

June 1977

A.E. Res. 77-6

RETAIL MARKET TESTS OF FROZEN MINCED FISH



By
Dana C. Goodrich, Jr.
And
Daniel B. Whitaker

Department of Agricultural Economics
Cornell University Agricultural Experiment Station
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York 14853

ACKNOWLEDGEMENTS

Although the concept of value-recovery through utilization of minced fish has been advanced by many researchers, the authors are especially grateful to Cornell University food scientists in the Department of Poultry Science whose technical expertise made possible the application of this concept in the market tests reported here. For their important contributions to this study in product and package technology, supply identification, and recipe formulation, we thank Dr. Robert C. Baker, Dr. Joe M. Regenstein and Mrs. June M. Darfler.

We are grateful to the supplier of minced fish for helping to meet the unique product and packaging needs of this project.

To the management and store personnel of cooperating retail outlets, we express our appreciation. Their interest in Frozen Minced Fish and their patience with our research methods were essential to the successful completion of these tests.

This research was sponsored by the New York Sea Grant Institute under a grant from the Office of Sea Grant, National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce.



TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Objectives	2
Procedures	2
The Product	2
Price of the Product	3
Advertising and Promotion	4
Demonstrations	4
The Stores	4
Consumer Surveys	5
Results	6
Rochester Supermarkets	6
Ithaca Supermarkets	9
Consumer Surveys	10
The Retail Seafood Market	12
Summary and Conclusions	13
Appendix A	15
Appendix B	25

RETAIL MARKET TESTS OF FROZEN MINCED FISH

Dana C. Goodrich, Jr. and Daniel B. Whitaker

Introduction

The world's water resources are a reservoir of food protein which has not been fully exploited. Billions of pounds of fish and seafood are landed each year by U.S. fishermen, yet much of this catch never reaches the human food market. Edible and nutritious portions either are diverted from human use or discarded completely. For example, only about 30 percent of the landed weight of groundfish goes into human food; the rest goes to industrial products or waste.^{1/} Furthermore, vast quantities of available fish never enter the human food chain because these so-called underutilized or undesirable species caught incidental to other species are immediately disposed of. Other presently unfavored species are purposely avoided in the harvesting process since they are considered too large, too small, too bony, or too "something" for use in present handling and processing methods.

The challenge, then, is to utilize both the seafood which is now lost through commercial harvesting and handling practices, as well as that which is not actively fished. Success in achieving these goals may be realized if "the muscle (can) be economically separated from skin and bones and ... processed into foods that are new and/or unique in appearance, flavor, texture or nutritional qualities (so as to) gain consumer acceptance."^{2/} Food scientists have been carrying on such research with meat-bone separators for several years. Briefly, these devices mechanically separate the soft, edible meat from the undesirable skin and bones to yield a product known simply as minced fish. It is important to note that the resulting minced fish contains little or no bone particles. Examples of the types of consumer goods made from minced fish are those reported by food scientists at several institutions including Cornell University.^{3/}

Results of marketing and laboratory studies of consumer acceptance of minced fish in various forms have been promising. For instance, "beefish patties" and fish cakes made from frozen minced fish have been tested and

¹ Ronsivalli, L. J., "The Role of Fish in Meeting the World's Food Needs," Marine Fisheries Review, Vol. 38, No. 6, 1976, p. 2.

² Teeny, F. M. and David Miyauchi, "Preparation and Utilization of Frozen Blocks of Minced Black Rockfish Muscle," Journal of Milk and Food Technology, Vol. 35, No. 7, 1972, p. 414.

³ Baker, R. C., J. Regenstein, and J. Darfler, Seafood Chowders and Seafood Crispies, Booklets 1 and 2, New York Sea Grant Institute, September 1976.

found acceptable.^{4/} However, there remains a need for more information on retail market testing of frozen minced fish in its unprocessed form.^{5/}

Objectives

Since Frozen Minced Fish as reported in this study is a relatively new retail form of seafood, a unique market presentation had to be developed which would inform the potential purchaser and user of the product's versatility as well as its value as a protein-rich food. Specifically, the purposes of this study were to:

1. Develop an attractive package for the retail presentation of Frozen Minced Fish which would provide the necessary product protection and inform purchasers of its proper use, and
2. Determine consumer acceptance of the product based primarily on sales performance in retail food stores.

Procedures

The Product

Frozen Minced Fish used in this market test was prepared from minced white mullet or sucker (*Catostomus commersoni*) taken from Lake Superior. The food technology research group in the Department of Poultry Science at Cornell University examined the product's nutritional qualities and storage characteristics.

The product was packaged while in the fresh, unfrozen state by a commercial seafood processor in one-pound (453-gram) containers of the "tray with hinged-cover" style measuring 5" x 2" x 4".^{6/} It was overwrapped and sealed with wax-coated paper in a "double-fold end point" manner. A two-color adhesive label with ingredient listing and distributor identification was applied so as to cover all but the principal display panel. An instruction and recipe booklet which served also as the principal display panel was affixed to the package with a cellophane sleeve. Thus, the sleeve could easily be removed by

⁴ King, Frederick J. and George J. Flick, "Beefish Patties," Marine Fisheries Review, Vol. 35, No. 7, 1973, pp. 31-33 and Bruce C. Morehead, "A Report on the National Marine Fisheries Service Comminuted Fish Cake Survey," Marine Fisheries Review, Vol. 36, No. 5, 1974, pp. 34-37.

