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AND THEIR SUBSTITUTES

MARKETING ECONOMICS DIVISION
ECONOMIC RESEARCH SERVICE
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Herbert H. Moede
Marketing Economics Division

ABSTRACT: *Dairy products such as fluid milk, cream, sour cream, ice cream and ice milk are being confronted with competition from substitute products. Generally, substitutes contain vegetable fat in place of milk fat in regular dairy products. Some substitutes do not contain any dairy ingredients. Prices and marketing margins for the substitutes are typically lower than those for the traditional dairy item. They tend to reflect the wide difference in the cost of milk fat as compared to the cost of vegetable fats.*
KEY WORDS: *Dairy substitutes, dairy substitute ingredient costs, milk and milk substitute marketing margins.*

For producers of dairy products, the 1960's were a period of challenge. Dairy products encountered strong market competition from substitutes. For example, sales of cream items declined from 9.1 pounds per capita in 1960 to an estimated 5.9 pounds in 1969. 1/ Undoubtedly, this decline was greatly influenced by the introduction of liquid and frozen coffee whiteners during the early part of the decade. Substitute coffee whiteners took an estimated 35 percent of the market for all cream items by the late 1960's. 2/ Fluid milk, ice cream, ice milk, sour cream and whipping cream also encountered marketing problems resulting from the introduction of substitutes or increased merchandising efforts for existing substitutes such as imitation ice cream and imitation ice milk. These latter products were not considered new in the 1960's since they were previously available in a limited number of States. In addition, butter has faced serious competition from margarine since before World War II. Increases in margarine sales have displaced a significant volume of butter because for many persons it is a complete substitute for butter.

This article examines the variations in ingredient costs, retail prices, and marketing margins between selected dairy products and substitutes.

Composition and Ingredient Cost

Substitute dairy products generally contain vegetable fat in place of the milk fat of the natural dairy product. Some substitutes contain no dairy ingredients, consisting of a vegetable fat and a blend of chemical products which act as body, sweetening, protein, emulsifying and buffering agents. Some substitute products use sodium caseinate as a protein source. Although sodium caseinate is made from milk, it is considered a chemical product not falling within the term "dairy products" as defined in the Federal Filled Milk Act.

The composition and estimated ingredient costs to make 100 pounds of selected types of dairy products are presented in table 6. The same information for substitutes generally used to replace these dairy products is shown in table 7.

1/ Dairy Situation, U.S. Dept. Agr., D.S. 328, November 1969, p. 22.
2/ D. L. Call. "Impact of Meat Analogs on the Livestock Industry." Feedstuffs, November 4, 1967, p. 74.

Table 6.--Composition and estimated ingredient cost of 100 pounds of selected dairy products, 1969

Product and estimated ingredient cost	Unit	Milk fat	Fluid skim milk	Other ingredients 1/	Total
Whole milk:					
Composition	lbs.	3.5	96.5	---	100.0
Ingredient cost	$/cwt.	2/2.97	2/3.81	---	6.78
Coffee cream:					
Composition	lbs.	18.0	82.0	---	100.0
Ingredient cost	$/cwt.	2/15.29	3.23	---	18.52
Whipping cream:					
Composition	lbs.	30.0	70.0	---	100.0
Ingredient cost	$/cwt.	2/25.48	2/2.76	---	28.24
Sour cream:					
Composition	lbs.	18.5	80.0	1.5	100.0
Ingredient cost	$/cwts.	2/15.71	2/3.16	1.05	19.92
Ice cream:					
Composition	lbs.	10.0	74.7	15.3	100.0
Ingredient cost	$/cwt.	3/8.05	3/1.13	1.90	11.08
Ice milk:					
Composition	lbs.	4.0	80.5	15.5	100.0
Ingredient cost	$/cwt.	3/3.22	3/1.22	2.09	6.53

1/ Includes sweeteners, starter cultures, and/or emulsifiers where required.
2/ Based on prices paid by dealers for milk used in fluid products. 1969 average = $6.78 per cwt. (3.5% B.F.) and a butterfat differential of 8.1 cents which result in the following prices for the 2 components of milk. Nonfat fluid skim = 3.945¢/lb. Butterfat = 84.945¢/lb.
3/ Based on prices paid for manufacturing grade milk. 1969 average = $4.28 cwt. (3.5% B.F.) and a butterfat differential of 7.9 cents which result in the following prices for the 2 components of milk. Nonfat fluid skim = 1.515¢/lb. Butterfat = 80.515¢/lb.

