milk powder. If skim powder is used, then a settlement payment is assessed and the payment is calculated on the difference between the price of Class 1 fluid skim and skim milk powder. This settlement payment is made to a central marketing pool which dispenses the payments to all milk producers who are members of the pool.

Under this system, the Class 1 fluid skim price is calculated as follows on the basis of 63¢ per pound butterfat:

Class 1 Fluid Price.....	$6.15
Less price of Butterfat ($3\frac{1}{2}$ x 63¢).....	2.21
	$3.94
Less separating and handling costs.....	.30
Class 1 Fluid Skim Price.....	$3.64

For plants that use powder skim milk in lieu of fluid skim, the settlement payment is calculated as follows based on 20¢ per pound skim milk powder:

Class 1 Fluid Skim.....	$3.64
Cost of Skim Powder (8.6 x 20¢).....	1.72
Settlement Payment.....	$1.92

Both of the foregoing proposals are designed to maintain Class 1 fluid milk prices at present levels. Neither proposal can be considered as a long term solution as there is no attempt to compromise the wide discrepancy in price between Class 1 fluid non-fat milk solids and skim milk powder. This large difference in the value placed on non-fat solids, 45.8¢ vs. 20¢ is the major cause of dairy farmers' concern over the introduction of filled and imitation milk.

Both of the foregoing proposals would require legislation to control the market prices, and many would argue that legislation of this type is not in the interest of consumers, producers, or processors. While producers may obtain a temporary benefit, the long term effect could be detrimental to all milk producers. Perpetuating artificially high prices for non-fat milk solids will only stimulate research in the development of complete non-dairy imitation milk and milk products.

One of the few fluid milk markets paying milk producers on the basis of non-fat solids and butterfat is the State of California. This payment plan was commenced on April 1, 1962, and fluid milk prices were kept the same as before the plan was adopted. This was accomplished by developing a three-component price plan and establishing a fluid value. This fluid value reflects a premium placed on fluid milk over and above the manufacturing milk value.

The three component minimum prices for milk fat, solids-not-fat, and fluid are established on the basis of some desired price per hundredweight for whole milk containing 3.5% milk fat, 8.622% solids-not-fat, and 87.878% fluid. The ratio is derived from the Jack Formula, developed by Dr. E.L. Jack and Associates of the University of California. This formula shows the relationship between fat and solids-not-fat, at various levels of butterfat test.

The established minimum prices are relatively uniform between market areas. In February 1968, the milk fat price was either 91¢ or 94¢ per pound, depending upon the area; the solids-not-fat price was 26¢ per pound in all areas, and the fluid factor varied from 9¢ to 93¢ per hundredweight.

For example, in the Ventura-Santa Barbara market area, the producer fluid milk price is calculated as follows:

Component	Test*	Price per lb.	Value per cwt.
	%		$
Milk fat	3.5	.94	3.290
Solids-not-fat	8.622	.26	2.242
Fluid	87.878	.0027	.237
		Price per cwt....$	5.769
		or $	5.77

Source: California Department of Agriculture

Most milk producers in California favour this component pricing method as each producer is paid for the inherent value of his individual milk. There has been some difficulty with breed promotion milk as the higher cost of solids in high testing milk on a per quart basis requires a premium price over standard milk. Previously, breed promotion milk enabled some groups to supply a high solids milk at the same price as standard milk. This advantage disappears under the three-component pricing system.

Three major criticisms have been made of this plan:

1: The butterfat is too high in relation to its value in manufacturing; processors incur a loss when disposing of excess butterfat.

2. The fluid component value is complicated and creates controversy.

* Jack Formula: Used in determining the relative tests of the solids-not-fat and fluid components

3: There is an additional cost in testing for solids-not-fat and calculating producer payments.

A milk component pricing system for fluid milk has considerable merit and important advantages, particularly when considering the introduction of filled and imitation milk. In developing a Canadian milk component pricing system there are a few outstanding differences to be considered between the Canadian and the United States' dairy industries. In the United States, 47 per cent of the total milk supply is utilized for fluid use and 21 per cent for creamery butter, whereas in Canada, of the total milk supply, 29 per cent is utilized for fluid purposes and 42 per cent for creamery butter. The United States per capita consumption of butter was only 5 pounds in 1967 compared to 17 pounds in Canada.

The Canadian Dairy Price Support Program makes direct subsidy payments in the amount of $1.31 per hundred pounds of milk to manufacturing milk and cream producers, whereas the United States does not have a similar program. In Canada, subsidies will be paid on the equivalent of 98.5 million hundredweight of milk in 1968/69 at a total cost of 129 million dollars.

In Canada there is also a trend towards permitting all manufacturing milk shippers who can qualify to participate in the higher priced fluid milk market. This is presently being

done in British Columbia and Ontario. This trend is a further reason for correlating the pricing of Class 1 fluid milk and manufacturing milk.

In the meantime, increased efforts are being made to promote the sale of dairy products, especially by the Dairy Farmers of Canada who have recently approved a doubling of their advertising check-off. However, if increased advertising of dairy products is to produce significant results, dairy products must be priced in relation to the economics of the market place. Maintaining high prices for dairy products by legislation that allows substitute products to considerably undersell dairy products, will more than offset the effect of increased dairy product promotions and advertising.

Therefore, the adoption of a component pricing plan for fluid milk, which prices milk components competitively with non-dairy products, would allow dairy farmers to participate in the total combined market for dairy and substitute dairy products. Restrictive legislation to protect the dairy product market will not be required and the decision of accepting or rejecting new products will be in the rightful hands of the consumer. Competitively priced milk will retain the major share of the dairy products market and also the major share of the ingredient cost of substitute products.

The declining per capita consumption of milk and milk products can be reversed if a new approach is taken to milk pricing along with an aggressive advertising and promotional program.

VARIABILITY IN THE PRICES OF INGREDIENTS USED IN MANUFACTURING SUBSTITUTE DAIRY PRODUCTS

There are considerable variations in the composition of filled and imitation dairy products since there are no standards for these products. There is a wide selection of the ingredients that may be used in these products and also a considerable variation in the percentages of the ingredients. For example, substitute products may be made with coconut oil or blends of several oils such as soya, cottonseed, rapeseed, and safflower oils. There are also numerous emulsifiers and stabilizers that can be utilized in these substitute dairy products. In regard to the replacement of the carbohydrates or milk lactose, most manufacturers generally utilize either low DE corn syrup solids, or low DE corn syrup.

Another factor influencing the manufacturers' cost of ingredients is the method of purchase. Some manufacturers purchase the individual ingredients to formulate their products while other companies prefer to purchase prepared base formulations. The purchasing power of the manufacturers also has an influence on the cost as there are considerable discounts that may be earned through quantity purchases.

The cost of dairy ingredients in filled products is relatively uniform due to the government price support

programs for dairy products. Skim milk powder, for example, is currently selling at 20 cents per pound and any price differences are usually due to transportation costs.

The following are representative costs of the major ingredients used in the manufacture of filled and imitation dairy products.

Vegetable Oils

Vegetable fats for substitute dairy products are available in a considerable variety from coconut oil to blends of coconut, soya, cottonseed and other oils. However, there is a considerable variation in price due to the type of oil and quantity purchased. The vegetable oil market is also very speculative with wide price fluctuations. The following table shows the quantity price range for coconut oil, F.O.B. Toronto, on July 16, 1968.

COCONUT OIL

Quantity	Type of Coconut Oil	
	76° oil	92° oil
pounds	Cents per pound	
Less than 2,000	33.5	33.75
2,000 to 5,000	33.0	33.25
5,000 to 10,000	32.0	32.25
10,000 to 30,000	30.5	30.75
Tank Wagon 30,000	24.75	25.0

BLENDED OILS

Coconut oil with emulsifiers, stabilizers, and colour added is quoted at 34¢ per pound. Blends of vegetable oil combining coconut, cottonseed, and soya bean oils with emulsifiers and stabilizers added are quoted at 26¢ per pound. Soya base margarine oil is quoted at 14.2 to 15.5 cents per pound in 30,000 pound tank truck quantities.

Protein

To replace milk proteins, most manufacturers generally utilize sodium caseinate or soya protein isolate. In Canada, sodium caseinate is more commonly used because soya protein isolates are not presently manufactured in Canada.

SODIUM CASEINATE

Quantity Pounds	Price per pound Cents
Less than 500	54
500 to 1,000	52
1,000 to 2,000	50
2,000 to 5,000	49
5,000 to 10,000	47.5
10,000 to 25,000	46.5
over 25,000	46.0

SOYA PROTEIN ISOLATE

Quantity Pounds	Price per pound* Cents
Less than 2,000	57.3
2,000 to 20,000	54.9
over 20,000	52.5

*Soya Protein Isolate prices will be reduced about 20 per cent when product is manufactured in Canada.

Carbohydrates

Corn syrup is generally used to replace the carbohydrates or lactose in imitation dairy products. Low Dextrose Equivalent (D.E.), corn syrup, or corn syrup solids are recommended because of their reduced sweetness and increased viscosity or bodying power.

CORN SYRUP SOLIDS 24 DE - 3% MOISTURE

Quantity in Bags (100 lbs.)	Price per Hundred Pounds
5 - 19	$ 13.45
20 - 240	12.95
240 - 500	12.05
over 500	11.70

CORN SYRUP 36 DE - 20% MOISTURE

Quantity in Drums (640 lbs.)	Price per Hundred Pounds
2 - 4	$ 9.05
4 - 19	8.75
20 - 60	8.60
Tank Truck 40,000 lbs.	8.05
Tank Car 120,000 lbs.	7.80

Emulsifiers and Stabilizers

Small quantities of emulsifiers and stabilizers are required in all filled and imitation dairy products. Stabilizers and emulsifiers vary in price depending on the type and quantity purchased. The emulsifier price range is from about 35 to 75 cents per pound, whereas stabilizer prices vary from about 85 cents to $1.90 per pound.

COST COMPARISONS OF DAIRY PRODUCTS WITH FILLED AND IMITATION PRODUCTS

The processing equipment, plant facilities, and manufacturing procedures for making substitute dairy products are similar to those used for processing and manufacturing dairy products. Distributing and marketing costs for substitute products will also be similar to those for dairy products. Therefore, the difference in costs between dairy products and filled and imitation products is primarily the difference in the costs of the raw material. In the case of filled and imitation milks there is a small additional processing cost for storing and mixing the non-dairy ingredients, but in most other products this cost would not be significant.

Sales tax on food products containing vegetable oil represents a significant additional cost and, where applicable, must be added to the ingredient cost of filled and imitation dairy products since there is no sales tax on dairy products.

Filled and imitation milks primarily will be competing with two per cent butterfat milk. Therefore, as shown in Table 1, comparison of ingredient costs of fluid and substitute milks has been calculated on the basis of milks containing two per cent fat.

Table 1 COMPARISON OF INGREDIENT COSTS IN CLASS 1 FLUID, FILLED, AND IMITATION MILKS CONTAINING TWO PER CENT FAT

Ingredients	Percent	Fluid Milk @ $6.15 per 100 lbs. Testing 3.5% BF	Filled Milk using Class 1 Fluid Skim Milk	Filled Milk using Skim Milk Powder	Imitation Milk
		.....	$ per 100 pounds		.....
Fat	2%	$ 1.30	$ .60	$ .60	$ .60
Milk Solids-not-Fat	8.6%	3.87	3.87	1.72	-
Protein (Caseinate)	3.0%	-	-	-	1.50
Corn Syrup Solids 24 DE	5.0%	-	-	-	.60
Stabilizer	0.05%	-	.09	.09	.09
Emulsifier	0.10%	-	.08	.08	.08
Estimated additional Mixing Cost @ 0.5¢ per quart	-	-	.19	.19	.19
Total Ingredient Cost per 100 lbs.		$ 5.17	$ 4.83	$ 2.68	$ 3.06
Sales Tax if applicable at 12% of estimated wholesale selling price		.00	1.16	.90	.96
Total Cost of Ingredient + Sales Tax per 100 lbs		$ 5.17	$ 5.99	$ 3.58	$ 4.02
		.....	cents per quart		
Cost per Quart - Cents (Sales Tax Exempt)		13.42	12.54	6.96	7.94
Cost per Quart - Cents (Sales Tax Included)		13.42	15.54	9.29	10.44

Note: Component Ingredient Cost used in the above calculations:

Milk Fat at 65¢/lb.
Skim Milk Powder at 20¢/lb.
Coconut Oil at 30¢/lb.
Corn Syrup Solids 24 DE at 12¢/lb.

*Caseinate at 50¢/lb.
Stabilizer at $1.80/lb.
Emulsifier at 75¢/lb.

*Soy Protein Isolate at 55¢/lb. may be substituted for casein.

The cost difference between two per cent fluid milk and filled milk using Class 1 skim milk is only .9 cents per quart compared to a difference of 6.5 cents per quart for filled milk, manufactured from skim milk powder, and 5.5 cents per quart for imitation milk. If sales tax is applicable to substitute milk, these price differences are reduced by approximately 2 to 3 cents per quart. The application of sales tax actually increases the cost of two per cent filled milk, using Class 1 fluid skim, by two cents per quart over the price of two per cent Class 1 fluid milk.

Consumers purchase large quantities of milk in multiple 2 and 3 quart containers, and hence will compare milk and substitute milk prices on the basis of the container price. Therefore, a differential of 5 cents per quart becomes a 15 cent price difference on a three quart jug, and this is a significant price differential to most consumers.

Fluid milk has a low fat content and a relatively high percentage of solids-not-fat in comparison to the fat content. However, most dairy products have a high fat content

of ten per cent or more, and generally a low ratio of fat to solids-not-fat. The price of manufacturing milk makes the solids-not-fat in manufacturing milk competitive with non-dairy replacement products. Therefore, the replacement of non-fat milk solids with non-dairy ingredients does not represent a significant price differential for dairy products which have a high fat content or are made from manufacturing milk. The major difference in cost between these dairy products and substitute products is the difference in the price of vegetable fat compared to butterfat.