⁵ A short-term retail test of frozen minced fish conducted by Dale R. Baker, Director of Minnesota Marine Advisory Service was described in "Minnesotans Take to Mullet," NOAA, Vol. 6, No. 3, July 1976, U.S. Department of Commerce. See also Joseph M. Mendelsohn, "Minced Fish in a New Form," Marine Fisheries Review, Vol. 36, No. 8, 1974, pp. 34-36 and Joshua John, "Some Marketing Considerations with Respect to Minced Fish Products," Marine Fisheries Review, Vol. 36, No. 12, 1974, pp. 18-20.

⁶ To enhance shelf life and control excess "water drip," a commercial preparation known as "Freez-Gard" (sodium hexametaphosphate, salt, and sodium erythorbate) was added.

the purchaser to obtain the recipe booklet, but the integrity of the package for home freezer storage and future use was preserved.

The four-color, 20-page recipe booklet on each package of Frozen Minced Fish was an integral part of the product presentation. Since minced fish was new to consumers in the test market area, few were familiar with its possible uses. The recipes prepared by the food technology staff were designed to emphasize the product's versatility.⁷ While many of the recipes called for the use of Frozen Minced Fish in much the same way as ground beef, the booklet made clear that the product also could be used in preparing some of the more conventional fish dishes.

Price of the Product

Frozen Minced Fish was priced at 89 cents per one-pound package. This price was intentionally chosen to be competitive with other meat and fish/seafood items. During the period of testing, this price was higher than the prevailing ground beef (hamburger) price. On occasion, ground beef was offered in test stores as price specials for as low as 69 cents per pound. On the other hand, the Frozen Minced Fish price was below that of other frozen fish or seafood products except for one week during which turbot was specially priced at 79 cents per pound.

The test price of 89 cents was chosen also to reflect the low end of the range of anticipated approximate costs of acquisition, packaging, and distribution on a commercial basis (Table 1). It was not the intent of this study to develop detailed and precise cost figures. Rather, the purpose was to suggest broad ranges of cost expectations so as to avoid the testing of Frozen Minced Fish at unrealistic prices. Raw product price (boxed but unwrapped) and transportation represent the range of actual costs incurred, adjusted for estimated volume differences under commercial conditions. Promotion expenses in the form of in-store demonstrations to be described later were disregarded.

Table 1. LIKELY RANGES OF ESTIMATED COMPONENT COSTS OF FROZEN MINCED FISH

Components	Approximate cost (Cents per pound)
Raw material (minced fish, frozen and boxed)	35- 40
Packaging (including recipe booklet)	15- 30
Transportation	5- 10
Distributor (wholesale) margin	8- 12
Retail margin	24- 34
Total cost	87-126

⁷ Reproduction of the contents of the recipe booklet is in the Appendix.

Advertising and Promotion

No paid advertising was used. However, local media coverage of the product's introduction stimulated considerable interest in the market area. Three articles appeared in the local newspapers coincidentally with the start of the test. Furthermore, a home economist appeared for eight minutes on a morning television program during the second test week to demonstrate the preparation of an entree using the Frozen Minced Fish. Finally, a television news film crew visited two of the test stores the third week of the experiment and interviewed the in-store demonstrators and store employees. These films were shown on local television news broadcasts. Thus the product received initial publicity which probably stimulated sales, but no effort was made to measure performance before or after such exposure.

Demonstrations

Professional home economists demonstrated Frozen Minced Fish in the test stores on Thursdays and Fridays for the first three weeks of the test period.^{8/} Demonstration began at approximately 10:30 a.m. each day and concluded about 5:00 p.m. and took place in an area adjacent to the product display.

Each demonstrator prepared two dishes from the recipe booklet. "Sloppy Jonahs" were served the first and third weeks; "Fish Patties" were prepared the second week. Both recipes demanded only a minimum of cooking equipment and were quick and easy to prepare. Thus, it was possible for the consumer to observe the entire procedure. Each shopper passing the demonstration area was offered a sample and an explanation of the origin and use of the product. It was estimated that about 7,000 samples of the Frozen Minced Fish preparations were distributed. Many of the recipients were members of multi-person shopping units.

Two 2' x 3' four-color posters in each store depicting the Frozen Minced Fish logo, along with the block letters "TRY ME" and the words "NUTRITIOUS," "CONVENIENT," and "MANY USES" were located in the area of the demonstration. In addition, smaller 7" x 5" "shelf talkers" carrying the same message were posted near the demonstration and the product display to improve identification.

The Stores

Frozen Minced Fish was tested in stores of three different firms. Six supermarkets of a retail food chain in Rochester, New York, two supermarkets of a retail food chain in Ithaca, New York, and a single-unit seafood market in Rochester, New York, participated. Consistent with the intent of the study to include stores which among them represented substantially different clientele, three of the Rochester supermarkets were located in shopping centers and

⁸ Demonstrations at the retail seafood market continued for six weeks. The same dishes and presentation were made. From the third to the eighth week, a self-contained slide projector/screen showing the preparation and end uses of Frozen Minced Fish was operated during days and hours the demonstrator was not present.

three were free-standing, one each at suburban, urban and inner-city sites. One Ithaca supermarket was in a neighborhood shopping center and the other in a free-standing urban location. The seafood market occupied a downtown urban location. Thus, a total of nine retail outlets offered Frozen Minced Fish during testing.

