

The dairy industry is confronted with the encroachment of substitute milks into the fluid market. These products are new in terms of market availability even though the technical development took place in the fifties. Marketing substitute milks introduces the butter-margarine controversy in a new form. Substitute milks have been sold at lower prices than regular milk because butterfat has been replaced by relatively low-cost vegetable oils. The product is available in approximately 20 states and sales are expanding. The rapid growth in the relative market share of filled milk in Arizona to ten percent of the Class I producer milk since its introduction in October 1966 has drawn the attention of those people particularly concerned with evaluating the competitive potential of fluid milk substitutes.

The purpose of this paper is to present the results of a study of factors that may explain the acceptance of filled milk in terms of consumer attitudes and alternatively in terms of the different characteristics of consumers and nonconsumers of filled milk. The results of our study are compared with a study made by the Milk Industry Foundation<sup>1</sup> in Arizona. These two studies were completely independent; the investigators had no knowledge of the other until the field work was finished.

Information was obtained on consumption, price, and place of purchase for 56 food products. Respondent households were selected at random from the Phoenix area during June 1968. Attitudes toward milk products were investigated by using 30 polar statements with a seven unit intensity scale. To facilitate discussion these results have been divided into three categories: (1) Product use; (2) Consumer Characteristics; and (3) Nutritive characteristics.

#### *Product Use*

Respondents were less familiar with imitation milk than whole milk. Of those questioned nearly half had never heard of imitation milk. Six times as many families used milk frequently as those who use imitation milk often. A ratio of 3:1 was found between those who never used imitation milk and families that never used regular milk.

Families that purchased substitutes the previous week consumed an average of 10.9 quarts of milk-type beverage per week; 4.9 quarts of regular

# Consumer Attitudes Towards Milk Substitutes

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milk and 6.0 quarts of substitutes. Those families that did not purchase substitutes last week consumed a total of 10.1 quarts of milk per week.

The MIF study reported weekly household consumption of whole milk, other milk and substitutes as 9.62 quarts. This figure includes .75 quarts of substitutes. Nonusers of substitutes consumed 8.96 quarts per week while substitute users had a milk type beverage consumption of 13.98 quarts, composed of 4.5 quarts of whole milk, 1.83 quarts of other milk and 7.65 quarts of substitutes.

Milk consumption figures from the two studies are in close agreement. The proportion of total milk beverage consumption accounted for by substitutes for regular users was 54.7 percent in the MIF study versus 55.1 percent in the Arizona work. Less regular milk is consumed by families purchasing substitutes. The difference was statistically significant.

A key toward evaluating potential market acceptance of substitute products may be found in the volume sold in Arizona. At present, about 10 percent of the Class I producer milk is filled milk products. This proportion has been stable since July 1968.

Price comparisons for the Phoenix area found imitation milk selling for 39 to 43 cents per half gallon during June 1968. Regular milk was priced

from 53 to 56 cents. The MIF study reports a seven to nine cent spread between these prices for July 1968.

#### *Consumer Characteristics*

Chi-square tests for independence of samples were used to examine the polar statements related to consumer characteristics.

The attitude proposition, "Not liked by children . . . Liked by children," resulted in a 7:1 ratio between imitation milk and regular milk on the "not liked" side. The ratio was 4:1 in favor of whole milk on the "liked" side.

Frequencies for the "Liked by adults . . . Not liked by adults" question pointed to a preference for regular whole milk. Imitation milk was liked by the entire family for only 14 percent of those interviewed.

Two questions dealt with sex differences via the "Women's drink . . . Men's drink," "Boy's drink . . . Girl's drink" scales. Imitation milk is considered by many to be more of a woman's beverage. However, the "boy-girl" scale did not reveal significantly different frequencies. One explanation is that respondents thought imitation milk had less calories, was watery and was for weight watchers.

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Thus, the imitation beverage may have more appeal for women than for girls who would have less serious calorie control problems.

The responses on "For company . . . Not for company" indicated regular milk was the drink to be served guests. One explanation is that imitation milk may be thought of as an inferior product. Regular milk was preferred for personal use.

The next step in the analysis consisted of an examination of the difference between families which purchased imitation milk last week and those who did not. This comparison includes the following factors: (1) education of homemaker; (2) disposable family income; (3) family expenditure for food eaten away from home; (5) size of household; (6) age of homemaker.