Butterfat for these products costs approximately 65 cents per pound compared to 25 cents or less for vegetable oil. Based on a 40 cents per pound cost differential between butterfat and vegetable fat, the approximate cost difference for the major dairy products is shown in Table 2. Sales tax may also be applicable to these products containing vegetable fat and therefore when sales tax is added, the vegetable fat cost differential is considerably reduced, as indicated in the table.

Table 2 COST COMPARISON OF DAIRY AND SUBSTITUTE PRODUCTS WHEN BUTTERFAT IS REPLACED WITH VEGETABLE FAT AND SALES TAX ADDED

Product	Percent Fat	Unit	Approximate Store Price for Dairy Product	Gross Cost Difference For Vegetable Fat Product	Estimated* Sales Tax on Vegetable Fat Product	Net Cost Difference
	%		$	¢	¢	¢
Half & Half Cream	10	Pint	.43	5.2	4.0	1.2
Table Cream	18	1/2 Pint	.32	4.7	2.9	1.8
Whipping Cream	32	1/2 Pint	.45	8.3	3.8	4.5
Sour Cream	18	Pint	.51	9.3	4.4	4.9
Evaporated Milk	8	Tin 1 lb.	.20	3.2	1.5	1.7
Ice Cream	10	Half Gallon	1.15	11.0	10.2	0.8
Cheddar Cheese	33	Pound	.85	13.2	6.8	6.4
Mozzarella Cheese	19	1/2 Pound	.51	3.8	4.6	+0.8
Cream Cheese	35	1/2 Pound	.45	7.0	3.9	3.1

* Sales Tax at 12 per cent of estimated wholesale price of the filled product.

The price advantage of substitute dairy products due to the substitution of lower priced vegetable fat is considerably reduced by the application of the federal sales tax. As shown in the above table, the sales tax on ice cream is approximately equal to the cost difference between butterfat and vegetable fat. In the case of Mozzarella cheese, the application of sales tax actually increases the retail price of the filled product by 0.8 cents per half-pound package over the original dairy product.

Substitute Dairy Product Formulations

For information on typical formulations for filled and imitation dairy products, refer to section on Dairy Substitute Formulations for details as to the ingredients and approximate percentage of ingredients used in manufacturing these products.

NUTRITIONAL ASPECTS OF FILLED AND IMITATION MILKS

Milk is a very important constituent of the diet for several age groups. Canada's Food Guide, published by the Canadian Council on Nutrition, indicates that children up to about 11 years of age should consume $2\frac{1}{2}$ cups or 20 oz. of milk each day and adolescents and pregnant and nursing mothers should receive 4 cups or 32 oz. each day. A "reasonable daily intake" of milk for all groups has been defined by the Food and Drug Directorate as 30 oz. Using this as a basis, it may be calculated that for children and many adolescents, 30 oz. milk supplies the total daily requirement for riboflavin, calcium and phosphorus, and lesser but important amounts of other nutrients. For an infant under about 4 months of age, milk is the primary, if not the sole, source of all nutrients. Thus, any food which is sold, represented, or likely to be used as a substitute for milk should furnish similar amounts of nutrients.

There are two types of products being developed which may be used in place of milk: the so-called "filled milks" and the "imitation milks". Filled milks are made up of non-fat milk solids and vegetable oil in place of butterfat. Thus, as long as sufficient milk solids are added (i.e., about 10%), the final product will supply all the protein,

minerals and water-soluble vitamins found in milk. Vitamin A would, of course, be removed with the fat and should be added. Vitamin D may be added to whole milk and should be permitted in filled milks. By varying the amount of added fat, filled milks could be made to replace either whole milk or "two per cent milk".

Imitation milks are composed of water, sugar, vegetable fat, a source of protein (soy protein or sodium caseinate), stabilizers and flavours. Since these ingredients contain no vitamins or minerals, those nutrients present in milk in significant amounts must be added to render the imitation product nutritionally similar to milk.

Both the quantity and quality of protein may vary widely. While deficiencies in quality may, within certain limits, be made up with an increased quantity of protein, there are definite limits within which this would be possible without influencing the value of the product. Milk protein has a high biological value but also is eminently suited, because of its lysine content, to supplement other proteins such as those of cereals. The value of sodium caseinate is similar to milk protein, but that of soy protein is usually lower and may vary with the process used to prepare it.

The source of fat for both filled and imitation milks is generally a vegetable oil. Although coconut oil is

probably most widely used, it contains essentially no linoleic acid and is thus not suitable as a dietary fat when the milk product is to be used as the sole source of fat in the diet, as for infants. For other groups which consume mixed diets and obtain their essential fatty acids from other foods, this factor is probably not of importance.

There are a few products presently on the market which might be classed as imitation milks. They have been made from soy protein and vegetable oil with added vitamins and minerals and are intended for the use of infants who are allergic to the constituents of cow's milk. Some of these reactions are very severe and in any of the new products anticipated, it is important that the labelling be informative and clear as to the ingredients used. This applies particularly to the source of protein, fat and carbohydrate, e.g., sodium caseinate has the allergenic effect of other milk proteins although it may not always be identified as such commercially.

Because of their relation to the products discussed, mention should also be made of items such as toppings, creams and frozen desserts. These products are not normally used as significant source of nutrients for the infant nor are they a staple food for any age group. There is not the same need, therefore, for these foods produced from non-dairy

constituents to be made nutritionally similar to their dairy product counterparts.

Finally, there is the problem of labelling. It is relatively easy to control those products which may be designated in a uniform manner, e.g., as filled milks or imitation milks, or those which may carry a recommendation on the label that they are to be used as a replacement for milk. The situation becomes complicated, however, if products are promoted only as refreshing drinks, sold in containers similar to fluid milk and appear, and even taste, like milk. If the price of such a product is half that of milk, there is a good possibility that it may be purchased for use in place of milk. Unless it is comparable to milk in nutritive value, the consequence of using it for feeding infants and children could be serious indeed. If such products are sold, there must be no possibility of their being confused with milk.

EFFECTS OF SUBSTITUTE PRODUCTS ON THE CONSUMPTION OF DAIRY PRODUCTS

Dairy Product Analogues

The substitution of vegetable oil for butterfat will change the consumption pattern of traditional dairy products considerably. It is difficult to forecast in what manner and to what extent this change will take place. Some substitute products have already made a substantial impact in the market. Coffee whiteners are an example. A recent survey of selected retail chain stores in the Toronto Metropolitan area indicated that close to 60 per cent of the sales of half and half cream currently comprised non-dairy products. Another product group gaining a firm foothold in the market formerly dominated by natural dairy products is the synthetic whipped toppings. The same survey indicated that non-dairy products had captured about 36 per cent of the market for whipped toppings.

While these products are making a determined effort to capture the consumer's interest, the large fluid milk market, exclusive of cream, still remains free from competitive inroads of substitute milks. Filled and imitation milks are being marketed commercially in the United States and have been moderately successful in some markets. It is just a matter of time until they are introduced in Canada and the dairy industry is uncertain and to some extent uneasy about the effects that

the introduction of substitute milks will have on the fluid milk market. Past experience with margarine has proven that the consumer will switch to substitute products when the new product is offered at a price low enough to attract economy-minded housewives.

The Impact of Margarine on Butter Consumption

In 1948 the prohibition of the sale of margarine in Canada was lifted by the Supreme Court after having stood for 62 years. Responsibility for the regulation of this product was subsequently left to the provincial governments. Quebec and Prince Edward Island continued to prohibit the sale of margarine while the other provinces, with the exception of Newfoundland, permitted the sale of uncoloured margarine. After 1961, colouring was allowed in successive acts passed by provincial legislatures. By 1967 only Quebec prohibited the addition of yellow colouring. (The addition of colour to margarine does not appear to have given any additional stimulus to consumption.) Margarine consumption per person peaked in 1962 at 9.9 lbs., then fell off gradually to 1965, recovering to about 9 lbs. in 1967. (See Table 1, Appendix D.)

Up to 1961 margarine consumption did increase steadily while butter followed a consistent downward trend. The consumer subsidy on butter implemented by the government from 1962 to 1965 was reflected by an immediate increase in

butter consumption in 1962 and 1963. Consumption declined slightly in the next two years as the government consumer subsidy was phased out.

The immediate effect of a lower butter price on consumption of butter characterizes this product's price elasticity. However, because of the fairly steady downward trend in butter consumption since 1949, a correlation between the per capita consumption of butter and the retail price of butter using annual data shows a positive relationship, not consistent with a hypothetical price elasticity of demand. However, if butter consumption is correlated with the retail price differential between butter and margarine, a definite inverse relationsip is indicated. (Table 2, Appendix D.) A simple correlation calculation will yield a regression coefficient of -0.28 with an r^2 of 62 per cent, which is rather low. Simply stated, this indicates that for every change of one cent per pound in the price differential between margarine and butter, there is an inverse change in the per capita consumption of butter amounting to .28 pounds per person. The amount of unexplained variation is still too high to provide accurate results in forecasting.

Margarine's relatively low price has made it appealing to many consumers. It has, however, other characteristics which affect consumer preference. The use of vegetable fat

as a substitute for butterfat, which is suspected as a major contributor to high cholesterol levels, has influenced some consumers in their preference for margarine. Superior spreadability and longer shelf life compared with butter are additional factors favouring margarine. Other consumers may be influenced to some extent by the attempt by manufacturers of margarine to create a differentiated product and foster brand loyalty. Butter is sold in undifferentiated form and is graded in accordance with Canadian government quality standards. Virtually all of the butter is sold as First Grade, i.e., 98 per cent in 1967. The appeal of butter as a natural dairy product remains strong with many consumers. For example, in 1966 butter still represented one third of the 52.8 pounds of fats and oils consumed per person. However, it is expected that per capita consumption will continue to decline as it has in the United States and, if rates of decline since 1964 continue, should be about 14 to 15 pounds by 1970.

Substitutes and Fluid Milk and Cream Sales

No substitute fluid milk products are yet commercially available in Canada. This situation is not expected to last long. The products can be made and marketed now. However, the companies which have the technical know-how are not presently marketing these products, due mainly to the complicated legal situation currently prevailing in most of the provinces.

While a number of provinces have legislation prohibiting the manufacture and sale of imitation dairy products, the legislation has not been enforced.

Coffee Whiteners

Synthetic coffee whiteners are being marketed at the present time. These products compete basically with cereal creams or half and half containing 11 to 12 per cent butterfat. The imitation products are in powder form, i.e., Coffee-Mate, Cremelle, Coffee Charm, Instant Please, or in frozen form as in Coffee-Rich. The cereal cream market is a growing one. In the past two years, commercial sales have increased by more than seven per cent per year (Table 4, Appendix D). In 1964, cereal cream represented 66 per cent of total cream sales. By 1967 this had grown to 70 per cent.

The consumer preference for lower fat cream and the lower cost at retail compared with higher fat creams are important factors in the popularity of half and half cream sales. It is this market which cream substitutes are designed to exploit. The survey of a selected group of chain store outlets made in 1967 by the Ontario Department of Agriculture and Food indicated that substitute products had captured 60 per cent of the market for half and half cream. Commercial sales of cereal cream in Toronto in 1967 totalled 9.5 million quarts. If the survey provided an accurate sampling of sales

trends, the sale of non-dairy coffee whiteners would be equivalent to about 5.7 million quarts of 10 per cent cereal cream. This would in turn displace about 42 million pounds of fluid milk valued at $2.3 million of fluid milk F.O.B. plant. 1/ This represents about 4.5 per cent of the total value of milk purchased from farmers for the Toronto area.

Imitation Ice Cream

Imitation ice cream is available in Canada in limited volume but has not made much of an impact on the frozen dessert market. In the Toronto area some chains are offering imitation ice cream, but according to a recent survey, consumer response to the product has not been very enthusiastic, having captured less than one per cent of the frozen dessert market.

Filled ice cream or Mellorine, as it is known, has been available in the United States for several years. In those States where it is marketed free of legal restrictions it has captured about 15 per cent of the market. However, sales in recent years have shown little growth while dairy products like ice milk have shown considerable growth.

In Canada the market for frozen desserts is an expanding one. The production of ice cream has grown continuously in the past ten years, increasing from 36.6 million

1/ Data for 1967 in Toronto area obtained from Ontario Department of Agriculture & Food, Monthly Dairy Report, Annual Statistics for 1967.

gallons in 1958 to 56 million gallons in 1967. Per capita consumption of ice cream has also been increasing. In 1967 it totalled 2.74 gallons per person, compared with 2.14 gallons in 1958. Sharing in this growing market are such products as ice milk, sherbet, water ices, and milkshake mix.

The failure of Mellorine in the United States to capture a large percentage of the frozen dessert market has been attributed to several factors. Production is said to be in the hands of dairy firms who are biased in favour of milk fat. The price differential between Mellorine and ice cream is not wide enough to attract consumers. At the same time, a wider price difference would make it less profitable to market Mellorine. Ice cream and ice milk are also claimed to have superior quality attributes which have greater consumer appeal and therefore can maintain and increase their market share.

At the present time it is not expected that imitation ice cream will seriously affect the sale of frozen desserts made from dairy products. Prices will remain close enough to products such as ice cream to prevent any substantial substitution, with sales limited to curious consumers. Firms producing imitation ice cream products are not actively promoting them in Canada. Instead, they are waiting to market a filled or Mellorine-type ice cream product when the legal restrictions are changed. A filled product is apparently more profitable

to produce and would appear to provide a more competitive product for traditional ice cream.

Filled and Imitation Milk

While the sale of non-dairy milk products has not occurred as yet in Canada, these products are being sold in some states of the American Union. Arizona provides a good example of a rapidly growing market for milk containing vegetable oil as a substitute for butterfat while retaining the natural dairy solids-not-fat portion. In October, 1966, according to the first statistics published, 438,000 lbs. of filled milk were sold in the Central Arizona Marketing Area. By March, 1967, sales had doubled to 945,000 lbs., and by May, 1968, had grown to 3.1 million lbs. This represented 8.9 per cent of the May sales of Class 1 milk (Table 3, Appendix D). However, in the 28 market areas covered by Federal Marketing Orders, filled milk represents only .5 per cent of Class 1 milk sales.

