



Progress on Projects, November 1953

DEVELOPMENT OF A DRIED PRODUCT FROM CONDENSED MENHADEN SOLUBLES OR STICKWATER: Proximate composition and analyses for physical and chemical characteristics were made on menhaden solubles from various plants throughout the Atlantic and Gulf areas. These tests were made to obtain detailed information on the physical and chemical properties of menhaden solubles which would lead to a better understanding of the problems involved in the preparation of a dry material and to the development of methods for the retardation or elimination of hygroscopicity of the finished product. The results to date on the analyses of different menhaden solubles samples are as follows:

Characteristics of Menhaden Solubles

Determination	Number of Samples	Average Value	Median Value	Minimum	Maximum
pHa/	33	4.86	4.82	3.24	6.13
Refractive Index ^b /	33	1.4212	1.4220	1.4018	1.4322
Specific Gravity	28	1.195	1.190	1.144	1.262
Viscosity (MacMichael ^c /)	33	217	78	13	3000
Protein (N x 6.25)--percent ..	28	33.2	32.7	30.8	38.0
Fat (ether extraction)--percent	18	6.89	7.60	1.53	11.50
Dry Solids--percent	29	48.4	48.8	43.2	53.3
Water Insoluble matter--percent	23	4.65	4.10	2.95	9.22
Ash--percent	32	9.24	9.31	5.47	13.07
Water-Insoluble Ash--percent .	23	0.31	0.25	0.06	1.04

^A/SOME OF THE SAMPLES WITH HIGH pH VALUES DID NOT CONTAIN ADDED ACID.
^B/THESE VALUES ARE INCLUDED SINCE MANY PLANTS USE THE HAND REFRACTOMETER TO DETERMINE THE SOLIDS CONTENT. IN A MAJORITY OF THE SAMPLES THE NATURE OF THE RAW MATERIAL DID NOT PERMIT A SHARP LINE READING, THEREFORE THE VALUES MAY BE CONSIDERED AS APPROXIMATE.
^C/DETERMINED WITH A MACMICHAEL VISCOSIMETER WHICH MEASURES THE TWIST GIVEN A BRONZE WIRE BY THE MATERIAL IN A ROTATING CUP. THE LARGE RANGE IN VISCOSITY REQUIRED THE USE OF SEVERAL WIRES, BUT COMPARABLE VALUES WERE OBTAINED BY USE OF CONVERSION FACTORS.

(College Park)

CHEMICAL AND PHYSICAL PROPERTIES OF FISH AND SHELLFISH PROTEINS:

The current phase of this project deals with the study of the nature and control of drip in thawed frozen fish. Preliminary data were obtained with frozen rockfish to obtain a comparison of the amount of drip produced from frozen rockfish fillets when cooked (1) after thawing and (2) in the frozen state. The tests were made during periodic intervals of storage of the frozen fillets so as to observe the effect of storage conditions on the drip formation. It was found for frozen rockfish fillets that the loss of weight in the form of drip was much less for those fillets cooked (baked) while frozen than for those fillets cooked after thawing. Periodic examinations showed that storage of the frozen fillets produced progressively greater amounts of drip when the fillets were thawed prior to cooking, but resulted in a slight decrease in the amount of drip when the fillets were cooked while frozen.

In order to determine whether these observations apply to other frozen fish, two additional series were initiated using frozen silver salmon and halibut fillets. The results to date are as follows:

Samples of Fillets		Loss in Weight			
Species of fish	Condition and treatment ^{a/}	As drip formed during thawing	Evaporation during cooking	As drip formed during cooking	Total
		Percent	Percent	Percent	
Silver salmon	Fresh (not frozen)	-	10.2	5.9	16.1
	Frozen & stored for 3 days at 0°F. then thawed & cooked.	0.5	7.0	6.3	13.8
	Frozen & stored for 3 days at 0°F. then cooked while frozen	-	5.0	7.7	12.7
Halibut	Fresh (not frozen)	-	11.2	13.3	24.5
	Frozen & stored for 3 days at 0°F. then thawed & cooked	8.1	7.6	10.9	26.6
	Frozen & stored for 3 days at 0°F. then cooked while frozen	-	4.0	11.6	15.6

^{a/}FOR THE COOKING TESTS, THE SAMPLES WERE BAKED AT 350° F. FOR 23 MINUTES FOR THE FRESH (NOT FROZEN) FILLETS AND FOR 33 MINUTES FOR THE FROZEN FILLETS.

(Seattle)

COMPOSITION OF FISH: The proximate composition of individual samples of sheepshead (*Aplodinotus grunniens*) caught in the Mississippi River near Clinton, Iowa, was determined. The data are of samples of fish taken in the same area during May and August 1953. The purpose of this phase of the project is to determine the variation in composition of certain fish during different seasons of the year. The results are shown in tables 1 and 2.