Frozen Minced Fish was sold in the Rochester supermarkets for 11 consecutive weeks, December 1976-February 1977. The test originally was planned for 12 weeks but limited supply of product caused early termination. The test in the two Ithaca supermarkets was scheduled for eight weeks but had to be discontinued in February 1977 after only 18 days due to supply problems. Sales tests of Frozen Minced Fish were started in October 1976 at the retail seafood market and continued for 18 weeks until February 1977. Thus, Frozen Minced Fish was available in test situations for a total of about 90 store/weeks.

The supermarkets ranged in selling area from about 20,000 square feet to about 60,000 square feet and in estimated annual sales volume from about \$4 million to \$15 million. The larger of these sold substantial amounts of non-food items. The retail seafood market was approximately 650 square feet in selling space.

In most cases, Frozen Minced Fish was displayed with other frozen seafood products in bins or on shelves of upright freezers. The number of frozen seafood items differed somewhat between supermarkets. While the larger ones carried more items, the number was not proportional to store size. The largest store displayed six different frozen unprepared finfish items and nine shellfish items, for a total of 15 unprocessed seafood items distinct either in species, package, or brand. In comparison, the smallest store offered three frozen unprepared finfish items and four shellfish items.

In two of the supermarkets the product was displayed adjacent to frozen red meat and poultry.

The amount of display space devoted to Frozen Minced Fish varied between stores, but was relatively stable within each store over time. With only one exception noted later, the space was not less than two facings or more than four. In a few instances, shifts in display space occurred as weekly meat or fish specials changed.^{9/}

Consumer Surveys

During the final two days of in-store demonstrations at the supermarkets, the home economists administered a short questionnaire to shoppers who passed the Frozen Minced Fish display. Questions were designed to identify opinions of those who had previously purchased and served the product.

In addition, brief mail questionnaires in the form of self-addressed postcards attached to approximately 140 Frozen Minced Fish packages were used to make similar inquiries of purchasers and users in Ithaca.

⁹ Temporary product shortages were responsible for "stock-out" situations in some stores for the equivalent of approximately one day during the final three weeks of the test.

Results

Rochester Supermarkets

Total sales of Frozen Minced Fish in six supermarkets during 11 weeks were 2,935 pounds, an average of 267 units per week (Table 2). Volumes of individual stores varied markedly. Store A generated the highest Frozen Minced Fish sales and accounted for more than 30 percent of the total. On the other hand, Store F sold less than three percent. Most of these differences were attributable to store size as reflected in total store revenue and customer count. Frozen Minced Fish sales generally were directly related to these measures.

Table 2. SALES OF FROZEN MINCED FISH, BY STORE
Six Supermarkets, 11 Weeks, December 1976-February 1977
Rochester, New York

Store	Total sales in pounds	Pounds per week	Pounds per \$1,000 store sales	Pounds per 1,000 customer transactions
Store A	917	83.4	0.28	3.64
Store B	588	53.5	0.23	2.64
Store C	574	52.2	0.35	3.59
Store D	432	39.3	0.18	1.93
Store E	348	31.6	0.38	2.90
Store F	76	6.9	0.06	0.53
Total 6 stores	2,935	266.9	0.24	2.61

Product demonstrations in the smallest outlet, Store F, were interrupted by personnel problems after the first week of the test. Demonstrations were not resumed. Nevertheless, the product was allowed to remain in the store for the duration of the test, but it did not fully benefit from the intended stimulation of the three weeks' demonstration. Furthermore, its slow sales caused store management to display only one facing of the product in an obscure location. The fact that 48 of the total 76 units of Frozen Minced Fish in that store were sold during the first two demonstration days is evidence of the dampening effect of interrupted demonstration and poor display location.

To account for differences in store size, Frozen Minced Fish sales were compared to total store revenues and customer transactions. For every \$1,000 of store revenue during the 11-week test period, the average Frozen Minced Fish sales were 0.24 pounds. That is, about one pound of Frozen Minced Fish was purchased for each \$4,000 of sales recorded by the store. Based on number of customers, about 2.6 pounds of Frozen Minced Fish were sold for each 1,000 customer transactions. That is, about 10 pounds of Frozen Minced Fish were purchased for each 4,000 shoppers.

Excluding the unusual results of Store F where the discontinuation of in-store demonstrations after the first week adversely affected sales, average Frozen Minced Fish sales for the remaining five stores were somewhat higher. Volume was .26 pounds per \$1,000 revenue and 2.9 pounds per 1,000 customer transactions.

It should be noted that three of the supermarkets were virtual "super stores," each with several non-food departments and large total selling spaces. No doubt the effects of these features resulted in lower Frozen Minced Fish sales relative to total dollar volume of business than might otherwise have been the case.