Using Arizona as an example of what may happen in Canada is not without its limitations. Arizona is not a dairy state and has had to rely traditionally on supplies from other regions to meet its needs for manufactured dairy products, although it is self-sufficient in the production of fluid milk. The statistics provided in Table 3, Appendix D

show rapid growth in the sale of filled milk in an area that includes Phoenix, one of the fastest growing metropolitan areas in the United States (Pop. 818,000 in 1965). Family income in Arizona is close to the national average which makes the State a market which is fairly representative of the average U.S. consumer. The trend in sales of filled milk, therefore, could be indicative of the kind of impact sales of filled milk would have in a market area such as metropolitan Toronto. If trends were similar one-and-a-half to two years after the introduction of a filled milk product, sales might amount to 8 to 10 per cent of the sale of fluid milk.

The sale of fluid milk in Canada is made up of three major products, standard milk, two per cent, and skim, differing only according to the level of butterfat. Standard milk (3.5% butterfat) continues to represent the major fluid milk sold. However, commercial sales of two per cent have been growing at a rate in excess of 15 per cent per year since 1964 while sales of skim milk and standard milk have been falling off, (Table 4, Appendix D). In 1964, this proportion had risen to 24 per cent. The proportion of two per cent milk sold in urban centres is higher than in the country as a whole. In Toronto, for example, 35 per cent of fluid milk sales in 1967 comprised two per cent milk.

A new filled milk product will most likely be

developed as a competitor for the two per cent milk market. This is, as indicated, the market with the greatest growth potential. Two per cent milk currently sells at about one to two cents per quart below standard milk. For the purpose of forecasting sales trends, if sales tax were not applicable, it is assumed that a new filled fluid milk containing two per cent vegetable fat would have ingredient costs low enough to permit sales at prices ranging between two and four cents per quart below the natural milk product or a four to eight cents differential on the basis of half-gallon purchases. At an eight cent margin, consumers in Toronto may be expected to respond in about the same manner as consumers in Arizona, and after about three years filled milk sales could amount to about 10 per cent of total fluid milk sales.

The sales of fluid milk in Toronto have followed much the same trend as in the country as a whole. Sales of standard milk and skim have declined while sales of two per cent have grown considerably (Table 5, Appendix D). If sales trends since 1964 continue to 1972, the sales breakdown of the major fluid milk products in the Toronto area are estimated as shown in Table 6, Appendix D.

The Toronto sales projections are based on the following assumed annual average rates of change: Standard (-0.05%), Two Per Cent (+10.0%), Skim (-2.0%)

The projected sales of total fluid milk in Toronto in 1972 amount to 269 million quarts. Two per cent sales may represent about 47 per cent of this total. If a filled milk product is introduced in the Toronto area in 1968 or 1969 as a substitute for two per cent, and if sales grow at roughly the same rate as has been demonstrated in Central Arizona (Phoenix) area, after three years the sales of filled milk may total 24 million quarts (nine per cent of 1972 fluid milk sales).

However, the sale of filled milk would occur at the expense of fluid milk sales. Deducting the 24 million quarts from the estimated total fluid milk market would result in fluid sales totalling about 245 million quarts in 1972. Nine per cent of this total revises the estimate of filled milk sales of 22 million quarts (See Table 7, Appendix D).

The growth in sales of filled milk is projected in Table 7. Comparing projected sales here with those in Table 6, where no filled milk sales are included in the market, shows the impact of the new imitation milk product on the various kinds of fluid milk. Price effects are important considerations for this comparison. It is anticipated that filled milk priced at about four cents per quart below regular milk will attract consumers accustomed to buying skim milk for economy reasons, as well as regular users of two per cent.

It is expected, too, that two per cent sales will not suffer as severely from the direct competition from filled milk as might be anticipated, since some trade-off between standard milk buyers and two per cent will take place as a result of the new lower priced filled two per cent entering the market. As a result, the new product cuts into the sale of standard and skim milk (see Table 7), creating a more rapid decline in their sale while slowing down the growth of two per cent sales. The sale of total fluid milk is reduced from an average annual rate of three to four per cent to an annual rate of one to two per cent as a result of the introduction of filled milk. In 1972, for example, the gain in fluid milk sales in Toronto may be only fractional when there is competition from filled milk. Without this competition, sales of fluid milk are forecast to increase by about 4.0 per cent in 1972.

Impact on Farm Sales

The commercial sale of 22 million quarts of filled milk in Toronto in 1972 would displace the equivalent of about 37 million pounds of whole milk (3.5 per cent). At 1967 prices, this would be valued at about two million dollars. Referring back to the section on coffee whiteners, the total amount of milk displaced in 1967 in the Toronto area by imitation creams was estimated at about 42 million pounds or

$2.3 million. Assuming growth in sales of imitation creams, by 1972 this amount may total over 50 million pounds. Total milk displaced by filled milk manufactured from skim milk powder would reduce farm sales by fluid milk shippers supplying the Toronto area in 1972 to about 90 million pounds of whole milk equivalent, or in the neighbourhood of $5.5 million.

Summary

The increasing cost of butterfat and the availability of lower cost vegetable oils have stimulated the production of imitation dairy products at retail prices low enough to attract budget-minded consumers. Margarine provides an excellent example of a substitute for a popular dairy product which has been able to capture a large proportion of the market formerly held by butter, in spite of restraints and hindrances imposed upon the product which prevented firms from entering the market with as complete a substitute for butter as was technically feasible and at as low a price as was possible at the time.

The increasing cost of butterfat and the availability of a greater variety of edible oil substitutes have now made it feasible to duplicate any dairy product. Those products with high butterfat content have become the most lucrative fields for exploitation. The powder coffee whiteners and imitation cereal

creams have demonstrated remarkable success in penetrating this market, especially the urban market. Consumers have shown no aversion to buying completely synthetic dairy products, in fact, welcome their introduction because of the savings they offer at a time when inflationary pressures appear to support consumer bias that food prices are rising continuously.

Imitation butter and cream are steps that have a tendency to lead to the eventual introduction of imitation milk or filled milk. This stage presents a greater degree of risk for the enterprise considering its introduction. The low percentage of butterfat in milk makes it more difficult to market substitute milk at prices which would be as much below fluid milk as margarine has been priced below butter. Taste problems with imitations make filled milks more desirable products to compete with fluid milk but legal restrictions preventing their introduction would have to be overcome. One way this has occurred in the past is by testing the provincial regulations by marketing a substitute product.

Assuming a filled milk is introduced, it is expected that within three years it will capture a fairly significant share of the fluid milk market. The amount sold is based on historical trends in Central Arizona, where statistics of filled milk marketings have been tabulated since

October, 1966. The Toronto area was considered to be the most likely market for the introduction of a substitute milk product.

The impact of filled milk on a market similar to Toronto would not be expected to be significant until the fourth or fifth year when sales would be expected to make up ten per cent or more of fluid milk sales. It is difficult to predict how sales will go after the initial period of market penetration ends. The price and quality of the filled milk, the response of consumers to promotion, all will be important factors in the determination of later sales growth. It does not appear, however, that shipments of whole milk from dairy farms will be seriously affected. Growth in the fluid milk market is expected to continue but at reduced rates for fluid milk producers if fluid skim milk is utilized in the manufacture of filled milks. However, if skim milk powder is used, this would provide a new market for manufacturing milk shippers.

The major problem facing potential producers and consumers of lower cost substitute milk at the present time is the provincial regulations preventing filled milk production. If pressure groups make it difficult to revise these regulations, it is probable that imitation products will eventually be developed which may cost less than filled milks and which may be nutritionally equal to or superior to

and taste exactly like natural milk. Once consumers accept and demand the new product, it will be extremely difficult to prevent a potentially rapid erosion of milk sales. The loss of skim milk sales will have unfortunate repercussions on a dairy industry already burdened with large surpluses of skim milk power.

Consumers today expect and look forward to new products. The examples of margarine and coffee whiteners indicate they will readily accept a good substitute dairy product when it is marketed. The question arises whether the dairy industry is willing to share in the tremendous market potential of this new product by pressing for revision of current restrictive legislation, or let other more forward thinking firms capture the initiative and relegate the dairy industry to the production of high-cost products serving a slowly growing market which may eventually stabilize or decline. Some members of the dairy industry will likely take up the challenge and respond with a product which will meet the needs of consumers and stimulate new growth and vitality to all levels of the industry.

COMPARISON OF THE DAIRY AND EDIBLE OILSEED INDUSTRIES

Industry Comparisons

In 1965 the dairy products and process cheese industries shipped products valued at $990 million and $71.5 million respectively, for a total of $1.1 billion. In contrast, shipments of edible vegetable oilseed products from vegetable oil mills amounted to about $81.5 million. 1/

The dairy industry, including process cheese, employed 33,475 persons compared with 622 employed by vegetable oil mills in 1965, a ratio of about 54 to 1. There was a large number of relatively small butter and cheese plants in 1965 shipping small quantities of product in contrast to the larger average size of the vegetable oil mills. However, process cheese plants were larger in size on the average than the oil mills, shipping about $8.9 million per plant compared with $7.9 million for the vegetable oil mills and having an average of 112 production workers in each establishment compared with 36 for the vegetable oil mills, (See Table 1, Appendix E).

1/ This amount excludes $8.6 million of linseed oils, $4.8 million of linseed oilcake and soap, but includes other oilseed products including soybean and rapeseed oilcake. See D.B.S., Census of Manufactures, Cat. No. 32-223.

According to data obtained from the D.B.S. Census of Manufactures, the oilseed crushing industry compares favourably with the dairy industry, paying better than average wages and salaries and having an average value added per employee which is exceeded only by the process cheese industry. Vegetable oil mills and condenseries appear to be the sectors that are more capital intensive than the remaining dairy industry sectors. Labour input in condenseries comprised only 27 per cent of value added, compared with 28 per cent in vegetable oil mills. Considerably above the average of the six industry sectors being compared, was the fluid milk industry (pasteurizing plants), which indicated that over 50 per cent of its value added was made up of salaries and wages. Raw material cost makes up a very large proportion of total dollar shipments in the crushing of oilseeds compared with the processing of dairy products, according to the D.B.S. data. Ice cream plants show the lowest ratio of raw material costs to shipments. This may indicate lower margins for oilseed crushers and more competitive pricing for products shipped. Butter and cheese plants show a high ratio of raw material costs to shipments and also pay the lowest salaries and wages of the industries being compared, (Table 2, Appendix E).

A significant factor influencing the butter and cheese industry is the presence of federal government price support policies. Pegged prices for butter and fairly inflexible prices to producers of manufacturing milk, of which the federal government pays a significant share through subsidy, provide little flexibility in varying the cost of raw milk.

In spite of the small size of the edible oilseeds industry in comparison with the dairy industry, it has shown a greater than average growth rate in recent years. In the five year period 1961 to 1965, shipments from dairy factories and process cheese plants showed an average increase of 4.4 per cent while edible oilseed products shipped by vegetable oil mills showed an average percentage increase of 12.5 per cent in the same period. 2/ The average growth rate for the total food and beverage group amounted to 6.3 per cent per year.

2/ The average percentage increase in shipments by process cheese manufacturers was 11.2% from 1961 to 1965, revealing a growth rate only slightly lower than for edible oil products.

Oilseed Crushers and Oil Processors

There are eight oilseed plants in Canada which crush edible oilseeds such as soybeans, rapeseed, and sunflower seed, and two which manufacture corn oil. These plants are distributed regionally as follows:

Location	Plants	Type of Seed Crushed
Ontario	5	Soybeans, corn
Manitoba	1	Rapeseed, sunflower & soybeans
Saskatchewan	2	Rapeseed
Alberta	1	Rapeseed & sunflower
Quebec	1	Rapeseed

The four Western crushers have small capacities not exceeding 240 tons of oilseeds per day, while the Ontario crushers have larger capacities, one of which amounts to about 1,200 tons per day. Some of these plants have facilities for the processing of crude oil but the major processors of vegetable oils are not reported in the vegetable oil mill industry. 3/ For example, shipments of refined vegetable oils amounting to about $11.8 million are reported by the slaughtering and meat processing industry. An additional

3/ Western Canada Seed Processors is a crusher with complete refining facilities while Co-Op Vegetable Oils and Saskatchewan Wheat Pool have partial facilities for processing oil.

$27.1 million of processed oils is reported by other food industries. 4/ Taking into account the firms that report shipments of vegetable oilseed products in these other industries, the value of shipments for crude and refined vegetable oils, soybean and rapeseed oil cake and lecithin amounted to $109.8 million in 1965. (Table 3, Appendix E). 5/

Products made from Vegetable Oils

In comparing the dairy industry with the vegetable oils industry, the value of shipments from process cheese manufacturers, representing a further stage in the processing of cheese, was included. To provide additional perspective on the importance of vegetable oils in the manufacture of finished products, the value of margarine and shortening

4/ Meat Packers with complete oil refining facilities include Canada Packers and Swifts. Burns and Schneiders have partial refineries. Other refiners of vegetable oils include Procter & Gamble, Lever, Monarch Fine Foods, Canada Starch and St. Lawrence Starch.

5/ Some double counting is unavoidable when the value of products such as crude vegetable oils and refined oils shipped by different industries, as in Table 2, are totalled. However, this limitation occurs in almost every instance when totalling shipment values in the Census of Manufactures. The total for each major grouping, e.g., Food and Beverages, contains this limitation. It does not invalidate the data for measures of total output although adjustments must be made when used for national accounts purposes.

containing vegetable fats was estimated from D.B.S. sources.

In 1965, shipments of vegetable shortening totalled $25.4 million and other shortening $23.3 million. 6/ In 1965, 57 per cent (by weight) of the oils used in the production of shortening was of vegetable origin. 7/ An arbitrary apportionment of the value of vegetable shortening using this factor would indicate that vegetable shortening produced in 1965 was valued at about $38.7 million in total.