Table 1 - Composition of Sheepshead Caught in the Mississippi River near Clinton, Iowa, in May 1953

Sample Number	Length Cm.	Weight Grams	Proximate Composition of Edible Portion			
			Moisture Percent	Fat Percent	Protein Percent	Ash Percent
1	31.5	395	76.0	4.75	18.1	1.15
2	29.5	325	75.4	5.36	18.1	1.15
4	27.5	255	79.4	1.45	17.9	1.12
5	33.0	420	72.5	7.08	16.9	1.12
6	31.5	435	73.6	7.30	17.6	1.36
7	33.0	425	74.8	8.58	17.1	1.00
8	32.0	425	79.9	1.78	16.8	1.12
9	32.0	490	70.0	13.0	16.5	1.03
10	33.0	515	74.9	9.20	17.7	1.01
11	33.5	490	72.0	13.5	17.5	1.00
12	33.0	525	69.4	14.2	16.4	1.08
13	33.0	485	74.7	7.40	17.8	1.12
14	35.5	660	73.3	9.00	17.3	1.05
15	34.0	575	71.1	11.7	17.2	1.00
16	38.0	765	71.4	11.6	17.4	1.06
AVERAGE	30.7	479	73.9	8.39	17.4	1.09

NOTE: RESULTS OF THE FIRST SIX SAMPLES OF SHEEPSHEAD CAUGHT IN MAY WERE PREVIOUSLY REPORTED IN THE OCTOBER 1953 ISSUE OF COMMERCIAL FISHERIES REVIEW, BUT ARE REPEATED IN THIS TABLE WITH THE REMAINDER OF THE SERIES SO THAT THE RESULTS OF THE TWO COMPLETE LOTS TAKEN IN MAY AND AUGUST MAY BE COMPARED.

The individual fish taken in August were considerably larger than those taken in May. Average weight of fish taken in August was 811 grams; in May, 479 grams. The average fat content of the August samples was 7.34 percent as compared to 8.39 percent for the fish taken in May. There was no significant seasonal variation in the moisture, protein, and ash contents.

Table 2 - Composition of Sheepshead Caught in the Mississippi River near Clinton, Iowa, in August 1953

Sample Number	Length	Weight	Proximate Composition of Edible Portion			
			Moisture	Fat	Protein	Ash
	Cm.	Grams	Percent	Percent	Percent	Percent
1	26.0	210	75.2	4.35	15.9	1.17
2	27.5	250	76.9	2.37	19.9	1.27
3	30.0	360	78.0	1.52	19.3	1.11
4	32.5	495	76.5	8.31	19.0	1.12
5	32.0	490	74.1	8.32	17.8	1.04
6	37.0	760	72.8	9.11	17.8	1.03
7	36.5	790	76.6	6.05	14.8	1.00
8	37.0	790	74.9	6.73	16.9	1.00
9	40.0	1,075	70.7	11.1	17.9	0.97
10	40.0	1,000	76.4	6.48	16.7	0.94
11	41.0	1,015	74.5	9.55	16.9	0.96
12	41.0	1,055	72.2	11.3	16.7	0.92
13	41.0	975	73.0	8.18	18.2	1.15
14	40.5	1,080	70.8	10.20	18.1	0.98
15	44.0	1,280	76.2	6.43	17.6	1.01
16	43.0	1,345	73.7	7.40	18.8	1.05
AVERAGE	36.8	811	74.5	7.34	17.7	1.04

(Seattle)

FREEZING FISH AT SEA--NEW ENGLAND: A fire of unknown origin destroyed the after quarters and galley of the Service's research trawler Delaware. The vessel had just returned from another successful trip (Cruise 25) to obtain a large lot of haddock for byproducts studies and to obtain, for storage tests, various commercial species of fish other than cod and haddock previously tested. The Delaware returned to the laboratory dock in Lockwood Basin, East Boston, on October 22 with 22,500 pounds of brine-frozen fish and 3,000 pounds of iced fish. Much of the frozen fish was salvaged, but none can be used for test purposes. Plans are being made to repair the Delaware; however, it is not possible to predict at this time the extent of the vessel's operations during the remainder of this fiscal year.

On this last cruise the vessel was at sea for nine days. Fishing was conducted mostly in the Georges Bank area. The refrigeration equipment performed satisfactorily throughout the trip.

The brine-frozen fish consisted of 3,500 pounds of haddock; 10,000 pounds of scrod haddock; 2,000 pounds of pollock; 2,000 pounds of whiting; and 5,000 pounds of ocean perch. The lot of iced, gutted fish was composed entirely of haddock.