Except for Store F where the discontinuation of in-store demonstrations adversely affected sales, the poorest performing outlet was Store D, which was relatively new, free-standing, and occupied a suburban, roadside location. Neither in-store display location nor clientele characteristics provided an explanation for this low level of performance.

Frozen Minced Fish sales varied dramatically according to time periods during the 11-week test. Product sales during the first three weeks were very high. Nearly 60 percent of the total sales of Frozen Minced Fish were recorded during this introductory period (Table 3). Moreover, about 68 percent of these introductory sales were made on the Thursdays and Fridays when in-store demonstrations were taking place.

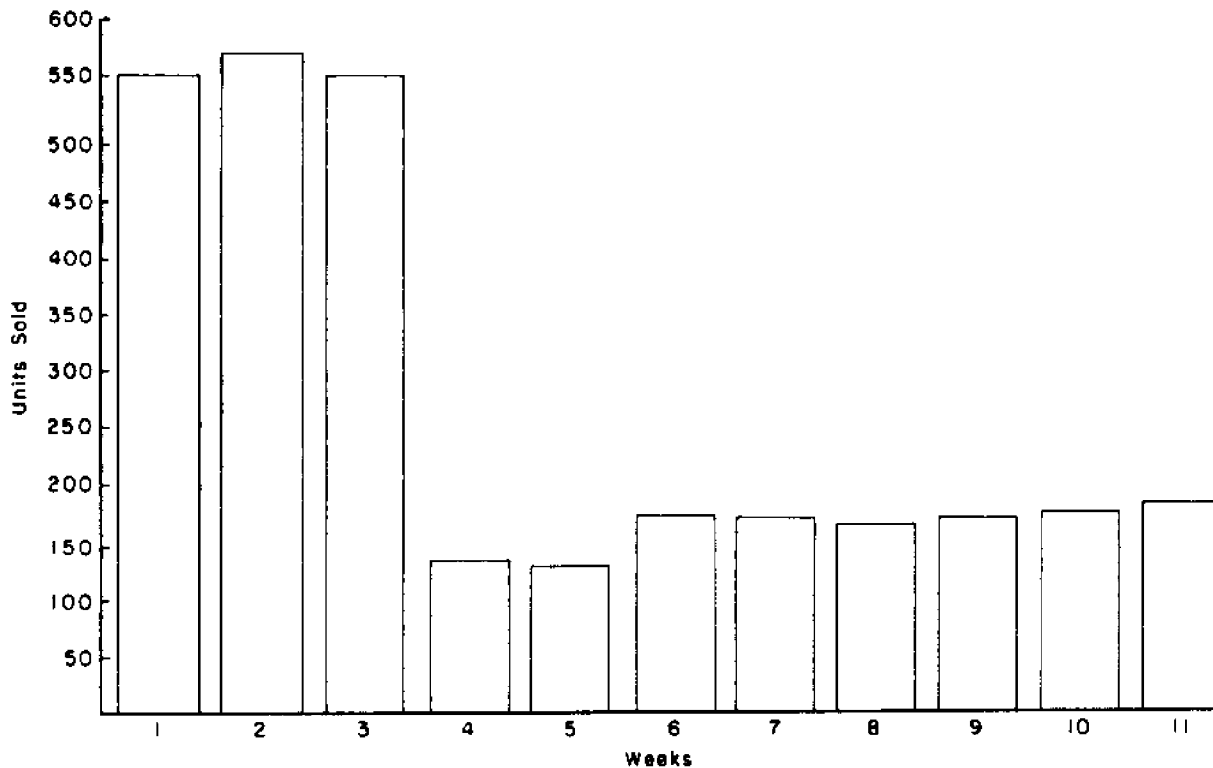
Table 3. SALES OF FROZEN MINCED FISH, BY TIME PERIOD
Six Supermarkets, 11 Weeks, December 1976-February 1977
Rochester, New York

Time period	Total sales in pounds	Pounds per week		Pounds per \$1,000 store sales	Pounds per 1,000 customer transactions
		Total	Per store		
Demonstration (introductory 3-week) period	1,691	563.67	93.95	0.53	5.40
Weeks 4-8	736	147.20	24.53	0.13	1.44
Final 3 weeks	508	169.33	28.22	0.16	1.70
Total test	2,935	266.82	44.47	0.24	2.61

Weekly sales per store were about 94 pounds of Frozen Minced Fish in contrast to the level of about 26 pounds during the remaining eight weeks. Introductory period sales per \$1,000 total store sales were 0.53 pounds compared to about 0.15 for the balance of the test. Similarly, 5.4 pounds per 1,000 customers was markedly higher than the rates recorded later in the experiment.

After the three-week introductory period, however, sales of Frozen Minced Fish immediately reached an expected lower level. The surprising stability of sales at this level for the remainder of the test is all the more remarkable in view of the absence of any promotional effort beyond the third week. Indeed, Frozen Minced Fish sales not only held their post-introduction levels, but even slightly improved average volumes during the final three weeks of the market test. There are at least two possible reasons for this phenomenon. First, the fifth week of the experiment was the Christmas/New Year's holiday period, and thus was not a time for traditionally heavy sales of fish. Second, sales during the last three weeks of the test (February) might have been influenced by purchases of fish in anticipation of the heavier use during the Lenten season. Regardless of the reasons, the sales of Frozen Minced Fish after the first three weeks of in-store demonstrations showed considerable strength (Figure 1).