In the same manner, the value of margarine produced from vegetable oil can be estimated. The total value of margarine shipped in 1965 amounted to $40.8 million, of which $29.4 million is estimated to be of vegetable origin. 8/

Salad dressing and mayonnaise are additional products which depend upon vegetable oil as a major ingredient. In 1965 shipments of these products were valued at $18.3 million. Since only vegetable oils are used in these products, they are included as vegetable oil products, (Table 3, Appendix E).

6/ "Other Shortening" means shortening containing some animal fat or marine oils.

7/ See, for example, D.B.S. Oils and Fats, December 1965, Table 2, Consumption of Oils and Fats in Margarine and Shortening.

8/ In 1965, 72 per cent of the 135.9 million pounds of margarine produced was made from vegetable oils, 22 per cent from marine and fish oils, and five per cent from animal oils. (D.B.S. Oils and Fats, Dec., 1965).

Shipments of Dairy Products and Vegetable Oilseed Products Compared

The value of shipments of dairy products can be obtained from two comprehensive D.B.S. bulletins in the Census of Manufactures. The total value of dairy product shipments amounting to $1.1 billion is made of butter and cheese plants ($363 million), pasteurizing plants ($511 million), condenseries ($76 million), ice cream manufacturers ($39 million) and $71.5 million for process cheese manufacturers.

The value of shipments of vegetable oilseed products, however, had to be obtained by examining several industries. In Table 3, Appendix E, the values of the major products are compared. The total shipments of products containing vegetable oils as the major ingredient are subsequently estimated to value $197 million. This indicates that the value of factory shipments of vegetable oilseed products represents approximately 18 per cent of the value of shipments from the dairy and process cheese industry. 9/

9/ Some double counting of shipments occurs for both industries but this does not affect the relative significance of the comparisons made. For example, in 1965, the process cheese industry purchased $17.7 million of cheddar cheese and $3.7 million of other cheese and dairy products, much of which may have been reported as shipments in the Dairy Factories Bulletin.

Dairy Products and Vegetable Oilseed Products Used as Inputs in Food Production

In 1965, food processors and feed mills purchased $156 million worth of dairy products including $56 million of butter, $52 million of milk and cream, $21 million of cheese and $13 million of milk powder (Table 4, Appendix E).

In the same year, oilseed products purchased by food processors, including feed mills, were valued at $98 million, which was 63 per cent of the value of dairy products purchased. Vegetable oil costing $52 million was the major vegetable oilseed product purchased (Table 5, Appendix E).

The purchase of these products by industry sector reveals the significance of the two types of products for food manufacture. If one excludes the purchase of dairy products by dairy factories and process cheese manufacturers, the value of dairy products used in other food industries amounts to $20.1 million compared with $59.8 million worth of vegetable oilseed products. 10/ The confectionery industry and bakeries are the largest users of dairy products, with condensed and evaporated milk and milk powder being the most important dairy products used by these industries. (Table 6, Appendix E). The meat packing industry along with feed mills and miscellaneous food processors are the largest users of oilseed products. The importance of various types

10/ excluding purchase of oilseed and dairy products by feed mills.

of vegetable oils to the meat packers is due to the manufacture of margarine and vegetable shortenings.

Two large firms which produce refined oils and manufacture margarine are not reported by the D.B.S. in the food industry group but are classified to the soap and cleaning compound industry. The amount of vegetable oils which these firms purchased for use in the production of edible products was estimated at about $16 million in 1965. This would raise the value of edible oilseed products purchased for use in food products from $59.8 million to $75.8 million compared with $152.4 million worth of dairy products used for production of food products. See Table 6 in Appendix E and deduct value of product purchased by feed mills.

Agricultural Comparisons

The most adequate method of comparing the contributions of dairy farming and of growing oilseeds to the agricultural sector is by measuring their respective impact upon farm income. Farm cash receipts from dairy farming in 1967 amounted to $629.4 million compared with receipts of $65.5 million for the sale of soybeans and rapeseed. 11/

11/ Rapeseed is grown commercially in the Prairie provinces while Ontario is the only province producing soybeans. Receipts from the sale of sunflower seed amounted to about $1.7 million.

In other words, farm cash receipts from the sale of oilseeds amount to about 10 per cent of the cash receipts from the sale of dairy products in Canada. While oilseed farming is relatively small compared with dairy farming, it is a rapidly growing agricultural industry. For example, in 1963, farm cash receipts amounted to only 4.9 per cent of cash sales for dairy products. Rapeseed production has provided the boost in cash sales for oilseeds. In 1965, for the first time, cash receipts from rapeseed exceeded receipts from soybeans, and in 1967 the were twice as large, (Table 7, Appendix E).

A comparison of the farm sales of oilseeds and of dairy products provincially reveals the importance of rapeseed in the agricultural economies of the prairie provinces, and particularly of Saskatchewan. In 1967, for example, cash receipts from the sale of rapeseed in Saskatchewan amounted to $18.7 million, almost as large as the $19 million received by dairy farmers. In Alberta and Manitoba the importance of oilseeds to the farm economy is growing, with prospects that in the near future cash income from oilseed production will outstrip the income earned from the sale of dairy products in these two provinces as well, (Table 8, Appendix E).

Farm Structure

According to the Census of Agriculture, there were 221,850 farms reporting milk cows in Canada in 1966. Of this amount, 113,885 or slightly more than one half were in Ontario and Quebec. In contrast, there were 21,706 farms growing rapeseed and 7,652 farms growing soybeans for a total of 29,358 farms. 12/

The size of the average dairy herd is very small. Nearly half, or 46.5 per cent of the dairy farms, maintained seven cows or less in 1966 and just over three quarters, or 76.1 per cent, kept 17 cows or less. Larger herds of over 33 milk cows have grown in numbers since 1956, rising from 1.3 per cent to 6.4 per cent of the total dairy farms but in general the average dairy herd is still very small.

The farms growing soybeans have increased to size of their crop substantially in the ten-year intercensal period 1956 to 1966. The number of soybean farmers declined by close to 1,500 but acreages in excess of 33 increased from 25 per cent to over 38 per cent of the total farms reporting, (Table 9, Appendix E).

Table 9 illustrates the growth in the number of farms reporting rapeseed in the five years between 1961 and 1966. 13/

12/ There were 84 farms reporting sunflower seed in 1966. Acreage amounted to 2,690 or 32 acres per farm.

13/ There was not a census of farms growing rapeseed as such in 1956. Only 352,000 acres were planted to rapeseed in 1956 compared with 1.5 million in 1966.

This provides a contrast with most farm enterprises which have shown declines in the number of farms participating. The average size of crop is also larger, with 12.5 per cent of the farms reporting over 128 acres in contrast to 7.1 per cent in 1961. In general, rapeseed is grown on farms along with other cereal crops so that acreages vary depending on rotation practices and the price of other cereals compared with rapeseed. Soybean farmers may also have other cash crops in addition to soybeans, and dairy farms in general still carry on other forms of agricultural production in addition to dairying. Although there is a trend to greater specialization, farm production is still based on mixed farming of some form or other.

International Trade Comparisons

In 1967 exports of oilseed and oilseed products amounted to $71.2 million while exports of dairy products amounted to $33.8 million. In the same year, imports of oilseed and oilseed products totalled $96.7 million, while imports of dairy products totalled $14.6 million.

Vegetable Oilseed Products

The export of oilseeds in 1967, of which 82.7 per cent by value comprised rapeseed, was sufficient to offset oilseed imports by just under one million dollars. All but

a small amount of the oilseeds imported into Canada were soybeans. However, in the five-year period 1963-1967, average imports of oilseeds more than offset the average value of Canadian exports. The five-year trade deficit thus amounted to $12.3 million, (see Tables 10 and 11, Appendix E).

The importation of oilseed products, particularly vegetable oils, has been twice the value of our exports in the past five years. While about four million dollars worth of soybean oil is exported, mainly to the United Kingdom, the bulk of our exports of oilseed products is made up of oilcake and meal, also to the United Kingdom market. These meal exports are almost balanced by imports of oilcake and meal from the United States. However, imports of vegetable oils, such as coconut oil, peanut oil, sunflower oil, and other vegetable oils, result in a substantial trade deficit in these products. This deficit averaged $23.5 million in the five-year period 1963 to 1967, (Table 11, Appendix E).

Dairy Products

In contrast to oilseed products, the export of dairy products has been considerably larger than imports. In 1967, exports amounted to $33.8 million and imports $14.6 million. The bulk of the exports comprised skim milk powder and cheddar cheese, valued at $15.5 million and $10.4 million respectively

in 1967. The importation of dairy products consists mainly of specialty cheeses such as Camembert, Gouda, Provolone and Gruyere process. These cheeses were valued at $9.8 million in 1967.

The trade balance for dairy products has been in Canada's favour for several years. In the 1963-1967 five-year period exports have earned an average exchange surplus totalling $28.7 million with exports exceeding imports at a ratio of about three to one. However, two important factors have contributed to this situation. Firstly, Canadian import controls are levied on butter and cheddar cheese which virtually prohibit imports of these products. Secondly, exports of skim milk powder and cheddar cheese are possible because of substantial government assistance. Large amounts of skim milk powder are purchased by government for shipment abroad as food aid. Commercial sales of powder on the international market would not be possible at the current market price on the domestic market (a support price), since world prices are much lower.

Like most other major dairy producing countries in the world, Canada experiences surpluses because of high protective barriers, coupled with government sponsored export assistance. The trade in oilseed and oilseed products, however, is extremely competitive, with tariff barriers being

relatively low or non-existent. In this situation, the trade deficit in oilseed products is understandable, especially as rapeseed and a limited quantity of soybeans are Canada's only significant indigenous source for vegetable oils.

Available Supplies of Edible Oils

Edible oils and fats, whether from vegetable, animal, or marine sources, are used in the production of many varied products. Butter, cheese, margarine, cooking oils, shortening, salad dressing, mayonnaise, and salad oils are some product examples. Dairy products containing butterfat, in addition to the major ones listed above, include fluid milk and cream, ice cream, evaporated and condensed milk and processed cheese. The butterfat in these products is there as a matter of course, due to the nature of the product. However, butterfat in recent years has become a relatively expensive source of fat, and one that can now be replaced in dairy products by other fats or oils which are considerably less costly. Margarine is an example of a product similar to butter made from vegetable or marine oils instead of butterfat. New substitutes for other dairy products replacing the butterfat content by less expensive oils are being developed and marketed. Imitation half and half cream and powdered coffee whiteners are examples.

The total supply of oils and fats from all sources in 1967 amounted to about 985 million pounds, excluding the fat in all dairy products except butter itself. This total was divided almost evenly between animal and marine oils, (496 million pounds), and vegetable oils (489 million pounds).

The largest single source of oil continues to be butter. In oil equivalent, butter made up 26 per cent of the total supply of all oils, (Tables 12 and 13, Appendix E). The second major source is soybean oil (24 per cent) of which about 30 per cent is made from Canadian grown soybeans. The other major sources of oil in Canada are: imported vegetable oils (21.4 per cent), rendered lard (11.1 per cent), and rapeseed oil (10.2 per cent).

In terms of self-sufficiency, about 66½ per cent of the total supply of oil and fat available in 1967 was of domestic origin, of which 49 per cent was animal or marine oil and 17½ per cent vegetable oil. However, the potential for domestic vegetable oils is far from being fully exploited. Less than one-quarter of the oil-yielding potential of rapeseed product in Canada is utilized. The remainder is exported abroad in the form of seed. It is expected that a larger share of rapeseed production will be used for crushing purposes and the need to import as large a volume of vegetable oils will decline accordingly.

SALES TAX APPLICATION TO SUBSTITUTE DAIRY PRODUCTS

All products sold in Canada are subject to a Federal Consumption or Sales Tax* except for those products which are specifically exempted under the Excise Tax Act. Many food products, including all dairy products, have been exempted from sales tax whereas the tax is levied on many edible oil products.

Sales taxes are not only an important source of government revenue but are also a method of attempting to equalize economic differences. This latter principle is a traditional method used by governments to equalize economic disparity and is one of the principles employed when assessing income taxes or import duties.

Imitation dairy products, such as margarine, coffee whiteners, and whipped toppings sold in Canada are not exempt from federal sales tax. These products all contain a high percentage of vegetable or edible oils and minimal amounts of dairy products. Due to their high percentage content of edible oils, these products have a considerable price advantage over the dairy product they are designed to replace. As new substitute dairy products are introduced to the Canadian

* Federal Sales Tax is made up of a nine per cent sales tax plus a three per cent Old Age Security Tax, making a combined tax of twelve per cent.

market, rulings will have to be obtained from the Department of National Revenue as to the application of sales tax on each product.

However, some of the filled dairy products may be considered as modified dairy products and hence be exempt from sales tax. Filled milk, for example, contains 8.6 per cent milk solids-not-fat and only 2 per cent vegetable oil, and for sales tax purposes may be considered to be a dairy drink and hence sales tax exempt as is the case with chocolate dairy drinks.

The application of sales tax to filled milk and low-fat filled dairy products will price these products at about the same price and, in some cases, a higher price than the natural dairy product. (See Tables 1 & 2, pages 30 & 33, Cost Comparison of Dairy Products with Filled and Imitation Products.) Levying a sales tax on these products would appear to be contrary to the original intent for assessing a sales tax on edible oil products. The reason for not exempting edible oil products from sales tax was to reduce the difference between the selling price of the substitute and the natural dairy product - not to increase the price to be equal to or higher than the price of the original product.

In view of the new product developments in substitute dairy products, the application of sales tax to these products

could well merit review. If the policy of levying a sales tax on edible oil products is to be continued, then the policy might be modified to exempt certain filled dairy products, particularly those containing relatively small percentages of edible oils.

GOVERNMENT LEGISLATION PERTAINING TO SUBSTITUTE DAIRY PRODUCTS

Various levels of government in Canada have legislation pertaining to the composition and cleanliness of milk products and the sanitary conditions under which they are produced.