(Boston)

CORRECTION

COLD STORAGE LIFE OF FROZEN SILVER AND KING SALMON: In the August issue of Commercial Fisheries Review, pp. 20-21, the results from the periodic examination of the frozen silver and king salmon stored for 9 months at 0° F. were incorrectly reported.

The corrected results follow:

Results of Storage Tests on Frozen Silver and King Salmon

Series Number	Species of Salmon	Description of Dressed Fish Used to Produce Steaks	Storage period of the samples			Quality of Salmon Steaks After Total Storage Period			
			Dressed Fish Prior to Steaking	Steaks Prepared from the Dressed Fish	Total (dressed fish and corresponding steaks)				
			Months	Months	Months				
I	Silver	Fish from Neah Bay, Wash. -- dressed, frozen, and stored at 0°F.	0	0	0	Good to excellent.			
				3	3	Good, but belly tips were slightly rancid.			
				6	6	Fair; color moderately faded; belly tips and dark meat rancid; flat to off-flavor.			
				9	9	Poor; color moderately faded; belly tips and dark meat very rancid; off-flavor.			
			3	0	3	Good, but belly tips were slightly rancid.			
				3	6	Fair; color faded slightly; belly tips and dark meat rancid; flat to off-flavor.			
				6	9	Fair to poor; color slightly faded; belly tips rancid; dark meat slightly rancid; off-flavor.			
			6	0	6	Good, but belly tips were slightly rancid.			
				3	9	Fair; color slightly faded; belly tips rancid; dark meat slightly rancid; off-flavor.			
			9	0	9	Good, but belly tips were slightly rancid.			
			II	Silver	Fish from Lapush, Wash. -- Dressed, frozen, and stored at 0°F.	0	0	0	Good to excellent.
							3	3	Good, but belly tips were slightly rancid.
6	6	Fair; color slightly faded; belly tips and dark meat were rancid; flat to off-flavor.							
9	9	Unacceptable; color faded badly; belly tips and dark meat were very rancid; off-flavor.							
3	0	3				Good, but belly tips were slightly rancid.			
	3	6				Fair; color slightly faded; belly tips and dark meat were rancid; flat to off-flavor.			
	6	9				Poor; color faded to pale; belly tips and dark meat were rancid; off-flavor.			
6	0	6				Good, but belly tips were slightly rancid.			
	3	9				Fair to poor; rancid belly tips; off-flavor.			
9	0	9				Good, but belly tips were slightly rancid.			

Results of Storage Tests on Frozen Silver and King Salmon (Continued)

Series Number	Species of Salmon	Description of Dressed Fish Used to Produce Steaks	Storage period of the samples			Quality of Salmon Steaks After Total Storage Period
			Dressed Fish Prior to Steaking	Steaks Prepared from the Dressed Fish	Total (dressed fish and corresponding steaks)	
			Months	Months	Months	
III	Chinook	Fish from Illwaco, Wash. -- Dressed, frozen, and stored at 0°F.	0	0	0	Good to excellent, but texture somewhat soft.
				3	3	Good, but texture was somewhat soft and belly tips were slightly rancid.
				6	6	Fair; color slightly faded; belly tips and dark meat were rancid; flat to off-flavor.
				9	9	Poor to unacceptable; color faded considerably; belly tips and dark meat were very rancid; off-flavor.
			3	0	3	Good, but texture somewhat soft.
				3	6	Fair to good; color slightly faded; belly tips slightly rancid; slight loss of flavor.
				6	9	Fair; color slightly faded; belly tips were rancid; dark meat showed trace of rancidity; off-flavor.
			6	0	6	Good, but belly tips were slightly rancid.
				3	9	Fair; color slightly faded; belly tips were rancid; dark meat showed trace of rancidity; off-flavor.
			9	0	9	Good, but belly tips were slightly rancid.

(Seattle)



DO YOU KNOW:

That potential sales for a new cat food consisting of whole fish are great since in the United States only 8 percent of the owners of 28 million cats now buy a prepared food.

--Weekly Digest, November 28, 1953
(The American Institute of Food Distribution, Inc.)

TECHNICAL NOTE NO. 28--POSSIBILITIES FOR THE PRODUCTION OF FISHERY SPECIALTY PRODUCTS IN ALASKA

In Alaska there is a well-recognized need for off-season industry to supply work for residents either before or after the short salmon-canning season. The production of various fishery specialty products would be one way of attaining year-round work for some Alaskans.

By specialty products we normally mean those products which are produced for limited or special markets. A broader and perhaps truer definition today would be any distinctive fishery product, either canned (heat-processed), pickled, smoked, or frozen, that requires more than the minimum amount of effort in its preparation and packaging. For the purpose of this discussion we will consider as staples fresh fish in general, canned fish (such as salmon and tuna), and frozen fish or fish fillets. Specialties are such products as smoked, breaded, and pickled fish and shellfish; also various fish pastes and spreads.