The average homemaker in families which purchased imitation milk had significantly more education than her counterpart. The difference was very small, imitation milk users completed one trimester while nonusers had four years of high school and no college.

The disposable family income for users and nonusers was not significantly different. The nonuser group averaged \$7892 opposed to \$7929 for users. Comparison of these income figures with those in the recent Milk Industry Foundation study is difficult because of the refusals and wide income classifications in the MIF report. The MIF report concludes that, "It is clear that substitutes are not being purchased primarily by the lower income groups." This conclusion is supported by the Arizona results.

No significant differences were found between users and nonusers for family expenditures, for food eaten at home or for expenditures for food eaten away from home.

The average size of household for purchasers of imitation milk was 4.6 persons versus 3.9 in the other group. This difference was not significant. The MIF study reported a higher proportion of larger families were regular users of milk substitutes than smaller families. The Arizona results agree but again the difference was not significant at the five percent level.

No significant difference was found between the groups with respect to the age of the homemaker. Perhaps number of children under 16 years would have been a better variable.

### *Nutritive Characteristics*

The ingredient characteristics of

substitute milk beverages vary widely because standards of identity have not been adopted by most judicational areas. The fat used in many products is based on hydrogenated vegetable oils. In some filled milks, isolated proteins are used in addition to unspecified amounts of nonfat milk. Likewise, there is variation in fortifying these beverages with minerals and vitamins.<sup>2</sup>

Questions dealing with vitamins, calories, general nutritive value, protein, and calcium were included so that consumer knowledge could be compared to product characteristics. Responses relating to caloric content were particularly interesting. Seven times as many indicated imitation was low in calories as compared to regular milk. This opinion is not supported in fact. Filled milk has approximately the same fat and nonfat content. This result is supported by the MIF study where 63.9 percent of occasional users of milk substitutes thought it had fewer calories than regular milk. Regular milk was considered to be less watery or richer and more stylish. Families frequently pointed out a greater uniformity in the quality of regular milk. The response to "For weight watchers . . . For thin people" showed that the imitation product was thought of as a weight watchers beverage. Consumers identify the substitute with diet type or low fat beverages.

The protein question resulted in high ratings for regular fluid milk. Consumers are generally aware of the relatively high calcium content of whole milk. In reality filled milks have the same protein and calcium content as whole milk provided the nonfat solids proportion is equivalent.

The preceding analysis was based on the entire sample of users and nonusers of imitation milk. The breakdown of contingency tables has been extended to compare attitudes toward imitation milk by those who purchased the product last week and those who did not. There were no significant differences between purchasers and nonpurchasers of imitation milk in their attitudes toward product content of vitamins, calories, protein, calcium, and general nutritional value. In contrast, there were no significant differences between imitation milk purchasers and nonpurchasers in their attitudes toward regular milk with respect to content of vitamins, calories, and protein. In

summary, both groups were equally well informed and equally confused about regular and imitation products.

### *Conclusions*

Attempts to explain why consumers ranked imitation milk and whole milk as they did verge on speculation. However, one must note the attitudes which do not conform to reality. There were several of these. The major one was the low evaluation for caloric content of imitation milk. This led to ranking it as a diet product. This fact was also reported in the MIF paper. A second factor prevails over the responses. Regular whole milk has a "good," "wholesome" image. This image may have led families to answer favorably for regular milk even though they had little or no concrete knowledge on a specific question.

The University of Arizona research and MIF work agree closely. The real question deals with directions for additional investigation. Is our information base good enough to form market policy?

A naive multiple regression model was constructed with milk consumption as a dependent variable and a set of quantifiable demographic variables as independent variables. The coefficient of multiple determination ( $R^2$ ) was .397. The significant variables were as follows: education of homemaker, a negative relationship; expenditures for food eaten at home and away from home, a positive relation; and the number of persons in the household, a positive relation. Disposable family income and the age of the homemaker were not significant. Additional independent variables can be added from the data. One example would be the number of family members under 16 years of age. Intercorrelations among independent variables are a serious problem in this type of analysis.

The point in discussing this regression analysis is that it highlights the problem for researchers. The real question for researchers is identifying the relevant variables which are related to milk and substitute milk consumption.

### *References*

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- <sup>2</sup> National Dairy Council. *1968 Relative Nutritional Value of Filled and Imitation Milks. Dairy Council Digest, 39 (2).*