Formulations for the dairy items and their substitutes in these tables are representative of products currently being sold. They do not necessarily reflect the composition of a particular product sold by a specific manufacturer.

Among products where imitations and substitutes appear to be economically attractive, significant cost differences exist between the fat component of the natural dairy product and its substitute. The cost of fat used in the listed natural dairy products ranged from 44 to 90 percent of total ingredient cost. For substitutes, it represented from 16 to 68 percent of the total ingredient cost. The cost of milk fat in the natural dairy products was from 2 to 5 times the cost of the vegetable fat used in the substitutes. This results from the fact that milk fat is approximately 3 1/2 times more expensive than vegetable oil. In addition, natural dairy products usually

Table 7.--Composition and estimated ingredient cost of 100 pounds of selected substitutes for dairy products, 1969

Product and estimated ingredient cost	Unit	Vegetable fat	Protein agent	Body and sweetening agent	Other, ingredients 1/	Water	Total
Filled milk:							
Composition	lbs.	2/3.0	96.8	---	.2	---	100.0
Ingredient cost	$/cwt.	.75	4/3.82	---	.16	---	4.73
Coffee whitener (liquid or frozen):							
Composition	lbs.	2/10.0	5/2.3	8.3	.7	78.7	100.0
Ingredient cost	$/cwt.	2.50	1.20	.97	.46	---	5.13
Coffee whitener (powder):							
Composition	lbs.	2/36.0	5/5.0	56.0	2.0	1.0	100.0
Ingredient cost	$/cwt.	9.00	2.62	5.43	.44	---	17.49
Whipped topping:							
Composition	lbs.	2/25.0	5/2.5	12.0	.8	59.7	100.0
Ingredient cost	$/cwt.	6.25	1.31	1.31	.30	---	9.17
Imitation sour cream:							
Composition	lbs.	3/18.0	5/4.0	5.0	.5	72.5	100.0
Ingredient cost	$/cwt.	3.15	2.09	.58	.56	---	6.38
Imitation ice cream (mellorine):							
Composition	lbs.	2/10.0	72.6	17.0	.4	---	100.0
Ingredient cost	$/cwt.	2.50	6/1.10	1.78	.51	---	5.89
Imitation ice milk:							
Composition	lbs.	2/4.0	77.2	18.5	.3	---	100.0
Ingredient cost	$/cwt.	1.00	6/1.17	1.91	.35	---	4.43

1/ Includes buffering, emulsifying, and stabilizing agents.
2/ Coconut oil.
3/ Soybean oil.
4/ Fluid skim milk Class I price of 3.945¢/lb.
5/ Sodium caseinate.
6/ Fluid skim milk for manufacturing use price of 1.515¢/lb.

contain more fat than their substitute. However, the level of fat does not affect the cost difference between the two types of products as much as the variation between the cost of milk fat and vegetable fat. Even where the fat content of the substitute product (powdered coffee whitener) is double the milk fat content of regular coffee cream, the difference between the cost of the fat used in the two products accounts for the major difference in total costs.

The cost of other components in the natural dairy products, primarily fluid skim milk, was less than the cost of other ingredients in the substitutes. In all cases, however, due to the lower cost of vegetable fat as compared with milk fat, the total ingredient cost of the substitutes is below that of the natural dairy product.

Retail Prices

Prices for dairy products and their substitutes compared in this article are average advertised prices which appeared in newspapers in 50 cities during May and June 1969 (table 8). Undoubtedly they reflect weekend price specials in most cases. Since most sales by retail food stores are made during the last 3 days of the week, these prices would represent the price at which substantial quantities of the selected products were sold during the period. Further, the packages in these comparisons are representative of the sizes having the greatest retail sales of the selected products.