FIGURE 1. WEEKLY SALES OF FROZEN MINCED FISH, SIX SUPERMARKETS, ROCHESTER, NEW YORK, DECEMBER 1976- FEBRUARY 1977



Management of the food retailing firms offering Frozen Minced Fish considered the test results very satisfactory. With the exception of one outlet, sales levels warranted the product's continuation.

A more precise measure of success based on a direct comparison of sales of Frozen Minced Fish with sales of other frozen unprepared fish items in the test stores was not available. An alternate standard for comparison, however, was derived from the summary of store volumes of selected product lines published annually by a food distribution trade journal.^{10/} Average movement of frozen unprepared fish in such stores was 47 units per week.

Average total dollar sales of the test stores in the present study were approximately 3.5 times the average sales reported by the trade journal. Thus, if one assumes a direct relationship between store size and seafood sales, a useful standard against which to measure Frozen Minced Fish is 165 units (3.5 x 47) of frozen unprepared fish per store per week. By this comparison, weekly sales of Frozen Minced Fish during the final three weeks of the Rochester test was 17 percent, or about one-sixth, of the unit sales of all frozen unprepared fish.

Furthermore, since the test stores offered a weighted average of 7.3 different frozen unprepared fish items, equal distribution of the estimated 165 units per week would be about 23 units per item. Sales of 28 units of Frozen Minced Fish thus exceeded this average volume movement.

Ithaca Supermarkets

Frozen Minced Fish was offered in two supermarkets in Ithaca, New York, for the period of only three introductory weeks. Thus the sales data in Table 4 must be viewed in light of the effects of in-store demonstrations. Nevertheless, volumes were surprisingly high when compared to the Rochester experience. News of the test in a local weekly newspaper, and the fact that Frozen Minced Fish was a "local" product may have been responsible. Whatever the reasons, sales of Frozen Minced Fish while only one-third higher per store than for the comparable period in Rochester, were about twice as high per dollar of store revenue and customer transactions. This unexpectedly strong performance caused the premature termination of the test since sufficient product was not available.

¹⁰ Chain Store Age Supermarkets, July 1976, Lebhar-Friedman, Inc., New York, N.Y.

Table 4. SALES OF FROZEN MINCED FISH, BY STORE
Two Supermarkets, Three Introductory Weeks, February 1977
Ithaca, New York

Store	Total sales in pounds	Pounds per week	Pounds per \$1,000 store sales	Pounds per 1,000 customer transactions
Store G	437	145.7	1.05	14.45
Store H	325	108.3	0.90	10.85
Both stores	762	254.0	0.98	12.66

The two stores sold 762 pounds of Frozen Minced Fish in three weeks. This was nearly one pound per \$1,000 of total store revenue and more than 12 pounds per 1,000 customer transactions. Level of sales during the remaining five of the intended eight weeks can only be conjecture, but it likely would have been higher than that reported for Rochester.

Consumer Surveys

During the final two days of in-store demonstrations in all supermarkets except Store F, home economists administered a brief survey to determine the opinions of purchasers and users of Frozen Minced Fish. More than 800 shoppers chosen from the stream of all shoppers passing the Frozen Minced Fish demonstration were included (Table 5). Somewhat more than 300 were aware of the new product and less than one-half of this group actually had purchased Frozen Minced Fish.

Table 5. IN-STORE SURVEY RESPONSES OF RETAIL SHOPPERS
Seven Supermarkets, 1976-77
Rochester and Ithaca, New York

Factor	Results
Number of shoppers surveyed	843
Number of shoppers aware of Frozen Minced Fish	337
Percent of 843 shoppers	40
Number of shoppers purchasing Frozen Minced Fish	151
Percent of 843 shoppers	18
Number of shoppers purchasing Frozen Minced Fish two or more times	17
Percent of 151 purchasers	11
Number of purchasers/users of Frozen Minced Fish	101
Percent of 151 purchasers	67
Number of purchasers/users expecting to repurchase Frozen Minced Fish	96
Percent of 101 purchasers/users	95
Intended frequency of repurchase:	
Once per week	17
Twice per month	37
Once per month	22
Non-specific frequency	24

Of those who had purchased the product, 11 percent had bought it twice in the period of the 16 days that it had been available. Unfortunately, no further indicator of repeat purchases was acquired, again because of the premature termination of the planned test.

Since one of the two demonstrated uses of Frozen Minced Fish in the store should have been perceived as a meat substitute and the other as a fish substitute, respondents were asked to recall the circumstances of their purchases. Nearly one-half stated that they did not buy Frozen Minced Fish in conscious substitution either for fish or seafood, or for ground beef. Somewhat more than 40 percent indicated that they purchased Frozen Minced Fish as a substitute for some other fish/seafood product, while another 10 percent claimed substitution for the purchase of ground beef. Had the product in most of the stores been located in or closer to the meat display, this proportion might have been higher.