The Government of Canada administers a Dairy Products Act through the Department of Agriculture. Food regulations pertaining to dairy products are administered by the Food and Drug Directorate under the Department of National Health and Welfare. Each provincial government, with the exception of Newfoundland, has dairy legislation under their Departments of Agriculture and some of them have public health regulations pertaining to composition and sanitation of milk products. Many municipalities and regional areas have health and sanitary regulations.

Dairy legislation pertaining to composition, administered by Departments of Agriculture, appear to be aimed at maintaining the "status quo". Milk in its natural form is the near-perfect food and, as such, nothing is to be added and nothing taken away. These Acts were inacted primarily to protect the public from fraudulent practices, to prevent adulteration and ensure adequate supplies of pure and wholesome milk products. They also form the basis for orderly marketing

conditions from the farmer to the consumer, for maintaining minimum prices to dairy farmers and, as well, provide a degree of protection for the farmer in the marketing of dairy products.

The main legislation of the Public Health departments is designed to assure the public of clean, wholesome products produced under sanitary conditions.

The Federal Food and Drug legislation is concerned mainly with the nutritional and sanitary aspects of food products. The legislation provides that food products are safe and fit for human consumption, free from disease-carrying organisms and toxic effects. It is also designed to protect the public from fraudulent claims or misleading labelling.

It is clearly perceptible that there is an overlapping of legislation. There is no distinct line between the responsibilities of the different levels of government, yet there appears to be no discord. In cases where duplication exists, each governing body recognizes the other's general area of jurisdiction.

Federal Department of Agriculture

The Canada Dairy Products Act, 1952, regulates the grading and composition of dairy products for interprovincial and international trade. No provision is made for synthetic dairy products. Schedule A of the regulations prohibits the use of any fat or oil other than that of milk in dairy

products. The object of this is to protect dairy products from adulteration but in essence would appear to prohibit the movement of filled dairy products interprovincially or internationally.

Standards of composition are prescribed for creamery, dairy, whey and renovated butter; cheese, ice cream, sherbet; condensed, evaporated, and dry whole milk; evaporated and dry skimmed milk; malted milk; dry buttermilk and sterilized milk and cream.

Federal Food and Drug Legislation

The Food and Drug Act and Regulations apply to food sold in Canada and are designed for the prevention of health hazards in fraud. It is an offence to advertise, label or package a food in a manner that is false, misleading or deceptive or that is likely to create an erroneous impression about food. Standards of composition or identity are set up for a number of foods and classes of foods. It is an offence to sell a food in such a way that it can be mistaken for a standardized food unless it does meet the standard in question. Requirements are laid down in the regulations for the labelling of all foods.

Standards of composition for dairy products are prescribed in the following regulations: The Canada Gazette, Part II, Volume 98, Sections B08.003 to B08.077 inclusive.

There is no reference to imitation or filled dairy products. Milk is defined as "the normal lacteal secretion, free from colostrum, obtained from the mammary gland of the cow", but no standards of composition are in the regulations.

The Food and Drug Directorate considers sodium caseinate to be a derivative of milk and consequently a product containing sodium caseinate cannot be labelled a "non-dairy product", or carry such wording as "does not contain a dairy product."

On March 19, 1968, the Federal Food and Drug Directorate issued a trade information letter pertaining to "substitutes for milk", for the guidance of food manufacturers. The letter stated that: "Unless a food used as a replacement or substitute for milk supplies equivalent amounts of these nutrients, serious nutritional deficiencies may be encountered."

Manufacturers were, therefore, cautioned that any product represented or sold as a replacement or substitute for milk must not be nutritionally inferior to milk. The above letter also indicated that they propose to formulate regulations pertaining to these products but, in the meantime, officers of the Directorate are prepared to discuss with manufacturers any plans which they may have for the development of such products.

An Order-in-Council, passed by Cabinet on March 25, 1965, amended Section B08.015 to permit the addition of (a) Vitamin D to whole milk, Vitamins A & D to skim and partly skimmed milk, and (b) Vitamin A to evaporated and skim milk powder, (c) of an anti-foaming agent to skim milk powder, and (d) of 3,000 ppm of sorbic acid to cheese.

These amendments were made on the recommendation of the National Dairy Council and reference is made to them to indicate that the Food and Drug Directorate is prepared to make amendments when such are considered warranted.

Provincial Health Acts

The Provincial Health Acts have regulations for dairy products and in most cases they are concerned only with the sanitation of the buildings and equipment used for processing milk.

Ontario, Quebec, New Brunswick, and Nova Scotia have the following regulation pertaining to the handling of products other than milk in dairy plants:

> "No products other than milk products and products of which milk is a substantial component shall be handled or processed in a pasteurization plant unless equipment entirely separate from the equipment used in pasteurization is used and the handling or processing is carried on in a separate room."

Provincial Department of Agriculture Acts

All of the provinces have the same composition standards as The Canada Dairy Products Act, 1952, for all dairy products except those classified as fluid milk products. Each province has its own regulations for these products, some under the Department of Agriculture and others under the Department of Public Health.

Milk is a natural product and although there are wide variations in its composition, they are all within a narrow range. There is a close correlation between fats and proteins in milk: a milk with a high fat content is also high in protein. It was comparatively easy to make composition standards for milk and milk products because of this correlation between fat and protein, and a comparatively quick and simple test was developed for testing for fat. Recently quick and accurate tests using Infra-Red rays have been developed for determining the amount of both fat and protein in milk. Standards for fat composition and solids-not-fat are set for milk and any other changes are classified as adulteration and prohibited in most of the provinces. Some provinces permit the addition of reconstituted milk to fluid milk products.

Tables I and II below are examples of the variations in butterfat standards for these products.

Table I

Provincial Milk Standards

Province	Name of Act	Minimum Fat Content %	S.N.F. %
British Columbia	Milk Industry	No figure must mark on label	8.5%
Alberta	Public Health	3.25	8
Saskatchewan	" "	3.25	8
Manitoba	Dairy Act, Part 1	3.25	8.5
Ontario	" " O.Reg. 107/67	3.25	8
Quebec	" " Ch.121, Sec.3	3.25	8
New Brunswick	Dairy Products Commission	3.25	8
Nova Scotia	Public Health	3.00	12% total solids
Prince Edward Island	" "	3.25	8

Table II

Provincial Fluid Dairy Product Butterfat Standards

	..... Minimum % Butterfat		
Province	Half & Half Cream	Table Cream	Whipping Cream
British Columbia	as stated on cap or container		
Alberta	10	18	32
Saskatchewan	10	18	32
Manitoba	10	18	must be shown on package
Ontario	10	16	32
Quebec	10	15 to 18	must be shown on package
New Brunswick	.8	16	30
Nova Scotia	10	18	30
Prince Edward Island	10	18	32

All of the provinces have the same minimum butterfat standards for "chocolate milk", and "chocolate drink", - 3% and 2% respectively. There are no minimum butterfat standards for salad or sour cream.

Each province, with the exception of Newfoundland, prohibits the manufacture and sale of "filled dairy products" by a wide variety of legislation. In addition, there are regulations prohibiting the mixing of margarine and butter for the purpose of sale.

Under present provincial legislation, only one province - Newfoundland - permits the manufacture and sale of all imitation dairy products. The other provinces issue permits or licences for the manufacture and sale of margarine, dessert toppings, and coffee whiteners. Some provinces have indicated that amendments in legislation were being made to permit the manufacture of a wider range of imitation dairy products.

The Ontario Regulation 107/66, as amended by O. Reg. 127/67, under The Milk Act, 1965, designates sodium caseinate as a "milk product". The Ontario Edible Oil Products Act prohibits the manufacture of edible oil products other than margarine in such manner that the resultant edible oil product is an imitation of or resembles a dairy product.

Although the Province of Quebec has an Act Respecting Substitutes for Dairy Products, as of July, 1968, permits have been issued only for the manufacture and sale of margarine. The Act also has a regulation prohibiting the use of terms or pictures which link the substitute product to the dairy industry.

The following table summarizes the provincial legislation on filled and imitation dairy products:

Table III

Province	Permits the Manufacture and Sale	
	Filled	Imitation
Newfoundland	Yes	Yes
Prince Edward Island	No	No
Nova Scotia	No	No
New Brunswick	No	No
Quebec	No	by permit only
Ontario	No	under licence
Manitoba	No	Yes
Saskatchewan	No	No
Alberta	No	No
British Columbia	No	under licence

STANDARDS FOR SUBSTITUTE DAIRY PRODUCTS

It is not desirable to retard the development of new products, but if separate standards of composition were permitted for substitute dairy products, it would lead to confusion in the mind of the consumer. The market could be flooded with a wide variety of inferior products and this would not be in the best interests of the consumer or the dairy industry.

Standards for filled and imition dairy products should be similar to those recognized for dairy products in order to promote honesty and fair dealing in the interests of the consumer, and to establish a basis to achieve orderly marketing for the industry.

Coffee Whiteners and Toppings (Whipping Cream substitutes), both in powder and liquid form, are on the market in all provinces in Canada. There are no standards for these products; no nutritional value is claimed on the label. The ingredients are of food grade and under the constant scrutiny of the Federal Food & Drug Directorate. These products are accepted by the consumer, and the provinces have amended their legislation to permit their sale. The ingredients in these products must be listed on the label.

Standards for composition for substitute dairy products marketed for their nutritional value should be established, recognizing their nutritional value before they are permitted on the market. For examples of these products;

refer to the chapter on Substitute Dairy Product Formulations (pages 92 to 96).

Composition Standards

The main purpose for prescribing standards of composition for substitute dairy products is to protect the public from being deceived by adulteration or fraud. In addition, standards form a basis for uniformity of product and orderly marketing. It is difficult to look at standards of composition without considering nutrition or food value, at least in some cases. If the product is to be used for its flavour and appearance, then food value is of secondary consideration. In other cases such as cheese, butter, milk, and perhaps ice cream, the consumer is paying for food value, thus in the composition of these products, the food value must be taken into consideration. It is very difficult, if not impossible, to ascertain the nutritional value of substitute products by reading the list of ingredients on the carton. If the public is to be protected by standards, it is important that the ingredients used in the composition have the proper nutritive value. Milk and other dairy foods provide significant amounts of nutrients to the North American diet. In 1967, dairy foods provided 76 per cent of the calcium, 44 per cent of the riboflavin, 23 per cent of the protein, 12 per

cent of the vitamin A, 10 per cent of the thiamine, and 12 per cent of the calories consumed on this continent.*

The simplest way for control along these lines is for the legislating body to request that the manufacturer establish the nutritive value of the product where it is essential before issuing a permit for its sale. At least one province in Canada is taking this position.

In order to establish standards of composition for substitute dairy products for the purpose of orderly marketing, it is necessary to recognize the composition of milk and milk products. Milk consists of many complex ingredients that vary with the age, period of lactation, and breed of cow; season of the year; amount and type of feed, and climatic conditions - far too numerous to elaborate on at this time. The main ingredients are fats, proteins, minerals, and vitamins. These four ingredients, therefore, should be given adequate consideration in the composition of substitute milk products.

Basic Ingredients of Substitute Dairy Products

a. Fats

All fats, regardless of the source, contain the same calories per gram. Recent research has demonstrated that only certain saturated fatty acids are believed to raise the blood cholesterol level. These same fatty acids appear in

*Source: M.F. Brink
Comparing Nutritional Values of Filled and Imitation Milk
American Dairy Review, April, 1968.

vegetable fats, including the so-called "polyunsaturates." The basic consideration in selecting vegetable oils is whether they contain the essential fatty acids that are present in milk fat.

It appears as if there should be a blending of fats to provide a balance between the saturates and polyunsaturates and to supply as many of the essential fatty acids as possible. In order to prevent fat oxidation in vegetable oils, small amounts of stabilizers are added. The types and amounts of these stabilizers are prescribed by Food and Drug regulations. The amount normally does not exceed 0.05 per cent of the weight of the finished food.

b. Protein

Milk contains 34 grams of protein per quart. There is no problem meeting the composition requirements for protein in filled milk since no milk protein has been removed. This is not the case in the manufacture of imitation milk. Unlike fats, all protein does not contain the same amount of available food value. Therefore, not only should there be comparable amounts of protein, but it must be of the right quality and contain the equivalent essential amino acids important for the building of body tissue. For example, soy protein is generally 80% as efficient as milk protein, so the composition of imitation milk would require 20% more soy protein. It is

reported that the protein quality of sodium caseinate is not comparable to that of milk, which contains globulin and albumin.

Milk protein is unique in that it influences the utilization of other proteins as well as its own. A good example is the use of milk on cereal, which improves the nutritional value of both proteins. In the manufacture of imitation dairy products, it may be advantageous to use a mixture of proteins from more than one source.

c. Minerals & Vitamins

Calcium, phosphorus, and sodium are the three main minerals in milk, and often the major source in the diet of the very young and very old. Calcium may easily be added to imitation milk but it is not always in a form readily absorbed into the body. This may be partially corrected by adding Vitamin D. Foods containing calcium and protein normally are good sources of phosphorus. Sodium is easily added to imitations, and its content should be evaluated in its relationship to the other nutrients in the product. Controlling the composition of vitamins in imitation milk should present no problem. In some areas natural milk is fortified with Vitamin D.

Sanitary Standards

It is assumed that when sanitary standards for plants and equipment used in the manufacture of substitute dairy products are established, they will be the same high standards as

required by the Public Health Act, Standard Milk Regulations.

Bacteria can grow in imitation milk products and if not controlled can produce substances with toxic effects much faster than in milk products. Some authorities are recommending temperatures higher than normal pasteurization temperatures for imitation dairy products because they contain no natural flora such as the acid-producing bacteria in cow's milk. The acid produced by these bacteria retards the growth of putrefying and toxin-producing bacteria. The products should be almost sterile.

Packaging and Labelling Standards

In order to facilitate orderly marketing, it would seem reasonable that similar weight standards as prescribed by the Canada Dairy Products Act should apply to filled or imitation dairy products. In the same manner, the container size prescribed by provincial departments of agriculture for fluid milk products should apply for their substitute products.