Except for coffee cream, the average advertised price for the dairy products ranged from 35 to 62 percent above the retail price of the substitute product.

Despite moisture differences, the price for one-half pound of powdered coffee whitener and a pint of coffee cream was for all practical purposes the same (0.1 cent difference). However, the label on one powdered product currently being marketed indicates that a liquid product can be made by combining 2 parts water to 1 part powder. Using this relationship, the one-half pound quantity of powder shown in table 8 would yield about 1.14 pints of liquid coffee whitener. Thus, on a liquid-equivalent basis the price difference between a pint of coffee cream and powdered whitener would amount to an estimated 5.4 cents instead of 0.1 cent.

The difference between prices of these two products is not as great as those between the other selected dairy products and their substitutes. Thus, it appears consumers may buy powdered coffee whiteners not so much on the basis of price as on the basis of convenience in storage and shelf-life of the powdered product. In all other instances, the price differential between the natural dairy product and its substitute could be a major factor in the decision to buy the substitute.

For whipping cream and whipped topping, the price comparison is made on the basis of retail units the consumer normally buys. A comparison on an equivalent whipped volume basis was not made because of the lack of data relating to the amount of air that would be introduced by the individual consumer during the whipping process.

Marketing Margins

The "marketing margin," in this article, is the difference between total ingredient cost to the processor and the retail selling price. It includes all costs of processing, packaging, distribution, and selling, as well as profits.

Marketing margins for 4 of the 6 dairy products were higher than for their substitutes. Per packaged unit, they ranged from 4.6 cents greater for whole milk to 14.1 cents for ice cream. However, marketing margins for the substitute products represented a greater percentage of the retail price than they did for the natural dairy item.

In two instances, the margin for the substitute was larger than for the standard dairy product--powdered coffee whiteners (10.8 cents larger) and whipped toppings (6.5 cents larger). Except for these two products, both the regular dairy item and its substitute are generally distributed through the same marketing

Table 8.--Comparison of average advertised prices, estimated ingredient cost and marketing margin for selected dairy products and substitutes

Product	Package	Average advertised retail price	Estimated ingredient cost	Marketing margin between ingredient cost and retail price	Marketing margin as percentage of retail price
		Cents	Cents	Cents	Percent
Whole milk	½ gallon	50.8	29.1	21.7	43
Filled milk	½ gallon	37.4	20.3	17.1	46
Coffee cream	pint	43.3	19.6	23.7	54
Coffee whitener (liquid or frozen)	pint	20.2	5.4	14.8	73
Coffee whitener (powdered)	½ pound	43.2	8.7	34.5	80
Whipping cream	pint	49.9	29.4	20.5	41
Whipped topping	pint	31.6	4.6	27.0	85
Sour cream	pint	66.8	21.4	45.4	68
Imitation sour cream	pint	45.6	6.9	38.7	85
Ice cream	½ gallon	67.2	25.0	42.2	63
Imitation ice cream	½ gallon	41.4	13.3	28.1	68
Ice milk	½ gallon	49.0	14.7	34.3	70
Imitation ice milk	½ gallon	36.2	10.0	26.2	72

channel. Most often this is the dairy supplying the retail outlet.

Higher marketing margins for the powdered coffee whitener and whipped topping may result from the fact these products generally do not move through regular diary product distribution channels. Powdered coffee whiteners are distributed through dry goods channels, similar to those for canned goods. Whipped topping is most likely distributed through frozen food marketing channels. Higher marketing margins for these two products than for their regular dairy counterparts imply that greater retail margins as well as possible lower distribution and storage costs could exist for whipped toppings and powdered coffee whiteners.

Overall, the difference in the marketing margins between the natural and substitute products appears to be significantly affected by the difference in total ingredient costs. These costs, however, do not represent all of the differences between the margins for the 2 types of products. Other factors such as differences in processing, packaging, transportation and warehousing costs combined with discounting policies and wholesaling practices may play a more important role in the differences than ingredient costs.