About 67 percent of Frozen Minced Fish purchasers already had used the product at the time of the survey, and 95 percent of these users said that they expected to repurchase it. Of those who planned to purchase again, about one-sixth thought they would purchase Frozen Minced Fish on a frequency of once a week while another 37 percent expected to buy twice a month. More than one-fifth planned to purchase the product once a month. In general then, about three-fourths of those consumers planning to repurchase Frozen Minced Fish said they would do so at least once a month.

Purchasers in Ithaca supermarkets during the last three days of the experiment bought Frozen Minced Fish packages to which a return postcard had been attached. The 140 postcards distributed this way included questions similar to those asked of shoppers during the in-store survey. Return postcards were received from 45 purchasers. More than one-fourth had purchased Frozen Minced Fish two or more times within the three-week test period. A large majority of the 33 customers who had purchased Frozen Minced Fish only once, and thus were unlikely to have been included in the in-store survey, indicated that they would purchase the product again when available. Similarly, well over half said they would purchase and presumably serve Frozen Minced Fish at least twice a month.

This apparent predisposition to repurchase was not confirmed by subsequent sales results in Rochester. Several reasons for this disparity can be advanced. One possible explanation is that some of those who claimed intentions to repurchase at frequent intervals were not accurately reflecting their true intentions; perhaps they simply were trying to please the interviewer. Another explanation is that, however genuine the shopper's original plans, the absence of promotional support during the final eight weeks of the test effectively suppressed the purchase stimuli and cues necessary for another transaction. Finally, since one-third of the purchasers had not used the Frozen Minced Fish by the time they were interviewed, the sales impact of their potential repurchases may have been substantially delayed. Taken together, these factors help account for the discrepancy between projected sales based on survey results and sales actually recorded.

The Retail Seafood Market

Relative to the size of the total retail enterprise, the seafood market reported significantly higher sales levels of Frozen Minced Fish than did the supermarkets. This no doubt is due to the nature of clientele and product line. During the 18-week test, 451 pounds of Frozen Minced Fish were purchased, an average of about 25 units per week (Table 6).

Table 6. SALES OF FROZEN MINCED FISH
One Retail Seafood Market, October 1976-February 1977
Rochester, New York

Test period	Total sales in pounds	Pounds per week	Pounds per \$1,000 store sales	Pounds per 1,000 customer transactions
Demonstration (introductory 6-week) period	230	38.3	6.60	45.43
Weeks 7-12	91	15.2	1.05	12.39
Final 6 weeks	130	21.7	4.95	27.92
Total 18 weeks	451	25.1	3.06	26.43

As with the supermarkets, sales during the introductory/demonstration period, which in this case was six weeks in length, were much higher than during the remainder of the test. More than 38 pounds per week were purchased during the introductory period compared to 15 pounds during the following six weeks. The especially low level of sales during this middle period was caused at least in part by a shift during the Christmas/New Year's holidays away from finfish to specialty seafood items such as shrimp.

Frozen Minced Fish sales relative to store volume and traffic were many times greater than in the supermarkets. Furthermore, test sales remained remarkably strong during the final six weeks. Frozen Minced Fish sales of 6.60 pounds were reported for every \$1,000 of store sales during the early period; the average over the entire period was about one-half that rate. During the introductory six weeks, about 45 pounds per 1,000 customers were sold. This rate later declined but remained sufficiently high to achieve an average of 26 pounds for the entire test period.

Summary and Conclusions

One-pound packages of Frozen Minced Fish were offered for sale in eight supermarkets and one retail seafood market at a price of 89 cents for periods varying from three to 18 weeks. Sales in every test store reached very high levels during the introductory weeks when in-store product demonstrations were carried out.

In six of the seven stores which carried the product for at least 11 weeks, Frozen Minced Fish sales immediately declined by 50 to 75 percent from these high introductory levels to satisfactory and remarkably stable levels for the remainder of the test. This sustained sales performance registered without promotional support, and the high proportion of Frozen Minced Fish users intending to repurchase, suggest promising results for products similar to Frozen Minced Fish if prepared and marketed commercially.

APPENDIX

REPRODUCTION OF FROZEN MINCED FISH RECIPE BOOKLET

You have purchased a package of frozen, deboned (minced) fish meat. Though the texture may seem more like hamburger than fish, it is almost identical in nutritional quality (low in fat, high in protein and low in calories) to fish purchased in more traditional forms. The tested recipes in this booklet will help demonstrate the product's versatility and give you some ideas for using it.

How to Use Minced Fish

Methods of thawing: 8-10 hours in the refrigerator or until the product can be broken apart with a fork but still has some ice crystals remaining.

If you must rush the thawing process, put the unopened package in cold water for about 1 1/2 hours, turning it over occasionally.

Using in your favorite hamburger recipe: The minced fish can be substituted in many recipes calling for hamburger, although, of course, the flavor will be somewhat different. It is particularly useful in recipes that call for ground meat in a "crumbly" form. However, since the fish has about 2% fat, instead of the (up to) 30% fat in hamburger, it may be necessary to add some vegetable oil to either the fish or the frying pan. About 2 tablespoons per pound should be sufficient; the fat content will then only be about 8%.

The product should be cooked until it is grey-white in color and becomes crumbly. It can then be used just like cooked hamburger.