Labelling of all food products is under the jurisdiction of the Federal Food and Drug Directorate. In order to meet F & D regulations, products should be legibly and indelibly marked with a true and accurate description of the contents, including the name of the product. In cases where standards are established for composition, the name is a

sufficient description of the product. Milk and butter are examples of such products.

In cases where no standards are established, a list of ingredients must be legible on the outside of the package. The volume or weight of the product must be on the label as well as the name and address of the responsible party. Other legislating bodies mentioned previously may have additional regulations for such details as size of type in relation to the size of the package. Before new labels are used, manufacturers would be well advised to have them approved by the appropriate authorities.

NOMENCLATURE FOR SUBSTITUTE DAIRY PRODUCTS

Describing as "Filled" those dairy products in which the butterfat has been replaced with vegetable oil and as "Imitation" those dairy products in which both the butterfat and milk solids-not-fat have been replaced with non-dairy ingredients is not a universally accepted practice, even within the dairy industry. As an example of the different nomenclature given to filled milk, it is interesting to review the situation in the United States where these products are marketed. The regulations in the State of California provide that filled milk must be labelled "Imitation Milk"; in New York the same product must be labelled "Melloream", whereas in Arizona filled milk cannot be referred to as milk and the product must be sold under a trade name.

To avoid this type of confusion in Canada, it is desirable to standardize the names for substitute dairy products. For example, Margarine is the universally recognized name for a vegetable oil product replacement for butter. Mellorine is a name that is also universally recognized within the dairy industry as denoting a substitute ice cream in which only the butterfat has been replaced with vegetable oil. Butterine is another name that is becoming recognized as

denoting a product replacement for butter in which the fat composition is approximately half butterfat and half vegetable oil.

Since there has not been any universally accepted interpretation of the terms "Filled" and "Imitation", a name for filled milk such as "Veg-Fat Dairy Drink" may be more suitable since it indicates to consumers that the drink is manufactured by combining vegetable fat with dairy products.

In regard to nomenclature for imitation dairy products, it would appear to be in the best interest of consumers and the dairy industry to market these products under trade names and not allow any mention to be made on the label or in advertising that the product is an imitation of a dairy product.

However, adopting standard product names for filled dairy products will assist consumers in identifying these products and also assist manufacturers in marketing the products.

SUBSTITUTE DAIRY PRODUCT FORMULATIONS

The following is a list of typical formulations for substitute dairy products. However, since there are no standards for most of these products, there are numerous adaptations as to the type and quantity of ingredients that may be used in manufacturing these products.

1. Milk - 2% Fat

Ingredients	Filled Milk %	Imitation Milk %
Vegetable Fat	2.00	2.00
Milk Solids-not-Fat	8.60	-
Caseinate	-	3.00
Corn Syrup Solids 24 D.E.	-	5.00
Stabilizer	0.05	0.05
Emulsifier	0.10	0.10
Water	89.25	89.85
Total	100.00	100.00

2. Coffee Cream Coffee Whiteners

Ingredients	Filled %	Imitation %
Vegetable Fat	10.00	10.00
Milk Solids-not-Fat	10.50	-
Caseinate	-	2.25
Corn Syrup Solids 42. D.E.	-	8.30
Stabilizer & Emulsifier	0.75	0.75
Water	78.75	78.70
Total	100.00	100.00

3. Coffee Whitener - Powdered

These are non-dairy products. They are prepared by dissolving the ingredients in water at a solids concentration of about sixty percent and then spraydrying the concentrate.

Ingredients	Per Cent Dry Basis %
Vegetable Fat	36.0
Corn Syrup Solids	56.0
Sodium Caseinate	5.0
Dipotassium Phosphate	1.5
Emulsifier	0.5
Moisture less than	1.0

4. Whipping Cream - Whipped Topping

Ingredients	Filled %	Imitation %
Vegetable Fat	30.00	30.00
Milk Solids-Not-Fat	6.00	-
Caseinate	-	3.00
Cane Sugar	3.00	6.00
Corn Syrup Solids 42 D.E.	1.00	2.00
Stabilizer Emulsifier	1.20	1.20
Water	58.80	57.80
Total	100.00	100.00

5. Sour Cream

Ingredients	Filled %	Imitation %
Vegetable Fat	18.0	18.0
Milk Solids-Not-Fat	10.0	-
Caseinate	-	4.0
Corn Syrup Solids	-	5.0
Stabilizer Emulsifier	0.5	0.5
Water	71.5	72.5
Total	100.0	100.0

6. Ice Cream - Mellorine

Ingredients	Filled %	Imitation %
Vegetable Fat	10.0	10.0
Milk Solids-Not-Fat	12.0	-
Caseinate	-	5.0
Cane Sugar	12.0	12.0
Corn Syrup Solids	5.0	8.0
Stabilizer - Emulsifier	0.5	0.5
Water	60.5	64.5
Total	100.0	100.0

7. Margarine

Ingredients	Percentage %
Vegetable Oil*	80.0
Water	16.0
Milk Solids-Not-Fat	1.4
Salt	2.5
Lecithin	0.1
Vitamin A	16,000 I.U. per lb.
Vitamin D	3,000 I.U. per lb.
Preservative	
Artificial Flavour	
Colourer	

*Canadian margarine production in 1967 utilized the following fats and oils:

Vegetable oils	75%
Marine oils	23%
Animal fats	2%

8. Butterine

Ingredients	Percentage %
Butterfat	41.0
Vegetable Fat	39.0
Water	16.0
Milk Solids	1.4
Salt	2.5
Emulsifier - Stabilizer	0.1
Total	100.0

9. Cream Cheese

Substitute low fat (20 percent) filled cream cheese formulations utilizing either skim milk or milk solids-not-fat.

Ingredients	Percentage	
	%	%
Vegetable Fat	20.0	20.0
Milk Solids-not-Fat		6.5
Water		64.0
Skim Milk	70.5	
Stabilizer	4.0	4.0
Emulsifier	5.0	5.0
Salt	0.5	0.5
Total	100.0	100.0

10. Infant Feeding Formula

(a) Filled Infant Feeding Product

Ingredients

Skim Milk	Calcium Chloride
Demineralized Whey	Ascorbic Acid
Oleo Oils	Sodium Bicarbonate
Lactose	Calcium Citrate
Coconut Oil	Potassium Bicarbonate
Soyabean Oil	Potassium Chloride
Corn Oil	Calcium Carrageenin
Lecithin	Vitamins

Approximate Analysis	Per Cent %
Fat	3.6
Carbohydrate	7.2
Protein (60% Lactalbumin (Whey Protein)). (40% Casein)	1.5
Water	87.4
Total	100.0

(b) Imitation Infant Feeding Product

Ingredients

Soybean Solids	Disodium Phosphate
Soybean Oil	Soybean Lecithin
Sucrose	Salt
Dextrins-Maltose-Dextrose	Calcium Citrate
Calcium Carbonate	Ferrous Sulphate
Vitamins	

Approximate Analysis:	Per Cent %
Fat	4.00
Carbohydrate	5.85
Protein	2.05
Minerals	0.30
Water	87.80
Total	100.0

SUBSTITUTE DAIRY PRODUCTS ON THE CANADIAN MARKET

This list includes substitute dairy products, excluding margarine. The list may not include all products marketed in Canada.

1. Coffee Whiteners

(a) Powdered Coffee Whiteners

	Brand	Company
1.	Coffee-Mate	Carnation Co. Ltd., Toronto,Ont.
2.	Cremelle	Borden Co. Ltd., Toronto, Ont.
3.	Instant Please	Pet Milk Canada Ltd., Toronto,Ont.
4.	Coffee Charm	Kraft Foods Ltd., Montreal, P.Q.
5.	Instant N-Rich	Sanna Inc., Madison, Wisconsin,U.S.A.

(b) Liquid or Frozen Coffee Whitener

1.	Coffee-Rich	Rich Products Ltd., Fort Erie, Ont.

2. Toppings

(a) Powdered Toppings

1.	Dream Whip	General Foods Ltd., Toronto,Ont.
2.	Quick Whip	Monarch Fine Foods Ltd.,Toronto,Ont.
3.	Lucky Whip	Lever Bros. Ltd., Toronto,Ont.

(b) Aerosol Toppings

1.	Monarch Whip	Monarch Fine Foods Ltd.,Toronto,Ont.

(c) Frozen Ready-to-Serve Whipped Toppings

1.	Spoon n' Serve	Rich Products Ltd., Fort Erie,Ont.
2.	Snow Whip	Good Humor Products Ltd.,Toronto,Ont.
3.	Cool Whip	General Foods Ltd., Toronto,Ont.

(d) Frozen Toppings (not whipped)

1.	Rich Whip Topping	Rich Products Ltd.,Fort Erie,Ont.

(e) Institutional Topping Products

1.	Sta-Lite	Canada Packers Ltd.,Toronto,Ont.
2.	Sta-Kreme	Stafford Foods Ltd.,Toronto,Ont.
3.	Nutrifill	Nutriproducts Ltd.,Whitby,Ont.
4.	Sundi Whip (Aerosol)	Rich Products Ltd.,Fort Erie,Ont.

3. Frozen Desserts (Imitation Ice Cream)

1.	Fre-Zert	Good Humor Products Ltd.,Toronto,Ont.

4. Infant Feeding Products

(a) Liquid Infant Products

1.	Similac	Cow & Gate(Canada) Ltd.,Brockville,Ont.
2.	S.M.A. 26	John Wyeth Canada Ltd., Windsor,Ont.
3.	Enfalac	Mead Johnson Canada Ltd.,Belleville,Ont.
4.	Sobee	" " " " " "
5.	Pro Sobee	" " " " " "
6.	Mull-Soy	The Borden Co. Ltd., Toronto, Ont.
7.	Neo-Mull-Soy	" " " " "
8.	Soyalac	Loma Lina Foods Ltd., Oshawa, Ont.

(b) Powdered Infant Products

1.	Enfalac	Mead Johnson Canada Ltd.,Belleville,Ont.
2.	Sobee	" " " " " "
3.	Olac	" " " " " "

APPENDIX A

Table 1 FARMS SELLING MILK BY PROVINCE AND TYPE OF SHIPMENT

(Appendix A)

Province	Dairy Year 1966-1967*			1966	
	Manufacturing Milk	Farm Separated Cream	Combined**	Fluid Milk	Total
P.E.I.	1,008	3,043	3,868	121	3,989
N.S.	201	2,350	2,503	1,249	3,752
N.B.	429	2,847	3,214	475	3,689
Que.	41,761	16,572	53,342	6,043	59,385
Ont.	22,306	15,455	36,515	8,214	44,729
Man.	716	15,803	16,333	728	17,061
Sask.	13	23,453	23,459	485	23,944
Alta.	1,950	23,391	24,940	847	25,787
B.C.	294	614	887	2,124	3,011
Canada	68,577	103,527	165,061	20,286	185,347

* April 1 to March 31

** Combined adjusted for split manufacturing milk and farm separated cream.

Source: Canadian Dairy Commission

Table 2 COMPARISON OF THE NUMBER OF MILKING COWS, PRODUCTION PER COW, AND TOTAL MILK PRODUCTION

(Appendix A)

Canada 1963 - 1967

Year	Cows kept for Milking	Milk Production Per Cow	Total Milk Production
	'000 head	lb.	'000 lb.
1963	2,914	6,325	18,431,982
1964	2,906	6,367	18,505,371
1965	2,885	6,363	18,359,954
1966	2,674	6,874	18,379,927
1967	2,668	6,861	18,303,994

Source: D.B.S.

Table 3 COMMERCIAL UTILIZATION OF FARM MILK PRODUCTION BY PRODUCT

(Appendix A) 1963 - 1967

Year	Creamery Butter	Cheese	Concentrated Milk and Ice Cream Mix	Fluid Sale of Milk and Cream	Total
			'000 lb.		
1963	8,234,905	1,728,115	1,493,192	5,021,875	16,483,844
1964	8,230,763	1,806,477	1,489,738	5,114,869	16,646,247
1965	7,894,715	1,996,537	1,521,563	5,205,551	16,622,088
1966	7,813,400	2,169,113	1,506,109	5,254,641	16,747,161
1967	7,713,927	2,130,405	1,554,333	5,283,929	16,689,377

Source: D.B.S.

Table 4 FARM CASH RECEIPTS FROM THE COMMERCIAL SALE OF MILK AND CREAM

(Appendix A) BY PRODUCT PLUS DIRECT GOVERNMENT SUBSIDIES

1963 - 1967

	Commercial Cash Receipts F.O.B. Farm*						
Year	Creamery Butter	Cheese Milk	Milk for Concentration & Ice Cream Mix	Fluid Sales	Total	Direct Payment Government Subsidies	Gross Farm Income
	thousands of dollars						
1963	197,084	43,368	39,906	224,295	509,803	0	509,803
1964	204,754	53,313	41,213	234,514	533,920	0	533,920
1965	208,894	61,922	44,666	243,995	559,588	16,912	576,500
1966	205,053	68,884	46,523	263,858	584,429	68,591	653,020
1967	218,562	71,305	51,586	287,879	629,438	103,229	732,667

* Plant paying price less haulage

Source: D.B.S.

APPENDIX B

Table 1 (Appendix B) — NUMBER OF DAIRY MANUFACTURING AND PROCESSING PLANTS IN CANADA

Year	Butter & Cheese	Pasteurizing	Condenseries	Ice Cream	Total
1961	914	732	23	41	1710
1962	889	711	24	43	1667
1963	851	690	24	40	1605
1964	805	670	23	37	1535
1965	731	626	22	34	1413
1966	672	581	23	32	1308

Source: D.B.S.