There are three general classifications of specialty products: (1) Low-priced large-volume products; (2) medium-priced large- or medium-volume products; and (3) high-priced limited-volume products. These products, depending upon their classification, have found markets for various reasons, the main one being that people like variety in their diets. Although markets are limited within Alaska because of the relatively small population, the current increasing population will tend to expand the markets for specialty products within the Territory. Volume production of many specialty products is contingent on promotion of increased consumption and the development of new market outlets.

Alaska is capable of producing a variety of specialty fish products. Certainly the availability of the raw materials is no problem. At various periods during the year commercial quantities of butter clams, herring, cod, sablefish, shrimp, crab, and many varieties of bottom and flat fish are available. At present many of these species are not even being fully utilized for food purposes. This does not take into consideration the tremendous quantities of edible trimmings discarded each year by the salmon canneries and the lower-priced salmon as sources of raw material for the preparation of specialty products. The remaining question is, "What types of specialty products could be produced by small concerns in Alaska?"

The technological problems involved in the preparation of fishery specialty products are concerned primarily with the procurement and handling of the raw material and the development of processing recommendations. The construction of a controlled tunnel-type smokehouse and a study of smoking procedures have been an important part of the developmental work at the Fishery Products Laboratory, Ketchikan, Alaska. Heat-processing recommendations were determined for each product, using copper-constantin thermocouples and a recording potentiometer and standard methods of calculation. Laboratory taste panels evaluated the appetite appeal, and storage tests were conducted to determine the keeping quality of each product. The methods developed are suitable for application under the conditions of small plants in Alaska which do not have capital for the purchase of expensive equipment or the employment of technically trained personnel. Work has been completed on the preparation of the following products: kelp sea pickles and relish, smoked salmon caviar spreads, smoked chum salmon spread, canned smoked salmon, canned smoked clams, canned smoked shrimp, and various smoked products from Alaska herring. All of these products were tested by the Laboratory's taste panel and were found to be very acceptable.

The products mentioned are just a few of those which could be produced from the fishery resources of Alaska. The main problems facing potential producers in Alaska are the high costs of labor, material, and transportation to volume markets. However, small-scale industry, even family-size industry, should be able to produce profitably many of the products mentioned.

Perhaps the best method of marketing any specialty sea-food product from Alaska would be in gift packages. The idea has proven to be very profitable to the fruit industry, where the gift package first grew into a large-sized industry. At present many other food industries have gone into the gift-package business, marketing their specialized packs at a better-than-average price. This would be the ideal way to market Alaska products such as canned smoked salmon, smoked fish spreads, kelp pickles, and relish. Fancy packs in colorful containers, attractively packaged, would sell for premium prices. The amount of tourist trade to Alaska, which grows each year, is a measure of the interest shown by people of the United States in the Territory. The name Alaska on a gift package would attract many consumers from all the States.

It is felt that there is always a market for a high-quality product which is good-tasting, a little out of the ordinary, and attractively packaged. The work on this project has shown that such products could be produced from readily available fishery resources in Alaska.

--Raymond G. Landgraf, Jr.
Fishery Products Laboratory
Ketchikan, Alaska

NOTE: THE FISHERY PRODUCTS LABORATORY RECENTLY ISSUED TECHNICAL REPORT NO. 6 "SPECIALTY FOOD PRODUCTS FROM ALASKA HERRING," BY R. G. LANDGRAF, JR. AND H. J. CRAVEN, FISHERIES EXPERIMENTAL COMMISSION OF ALASKA, KETCHIKAN. ADDITIONAL REPORTS ON OTHER PHASES OF THE PROJECT ON THE DEVELOPMENT OF SPECIALTY FOOD PRODUCTS FROM ALASKAN FISH ARE IN PREPARATION AND WILL BE ANNOUNCED IN COMMERCIAL FISHERIES REVIEW WHEN READY FOR ISSUE. IN THE MEANTIME, INFORMATION OR PREPARATION OF SPECIFIC SPECIALTY FISH PRODUCTS MAY BE OBTAINED BY WRITING TO THE FISHERY PRODUCTS LABORATORY, 622 MISSION STREET, KETCHIKAN, ALASKA.



FREEZER WRAP FOR FOODS

A coating for meats and other foods, apparently usable as a covering for consumer items or as a "freezer wrap" for products in storage, is being studied by meat processors. Product of a New Jersey plant, the coating has as its base a purified, vacuum-dried derivative of Irish moss, which is mixed with sorbitol and water to produce a skin which can be applied by dip or spray and will set in 30 seconds. The coating is transparent and resilient and can be removed by peeling. It remains firm at temperatures up to 115° F. and is unharmed by freezer conditions. Reports indicate that the product may be used for freezer-burn and moisture-loss protection.

--National Provisioner, Sept. 3, 1952