Slightly smaller amounts of liquid (milk, water, etc.) should be added to the fish meat in recipes which call for added liquid as fish naturally contains more water than other meat.

Many of the packaged mixes for hamburger (Hamburger Helpers, Sloppy Joes, etc.) can be adapted for minced fish.

Fish Patties

In order to make patties and loaves from this fish, a binder is needed, as well as a small amount of oil.

1 lb. semi-thawed fish	3/4 cup oatmeal
2 tbsp. oil	1 tsp. salt
1 egg	1/8 tsp. pepper

Mix together, shape into 6 patties. Pan fry in small amount of oil until just cooked, 10-15 minutes. Serve on toasted buns or as dinner entree, with ketchup or sauce, such as mushroom.

Fish Loaf

In order to make patties and loaves from this fish, a binder is needed, as well as a small amount of oil.

1 lb. semi-thawed fish	1 cup chopped onion
2 tbsp. oil	1/2 pkg. dry onion soup mix
3/4 cup oatmeal	2 tsp. soy sauce
2 eggs, beaten	

Mix together all ingredients except 1 tsp. soy sauce. Put into greased loaf pan, pour remaining 1 tsp. soy sauce over top. Bake at 350° F for about 1 hour. Makes 4-6 servings.

Sloppy Jonahs

Cook 1 lb. semi-thawed fish in 2 tbsp. oil. Blend in 1 tsp. salt, 1/4 tsp. pepper, and 2 tbsp. flour. Add 1 tbsp. dry minced onion, 1 cup water, 1/2 tsp. Worcestershire sauce, and 1 can (8 oz.) tomato sauce. Simmer, stirring often, for 20 minutes or until thick. Serve on rolls. Makes 4-5 sandwiches.

Fish Stroganoff Style

1/4 cup chopped onions	1/4 tsp. garlic salt
2 tbsp. butter or margarine	salt and pepper to taste
1 lb. semi-thawed fish	1/2 cup sour cream (room temperature)
1 can (3 oz.) sliced or chopped mushrooms, drained (reserve liquid)	cooked rice or mashed potatoes
1 can cream of mushroom soup	

Saute onion and mushrooms in 2 tbsp. butter until golden, add semi-thawed fish. Stir until crumbly. Add salt, pepper, mushroom liquid, and soup, simmer gently for 15 minutes. Add sour cream, stir in and heat, but do not boil. Sprinkle with parsley if desired, serve with rice or mashed potatoes. Makes 4 servings.

Lasagna Oceana

8 oz. lasagna noodles	Sauce (below)
1 lb. ricotta cheese	1/2 cup grated Parmesan cheese
8 oz. mozzarella cheese, sliced	

Cook noodles in boiling, salted water 25 minutes, or until tender. Drain. Arrange in shallow 2 1/2-quart baking dish, making 3 layers each of noodles, ricotta, mozzarella, sauce, and Parmesan. Bake at 325° F for about 45 minutes. Makes 6 servings.

Sauce

1 medium onion, chopped	2 cups water
2 cloves garlic, chopped	1 tbsp. salt
2 tbsp. oil	1/8 tsp. cayenne pepper
1 lb. semi-thawed fish	1 tsp. salt
3 1/2 cups (1 lb. 12 oz. can) tomatoes	pinch of oregano
1 can (6 oz.) tomato paste	1 bay leaf

Brown onion and garlic lightly in oil, add fish and cook until crumbly. Add remaining ingredients and simmer, uncovered, for 1 1/2 hours. Remove bay leaf.

Scalloped Fish and Potatoes

1 lb. semi-thawed fish	1 cup water
2 tbsp. butter or margarine	1 pkg. (10 oz.) frozen mixed vegetables
1 tsp. salt	2 cups thinly sliced, peeled potatoes
1/2 tsp. paprika	1 cup buttered bread crumbs
1/8 tsp. pepper	
1/8 tsp. poultry seasoning	
1 envelope onion sauce mix or mushroom sauce mix	

Cook fish with butter or margarine until crumbly, stirring. Add seasonings. Sprinkle onion sauce mix over top, stir in water. Heat just to boiling, stir in mixed vegetables. (Continued)

Scalloped Fish and Potatoes (Continued)

Spoon 1/3 into greased baking dish, top with half the potatoes, repeat, then top with remaining fish mixture. Cover, bake in moderate oven (375° F) for about 45 minutes. Uncover, sprinkle with bread crumbs. Bake about 10 minutes longer or until crumbs are golden brown. Makes 4 servings.

Variations: Substitute a can of cream soup, such as mushroom or celery, plus 1/3 soup can of water for the sauce mix and water.

Substitute frozen peas for mixed vegetables.

Seafood Casserole with Corn Chips

1 lb. semi-thawed fish	1 can shrimp soup, thawed
1/2 cup chopped onion	1/2 cup milk
3 tbsp. salad oil	1 pkg. frozen peas
2 tbsp. flour	3 cups corn chips
1 tsp. salt	

Cook fish and onion in oil until fish is crumbly. Stir in flour, then soup, milk, and peas. Spread 2 cups corn chips on bottom of 12 x 18-inch oven-proof casserole dish, add fish mixture. Sprinkle remaining chips around edges. Bake at 350° F for 25-30 minutes. Makes about 6 servings.