Table 2 (Appendix B) — DAIRY PRODUCT PRODUCTION 1963-1967

Year	Fluid Milk and Cream	Creamery Butter	Cheddar Cheese	Skim Milk Powder	Evaporated Whole Milk	Ice Cream
	.....		'000 lbs	.....		'000 Gals.
1963	5,021,875	351,919	139,367	176,086	313,086	46,819
1964	5,114,869	351,742	144,644	203,047	314,705	49,484
1965	5,205,551	337,381	158,088	222,155	310,136	51,623
1966	5,254,641	333,906	168,146	263,508	309,696	53,561
1967	5,283,929	329,655	161,299	316,378	288,107	56,023

Source: D.B.S.

Table 3 PER CAPITA CONSUMPTION OF DAIRY PRODUCTS 1963-1967

(Appendix B)

Year	Product: Fluid Milk Products	Butter	Cheese	Skim Powder	Evaporated Milk	Ice Cream
	..... pounds					Gallons
1963	323.4	19.11	8.30	8.09	16.19	2.47
1964	320.6	18.98	8.62	7.94	15.66	2.56
1965	317.1	18.52	9.10	7.06	15.23	2.62
1966	312.2	17.76	9.18	8.16	14.96	2.67
1967	307.5	16.85	9.90	6.84	14.18	2.74

Source: D.B.S.

Table 4 PER CAPITA CONSUMPTION BY TYPE OF CHEESE 1963-1967

(Appendix B)

Year	Type of Cheese: Cheddar Cheese	Process Cheese	Other and Specialty Cheese	Total
	..... pounds			
1963	3.25	3.42	1.63	8.30
1964	3.40	3.56	1.66	8.62
1965	3.41	3.83	1.86	9.10
1966	2.93	4.21	2.04	9.18
1967	3.35	4.15	2.40	9.90

Source: D.B.S.

APPENDIX C

Table 1 (Appendix C)

COMPARISON OF SOUTHERN ONTARIO CLASS I FLUID AND MANUFACTURING MILK PRICES PER HUNDREDWEIGHT

1964 - 1968

Year	Commercial Manufacturing Milk Price	Direct Payment Federal Subsidy	Export Equalization Holdback	Total Manufacturing Milk Price less Export Holdback	Class I Fluid Price
	$	$	$	$	$
1963/64	2.86	-	-	2.86	5.26
1964/65	3.05	-	-	3.05	5.26
1965/66	3.30	.20(1)	-	3.50	5.26
1966/67	3.33(2)	.85(3)	.10	4.08(4)	5.75(5)
1967/68	3.54	1.21(6)	.11	4.64	6.15(7)
1968/69	3.54	1.31	.15	4.70	6.15

NOTE: (1) - Federal subsidy averaged at 20¢ per hundredweight - 25¢ paid on the first 48,000 pounds, 20¢ for the next 48,000 pounds, and 10¢ per hundredweight for everything over 96,000 pounds.

(2) - Commercial price increased from $3.25 to $3.33 due to increasing butter support prices 2¢ per pound, September 9, 1966.

(3) - Federal subsidy was also paid to fluid producers for milk surplus to Class I requirements.

(4) - The Province of Ontario paid an additional 25¢ subsidy from October 1, 1967 to March 31, 1967. Total return to Ontario manufacturing milk producers $4.33 per hundredweight.

(5) - Class I fluid price increase July I from $5.26 to $5.75.

(6) - Federal subsidy payments discontinued to Class I fluid producers in milk used for manufacturing purposes.

(7) - Class I fluid price increased in April to $6.15.

APPENDIX D

Table 1 (Appendix D) APPARENT PER CAPITA DOMESTIC DISAPPEARANCE OF OILS AND FATS - CANADA, 1949 - 1967

	Margarine	Lard	Shortening	Other Oils & Fats	Butter	Total Fats & Oils
			- pounds retail weight -			
1949	5.5	n/a	n/a	n/a	23.5	n/a
1950	6.8	8.1	9.3	3.0	22.3	49.5
1951	7.6	8.1	8.2	2.4	21.2	47.5
1952	7.7	9.4	8.3	2.7	20.7	48.8
1953	7.4	8.4	9.2	2.5	20.6	48.1
1954	7.6	8.3	10.2	2.9	20.4	49.4
1955	8.0	8.7	9.7	2.4	20.3	49.1
1956	7.7	7.4	9.7	2.7	20.5	48.0
1957	7.8	7.4	9.2	2.9	20.3	47.6
1958	8.5	7.0	9.6	3.2	19.1	47.4
1959	8.7	10.3	9.2	3.7	18.1	50.0
1960	9.4	7.2	9.4	4.1	16.9	47.0
1961	9.8	8.4	9.1	4.2	16.5	48.0
1962	9.9	8.0	9.6	5.0	17.9	50.4
1963	9.2	7.5	9.9	5.0	19.1	50.7
1964	8.9	7.7	10.3	4.8	19.0	50.7
1965	8.7	7.4	9.9	4.7	18.6	49.3
1966	8.9	6.9	12.8 a/	6.4	17.8	52.8
1967	9.1	n/a	n/a	n/a	16.8	-

a/ Not comparable with previous years due to increased coverage.

Source: Dominion Bureau of Statistics

Table 2 (Appendix D) MAJOR FACTORS AFFECTING THE CONSUMPTION OF BUTTER AND MARGARINE - CANADA

	Personal Disposable Income a/		Average Retail Price		
	Total	Per Capita	Butter	Margarine	Differential
	Million dollars	dollars	- cents per pound		
1949	11,849	881	64.6	n/a	-
1950	12,688	925	60.3	34.7	25.6
1951	14,794	1,056	67.8	41.4	26.4
1952	16,072	1,112	66.2	37.1	29.1
1953	16,904	1,139	65.0	38.0	27.0
1954	16,984	1,111	64.0	37.9	26.1
1955	18,239	1,162	64.1	33.7	30.4
1956	20,153	1,253	63.5	33.1	30.4
1957	21,274	1,282	65.7	33.9	31.8
1958	22.880	1,340	69.2	32.5	36.7
1959	23,948	1,370	69.6	31.3	38.3
1960	25,075	1,403	69.8	30.0	39.8
1961	26,011	1,426	69.9	31.0	38.9
1962	28.243	1,521	62.1	29.6	32.5
1963	30,018	1,589	58.5	28.0	30.5
1964	31,725	1,649	58.9	29.3	29.6
1965	34,990	1,788	61.4	33.9	27.5
1966	38,278	1,922	67.1	36.0	31.1
1967	41,709	2,044	70.4	35.4	35.0

a/ Personal disposable income in constant dollars. Deflated by the Consumer Price Index.

Sources: D.B.S., National Accounts, Income and Expenditures. Cat. No. 13-001.
D.B.A., Prices and Price Indexes, Cat. No. 62-002.

Table 3 (Appendix D) CENTRAL ARIZONA MARKETING AREA, FEDERAL ORDER 131, UNITED STATES

	Filled Milk	Class I Milk	Filled Milk as % of Class I Milk
1966	- 000 pounds -		
Oct.	438	34,200	1.3
Nov.	597	33,700	1.8
Dec.	626	34,100	1.8
1967			
Jan.	691	34,473	2.0
Feb.	769	32,000	2.4
Mar.	945	35,662	2.6
Apr.	894	34,432	2.6
May	964	33,671	2.9
June	933	30,200	3.1
July	989	30,700	3.2
Aug.	1,185	31,100	3.8
Sept.	1,392	34,300	4.0
Oct.	1,547	34,500	4.5
Nov.	1,598	34,300	4.6
Dec.	1,700	33,200	5.1
1968			
Jan.	1,872	35,570	5.3
Feb.	2,293	33,700	6.8
Mar.	2,779	35,622	7.8
Apr.	2,841	32,186	8.8
May	3,129	34,999	8.9

Source: Central Arizona Marketing Area, Market Information Bulletin, Vol. XIII, June 1968.

Table 4

(Appendix D)

COMMERCIAL SALES OF FLUID MILK AND CREAM AND EQUIVALENT PRICES

CANADA 1964-1967

	1964	1965	1966	1967
Standard milk				
Sales (000 qts.)	1,254,815	1,263,612	1,226,660	1,191,662
Price (¢/qt.)	24.6	25.0	26.8	29.0
Two per cent milk				
Sales (000 qts.)	218,872	261,295	315,717	372,083
Price (¢/qt.)	22.6	23.0	24.8	27.0
Skim milk				
Sales (000 qts.)	65,804	67,861	65,062	60,135
Price (¢/qt.)	20.6	21.0	22.8	25.0
Cereal cream				
Sales (000 qts.)	42,466	44,495	45,545	46,611
Price (¢/qt.)	70.2	71.4	76.6	82.8
Table cream				
Sales (000 qts.)	8,785	7,978	6,998	6,478
Price (¢/qt.)	82.0	83.3	89.3	96.7

Note: The price for standard milk is a national average price obtained from the D.B.S. Margins for 2% milk and skim are estimated at two cents and four cents per quart respectively, compared with standard milk. Prices for cream are based on standard milk, i.e., 35% for cereal cream and 30% for table cream. Cereal cream is sold in half pint and pint cartons. Table cream is sold only in half pints.

Sources: D.B.S. Fluid Milk Sales, Dec. 1965-1967, Cat. No. 23-002. Prices and Price Indexes.

Table 5 SALES OF FLUID MILK IN TORONTO, 1964 - 1967

(Appendix D)

	Standard	Two Per cent	Skim	Total Fluid a/
		- 000 qts.		
1964	134,556	57,482	13,360	207,006
% of Total	65.0	27.8	6.4	100.0
1965	134,096	64,401	12,989	212,840
% Change	-0.034	12.0	-2.8	2.8
% of Total	63.0	30.2	6.1	100.0
1966	134,452	72,633	12,688	220,846
% Change	0.026	12.8	-2.4	3.8
% of Total	60.9	32.9	5.7	100.0
1967	134,374	78,678	12,398	226,244
% Change	-0.05	8.3	-2.3	2.4
% of Total	59.4	34.8	5.5	100.0

a/ Includes small amount of special high fat milk.

Source: Ont. Dept. of Agriculture & Food, Montly Dairy Report, March Supplements, 1965-1967.

Table 6 (Appendix D) SALES OF FLUID MILK IN THE TORONTO AREA, TO 1972

	Standard	Two Per Cent	Skim	Total Fluid a/
		- thousand quarts -		
1964	134,556	57,482	13,360	207,006
1965	134,096	64,401	12,989	212,840
1966	134,452	72,633	12,688	220,846
1967	134,374	78,678	12,398	226,244
1968	133,700	86,500	12,100	232,300
1969	133,000	95,200	11,900	240,700
1970	132,400	104,700	11,700	249,300
1971	131,700	115,200	11,400	258,800
1972	131,000	126,700	11,200	269,400

a/ Includes special milk of high b.f. content.

Table 7 (Appendix D) PROJECTED SALES OF FLUID MILK AND FILLED MILK CONTAINING ABOUT 2% VEGETABLE FAT - TORONTO, 1967 - 1972

	Standard	2 Per Cent	Skim	Total Fluid	Filled Milk
			- thousand quarts -		
1967	134,374	78,678	12,398	226,244	-
1968	133,700	86,500	12,100	232,300	-
1969	132,160	94,120	11,420	238,300	2,400
1970	130,720	102,540	10,740	244,500	4,800
1971	127,395	109,665	8,940	246,500	12,300
1972	123,300	116,800	6,800	247,400	22,000

APPENDIX E

Table 1 (Appendix E) COMPARISON OF THE AVERAGE SIZE OF ESTABLISHMENTS ON THE BASIS OF SHIPMENTS AND PRODUCTION WORKERS PER ESTABLISHMENT, CANADA, 1965

	Establishments	Production Worker Per Establishment	Average Shipment Per Plant
			$
Butter & Cheese Plants	731	7	496,770
Pasteurizing Plants	626	11	817,110
Condenseries	22	35	3,481,720
Ice Cream Plants	34	24	1,144,580
Process Cheese Plants	8	112	8,941,870
Vegetable Oil Mills	12	36	7,914,750 a/

a/ Includes Flaxseed Products

Source: D.B.S. Census of Manufactures 1965, Cat. Nos. 32-209, 210 and 223

Table 2 SELECTED RATIOS OF THE DAIRY AND VEGETABLE OIL MILLS INDUSTRIES

(Appendix E) CANADA, 1965

	Average Value Added Per Employee a/	Cost of Materials as % of Shipments	Salaries & Wages as % of Value Added	Average Annual Salaries & Wages	Average Wage Rate Per Man Hour
	$	%	%	$	$
Butter & Cheese Plants	8,300	83	43	3,500	1.52
Pasteurizing Plants	8,000	66	57	4,600	1.96
Condenseries	17,500	75	27	4,700	1.99
Ice Cream Plants	10,100	60	44	4,500	1.80
Process Cheese	20,400	63	30	6,200	2.21
Vegetable Oil Mills	17,500	88	28	5,000	2.07
Six Industry Average	13,600	72	38	4,750	1.92

a/ Value Added for Total Activity

Source: D.B.S. Census of Manufacturers, Cat. Nos. 32-209, -210 and -223, 1965

Table 3 *VALUE OF PRODUCTS MADE FROM EDIBLE OILSEEDS SHIPPED IN 1965 - BY INDUSTRY SECTOR,*

(Appendix E) CANADA

	Miscellaneous Food Industries	Slaughtering & Meat Processors	Vegetable Oil Mills	All Industries	Considered as Vegetable Oilseed Product Only
	$000	$000	$000	$000	$000
Margarine	27,841	8,855		40,896	29,445
Vegetable Shortening		9,458		25,403	25,403
Refined Vegetable Oils					
Coconut		1,762		3,031	
Cottonseed		3,792		4,072	
Peanut		404		1,330	
Soybean		2,878		9,775	
Rapeseed		a)		5,449	
Other		1,863	10,073	15,247	38,904
Crude Vegetable Oils			25,652	25,652	25,652
Soybean Oilcake			43,227	43,227	
Rapeseed Oilcake			2,186	2,186	45,413
Lecithin			553	553	553
Salad Dressing & Mayonnaise				18,276	18,276
Shortening containing some animal fat or marine oils		16,404		23,292	13,276
Total Value	27,841	45,416	81,691	218,391	196,922

a) Included in "other"

Source: D.B.S. Census of Manufactures, 1965

Table 4 (Appendix E) DAIRY PRODUCTS PURCHASED BY FOOD MANUFACTURERS IN THE PRODUCTION OF FOOD PRODUCTS, CANADA, 1965

	Materials & Supplies Purchased		
	By Dairy Factories	By Food Plants Other Than Dairy	By Manufacturers in Total Food Group a/
		$000	
Butter	52,653	3,171	56,276
Milk & Cream	46,076	4,835	51,632
Cheese	-	925	20,651
Milk Powder	4,637	7,853	12,883
Cream Powder	-	81	81
Buttermilk Powder	-	765	765
Whey Powder	-	1,084	1,084
Condensed & Evaporated Milk	2,996	3,490	6,606
Whey Cream	678	-	678
Evaporated, Condensed or Powder	-	1,644	1,644
Casein	3,907	-	3,907
Subtotal	110,947	23,848	156,207
Cheese & Other Dairy Products Used By Process Cheese Plants	21,412		
Total b/	132,359	23,848	156,207

a/ Includes purchases by Feed Mills amounting to about $3.8 million.

b/ Some double counting can be expected in these totals. See footnote 5/ in text for further explanation.