Creamy Fish Balls

1 lb. thawed fish	1/4 cup chopped onion
1/2 cup dry bread crumbs	1 tsp. MSG (Accent)
1/2 cup double strength reconstituted dry milk or undiluted evaporated milk	1 egg flour oil
1 tsp. salt	1/2 tsp. nutmeg

Mix together very well, shape into small balls. Roll in flour, fry in small amount of oil until browned on all sides. Remove each lot as it is browned. When all are browned, make sauce in frying pan with the following:

Creamy Fish Balls (Continued)

2 tbsp. oil left from frying	1/2 tsp. onion salt
1 cup milk	salt to taste
1 tsp. soy sauce	

Add fish balls to sauce, cook slowly 15-20 minutes. Serve on rice, noodles, or mashed potatoes. Makes about 4 servings.

Eggplant Parmigiano

1 lb. semi-thawed fish	2 eggs, slightly beaten
2 cloves garlic, minced	fine dry bread crumbs
1/4 cup tomato paste	salad oil
1 can (16 oz.) tomatoes	1/2 lb. sliced mozzarella cheese
salt and pepper	1/2 cup grated Parmesan cheese
2 medium eggplants	oregano

Cook fish and garlic, stirring, till crumbly. Add tomato paste, tomatoes, 1 cup water, 2 tsp. salt, and pepper to taste. Cook slowly 25 minutes. Cut eggplant in 1/2-inch slices, sprinkle with salt, dip in egg, then in crumbs, fry in a little oil till lightly browned. In a large shallow casserole arrange alternate layers of eggplant, mozzarella, sauce, and Parmesan, sprinkle with oregano. Bake at 350° F about 30 minutes. Makes 6 servings.

Rhonda's Fish Dish

1 lb. semi-thawed fish	4 medium potatoes, thinly sliced
2 tbsp. oil	salt and pepper to taste
1/2 pkg. frozen peas	sprinkling of basil
1 medium onion, thinly sliced	1 cup bread crumbs
6 canned water chestnuts, thinly sliced	2 tbsp. butter
1 large (14 oz.) can evaporated milk	

Cook fish in oil until crumbly. Add onions, peas, and water chestnuts, stir in milk gently. Layer fish mixture in baking pan alternately with sliced potatoes. Sprinkle with basil, then bread crumbs, and dot with butter. Bake at 375° F for about 1 hour, uncovered. Serves 4.

Quick Fish Pie

1 lb. semi-thawed fish	1 small can (2/3 cup) evaporated milk
1 large onion, chopped	1 can (8 oz.) peas
2 tbsp. butter or margarine	2 pimientos, diced
1/3 cup flour	4 slices buttered bread, halved diagonally
1 tsp. salt	
2 cups milk	

Cook fish in butter or margarine until crumbly, stir in onion and cook a few minutes longer, or until soft. Stir in flour, salt, milk, and evaporated milk. Cook, stirring constantly, until mixture thickens and boils 1 minute. Stir in peas and their liquid and pimientos. Pour into greased shallow baking dish, top with overlapping bread slices. Bake in hot oven (400° F) until bread is golden brown, about 10 minutes. Makes 4-6 servings.

Molded Fish Salad

1 lb. semi-thawed fish	1/4 cup diced celery
1 tbsp. (1 pkg.) gelatin	1/2 tsp. salt
1/4 cup water	1 tbsp. lemon juice
1 cup mayonnaise	1 tsp. dill weed, fresh if available
1/4 cup pickle relish	

Mix gelatin with water, let stand a few minutes. Cook fish in its juice until crumbly, stirring constantly. Stir in gelatin, cool. Blend in remaining ingredients. Refrigerate until mixture starts to congeal, then stir to mix ingredients and spoon into a mold, preferably fish shaped. Refrigerate until set, then turn out onto a lettuce-lined platter. Makes 6 servings.

Fish Chowder

1 lb. semi-thawed fish	1 1/2 tsp. salt
2 tbsp. oil or shortening	3 tbsp. flour
1/2 cup chopped onion	3 cups milk
2 cups water	1 tbsp. minced parsley
2 cups diced raw potatoes	

Cook onion in oil until lightly browned. Stir in fish and cook, stirring until crumbly. Add water, potatoes, and salt. Simmer, covered, until potatoes are tender. Stir about 1/2 cup of milk into flour, add to fish mixture, bring to boil, and simmer 1-2 minutes. Add remaining milk and heat to boiling. Sprinkle parsley on bowls of soup before serving. Makes 6-8 servings.

Gefilte Fish

Fish Balls:

1 lb. thawed minced fish
1 small onion, finely chopped
1 egg
1/4 cup matzo meal
3/4 tsp. salt
1/8 tsp. pepper

Broth:

2 cups water
1 sliced carrot
1 sliced onion
1 sliced celery stalk
1 tsp. salt

Bring broth ingredients to boil. Beat fish ball ingredients together with electric mixer until sticky, 2-3 minutes. Shape in small balls with wet hands, drop into broth, turn down heat, and simmer slowly for 1 hour, covered. Remove from broth, chill, serve with beet horseradish sauce as an appetizer. Makes 25-30 balls.