Source: D.B.S. Census of Manufactures, 1965

Table 5 (Appendix E) EDIBLE OILSEED PRODUCTS PURCHASED BY FOOD PROCESSORS AND FEED MILLS, BY PRODUCT, CANADA 1965

	Materials & Supplies Purchased			
	By Feed Mills	By Slaughtering & Meat Processors	By Other Food Processors a/	By Total Food Group
		$000		
Margarine	-	-	263	263
Cooking Oils	-	-	6,170	6,170
Vegetable Oils	-	20,064	32,714	52,778
Lecithin	-	-	128	128
Subtotal	-	20,064	39,335	59,399
Soybean Oilcake & Meal	36,108	-	-	36,108
Other Oilcake & Meal	2,239	-	-	2,239
Oilseed Products, Meal, etc.	-	-	489	489
Subtotal	38,347	-	489	38,836
Total	38,347	20,064	39,824	98,175

a/ Some double counting can be expected in these totals. See footnote 5/ in text for further explanation.

Source: D.B.S. Census of Manufactures, 1965

Table 6 (Appendix E) TOTAL VALUE OF DAIRY AND EDIBLE OILSEED PRODUCTS PURCHASED BY FOOD PROCESSORS AND FEED MILLS, BY INDUSTRY SECTOR, CANADA 1965

Industry Sector	Value of Materials & Supplies			
	Dairy Products		Oilseed Products	
	$000	%	$000	%
Slaughtering & Meat Processing Plants	283	(0.18)	20,064	(20.4)
Poultry & Fish Plants	3	-	903	(0.9)
Confectionery	7,059	(4. 5)	636	(0.6)
Bakeries	5,740	(3. 7)	1,276	(1.3)
Biscuit Manufacturers	821	(0. 5)	1,538	(1.6)
Fruit & Vegetables Canners & Preservers	1,759	(1. 1)	2,160	(2.2)
Miscellaneous Foods	4,336	(2. 8)	29,852	(30.4)
Flour Mills	86	(0.05)	489	(0.5)
Macaroni	-	-	105	(0.1)
Subtotal	20,087	(12.8)	59,828 a/	(60.9)
Dairy Factories	110,947	(71.0)	-	
Process Cheese	21,412	(13.7)	2,805	(2.8)
Feed Mills	3,761	(2. 4)	38,347	(39.0)
Total	156,207	(100.0)	98,175	(100.0)

a/ An estimated $16 million of vegetable oils was purchased by manufacturers of Soap and Cleaning Compounds for use in the production of food products.

Source: D.B.S. Census of Manufactures, 1965

Table 7 (Appendix E) FARM CASH RECEIPT FROM FARMING FOR EDIBLE OILSEEDS AND DAIRY PRODUCTS, CANADA 1963 - 1967

Canada	Rapeseed	Soybeans	Total Oilseeds	Dairy	Oilseed to Dairy
	$000	$000	$000	$000	%
1963	11,730	13,463	25,193	509,803	4.9
1964	17,957	19,091	37,048	533,920	6.9
1965	26,772	14,120	40,892	559,588	7.3
1966	43,838	19,813	63,651	581,900	10.9
1967	43,994	21,504	65,498	629,438	10.4

Source: D.B.S., Farm Cash Receipts, 1967, Cat. No. 21-001

Table 8 (Appendix E) FARM CASH RECEIPTS FROM FARMING FOR EDIBLE OILSEEDS AND DAIRY PRODUCTS BY SELECTED PROVINCE, a/ 1963 to 1967

	$000 Total Oilseeds	$000 Dairy	% Oilseeds to Dairy
Ontario			
1963	13,463	193,454	7.0
1964	19,091	206,805	9.2
1965	14,120	219,234	6.4
1966	19,813	225,643	8.8
1967	21,504	242,000	8.9
Manitoba			
1963	1,091	23,984	4.5
1964	2,260	23,699	9.5
1965	2,593	23,255	11.2
1966	4,664	22,056	21.1
1967	4,000	23,046	17.4
Saskatchewan			
1963	5,819	22,550	25.8
1964	6,745	22,185	30.4
1965	11,308	20,908	54.1
1966	20,586	19,485	105.6
1967	18,679	19,015	98.2
Alberta			
1963	4,820	39,709	12.8
1964	8,952	41,426	21.6
1965	12,871	40,324	31.9
1966	18,588	40,012	46.4
1967	21,358	42,031	50.8

a/ Oilseeds are grown commercially only in the Prairie provinces and Ontario. Quebec is an important dairy province but no oilseeds are grown in the province.

Source: D.B.S., Farm Cash Receipts, 1967, Cat. No. 21-001

Table 9 CENSUS FARMS REPORTING MILK COWS, SOYBEAN AND RAPESEED ACREAGE

(Appendix E) CANADA, 1956 and 1966

Milk Cows Canada	1956	% of Total	1966	% of Total
	No.	%	No.	%
1 - 2 cows	101,309	25.4	47,449	21.4
3 - 7	135,662	34.0	55.997	25.2
8 - 17	123,664	31.0	65,535	29.5
18 - 32	32,799	8.2	38,636	17.4
33 - 62	4,787	1.2	12,788	5.8
63 and over	383	0.1	1,455	0.6
Total Farms	398,604	100.0	221,850	100.0

Soybean Acreage Ontario	1956		1966	
	No.	%	No.	%
1 - 2 acres	229	2.5	93	1.2
3 - 7	1,094	12.0	556	7.3
8 - 32	5,546	60.6	4,048	52.9
33 - 62	1,571	17.2	1,814	23.7
63 and over	710	7.8	1,141	14.9
Total Farms	9,150	100.0	7,652	100.0

Rapeseed Acreage Prairie Provinces	1961		1966	
	No.	%	No.	%
1 - 17 acres	1,480	11.8	1,821	8.4
18 - 47	5,468	43.4	7,953	36.6
48 - 127	4,737	37.6	9,223	42.5
128 - 192	597	4.7	1,629	7.5
193 and over	300	2.4	1,080	5.0
Total Farms	12,582	100.0	21,706	100.0

Source: Census of Agriculture, 1966

Table 10 EXPORTS AND IMPORTS OF DAIRY PRODUCTS, OILSEEDS AND OILSEED PRODUCTS

(Appendix E) CANADA, 1964 - 1967

	Exports				Imports			
	1964	1965	1966	1967	1964	1965	1966	1967
1. Agricultural Products		- $000 -				- $000 -		
Rapeseed	10,152	30,890	38,480	40,868	-	-	-	-
Soybeans	5,767	9,954	10,906	7,940	52,898	46,327	52,438	48,063
Sunflower	790	946	1,557	605	-	-	-	-
Other Oilseed & Nuts	-	6	7	3	292	434	427	425
Total	16,709	41,796	50,950	49,416	53,190	46,761	52,865	48,488
2. Processed Products								
(a) Dairy								
Cheddar Cheese	10,667	11,478	13,830	10,449	-	-	-	-
Cheese, n.e.s.	495	198	343	758	8,722	10,559	7,649	9,758
Butter	12,608	1,076	99	36	-	441	6,710	2,512
Whole Milk Powder	8,175	9,358	3,417	2,236	-	-	-	-
Skim Milk Powder	5,736	12,917	10,742	15,539	-	-	-	-
Powdered Milk, Cream & Byproducts	428	915	353	176	500	1,293	527	1,258
Evaporated Milk	2,341	916	1,185	992	-	-	-	-
Dairy Products, nes.	17,292	3,546	654	772	322	408	436	826
Condens.Evap. Milk, Cream & Byproducts	70	22	-	-	90	60	138	112
Casein	3,227	6,010	5,469	2,841	142	140	163	182
Total	61,039	46,436	36,092	33,799	9,776	12,901	15,623	14,648

Table 10

(Appendix E) Continued

	Exports				Imports			
	1964	1965	1966	1967	1964	1965	1966	1967
		- $000 -					- $000 -	
(b) Vegetable Oils								
Margerine, Shortening & lard	34	49	61	50	2,557	3,285	4,363	2,842
Vegetable Oils								
Coconut	-	-	-	-	5,329	6,122	5,800	5,823
Corn	-	-	-	-	2,068	2,431	3,706	1,991
Cottonseed	-	-	-	-	4,246	6,102	4,646	1,549
Palm	-	-	-	-	1,393	2,180	2,800	2,203
Palm Kernel	-	-	-	-	1,053	1,656	1,318	1,568
Peanut	-	-	-	-	1,213	1,421	4,499	3,786
Soybean	3,047	4,704	3,728	4,884	3,822	4,104	3,398	2,737
Sunflower	-	-	-	-	-	-	-	3,603
Oils & Fats nes.	79	130	114	113	755	1,064	5,090	1,849
Veg. Cooking Fats & Oils Pkged.	-	-	-	-	992	2,517	2,050	376
Soybean Oilcake & Meal	21,075	24,270	20,267	16,738	17,442	20,716	20,500	19,867
Oilseed Cake & Meal, nes.	74	318	1	4	235	358	176	37
Total	24,309	29,471	24,171	21,789	41,105	51,956	58,346	48,231

Source: D.B.S., Trade of Canada, Exports and Imports by Commodities, 1964-1967

Table 11 TRADE BALANCE, IMPORTS AND EXPORTS OF OILSEEDS, OILSEED PRODUCTS AND DAIRY PRODUCTS

Appendix E CANADA, 1963 - 1967

	Oilseeds		X/M	Oilseed Products		X/M	Dairy Products		X/M
	Exports	Imports	Ratio	Exports	Imports	Ratio	Exports	Imports	Ratio
	$000			$000			$000		
1963	22,316	41,354	.54	27,186	45,192	.60	27,915	8,873	3.15
1964	16,709	53,190	.31	24,309	41,105	.59	61,039	9,776	6.24
1965	41,796	46,761	.89	29,471	51,956	.56	46,436	12,901	3.60
1966	50,950	52,865	.96	24,171	58,346	.41	36,092	15,623	2.31
1967	49,416	48,488	1.02	21,789	48,231	.45	33,799	14,648	2.31
Five Year Average	36,237	48,532	.75	25,385	48,966	.51	41,056	12,364	3.32
Balance or Deficit		-12,294			-23,581		+28,692		

Source: D.B.S. Exports and Imports by Commodities, Cat. Nos. 65-004, 65-007

Table 12 (Appendix E)

SUPPLY PATTERN OF EDIBLE VEGETABLE OILS

CANADA, 1967

			000 lbs.
Production			
From Canadian oilseeds			
	Rapeseed	100,865	
	Soybeans a/	64,650	
	Sunflower seed	6,815	172,330
From Imported oilseeds			
	Soybeans a/	150,853	150,853
Imports			
	Coconut	44,600	
	Sunflower	34,300	
	Peanut	26,600	
	Soybeans	23,100	
	Palm	21,600	
	Corn b/	14,000	
	Cocoa butter b/	12,942	
	Cottonseed	11,500	
	Olive	4,500	
	Oils & Fats, nes. c/	17,400	210,542
Exports	Soybean	42,932	
	Oils & Fats, nes. c/	1,100	44,032
Total Available Domestic Supply			489,243
Amount Produced from Canadian Seed			172,330 (35.2%)

a/ About 30 per cent of the soybeans crushed in Canada are grown domestically.
b/ Production figures for corn oil and cocoa butter are not available.
c/ Oils & Fats nes. are basket items including all oils & fats not elsewhere specified in the trade classification.

Source: D.B.S. Trade of Canada, and Oils and Fats

Table 13 SUPPLY PATTERN OF EDIBLE ANIMAL AND MARINE OILS AND FATS

(Appendix E) CANADA, 1967

Production		- 000 lbs. -
Marine Oils a/		
Herring oil	47,310	
Seal oil	2,167	
Whale oil	11,700	61,177
Animal Oils		
Butter (oil equavalent) b/	263,724	
Edible Tallow	48,956	
Rendered Lard	109,313	421,993
Total		483,170
Imports		
Lard	24,112	
Butter (oil equivalent)	7,656	31,768
Exports		
Butter (oil equivalent) b/	44	
Herring oil	4,242	
Whale oil	12,549	
Fish & Marine nes.	1,900	18,735
Total Available Domestic Supply		496,203

a/ Production of Herring and Seal Oil amounted to 5.3 million gallons in 1967 according to D.B.S. Cat. No.24-002. Conversion to weight is done on the basis of 9.3 lbs. per imperial gallon.

b/ The oil equivalent of butter is placed at 80%.

Source: D.B.S., Trade of Canada, Exports and Imports by Commodities (Dec., 1967)
D.B.S., Oils and Fats (Dec., 1967)
D.B.S., Monthly Review of Canadian Fisheries Statistics (Dec., 1967)
Also, Dept. of Fisheries, Ottawa (Whale oil production)