Progress on Projects, March 1954

VITAMIN CONTENT AND NUTRITIVE VALUE OF FISHERY BYPRODUCTS: Biological Studies: A comparison was made of the growth response of chicks fed drum-dried menhaden solubles to chicks fed solvent-extracted solubles. The results seemed to indicate that the two methods of drying the solubles had no effect on the nutritive value of the protein. (College Park)

* * * * *

FEDERAL SPECIFICATION FOR FISHERY PRODUCTS: The Federal specification--Salmon, Canned, PP-S-31c--was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies. Copies of the canned salmon specification may be purchased for 5 cents.

(Copies of Federal Specifications and the Index of Federal Specifications and Standards may be obtained upon application accompanied by check, money order, cash or Government Printing Office coupons, to the General Services Administration, Business Service Center, Region 3, 7th and D Streets SW., Washington 25, D. C. This office will also honor deposit account numbers issued by the Government Printing Office. Prices may be obtained from the Index of Federal Specifications and Standards, or from the GSA Regional Offices. Single copies of the canned salmon specification and other product specifications required for bidding purposes are available without charge at the GSA Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo.; Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.) (Washington, D. C.)

* * * * *

FREEZING FISH AT SEA--NEW ENGLAND: The contract for repair of the Service's research trawler Delaware recently damaged by fire was awarded to a firm in East Boston, Mass. The vessel was drydocked during the latter part of the month and reconstruction work has already begun. It is expected that the repair work will be completed by the early part of June. (Boston)

* * * * *

Proximate Composition of the Edible Portion of 20 Whitefish

Determination	Maximum	Minimum	Average
	Percent	Percent	Percent
Moisture	80.5	67.0	78.3
Protein	18.1	15.7	17.2
Oil.....	14.1	2.0	4.2
Ash.....	1.3	1.0	1.1

COMPOSITION OF FISH: The proximate analysis was completed of 20 whitefish (Coregonus sp.) caught during January in Birch Lake (near Fairbanks), Alaska. The results are shown in the table.

* * * * *

STUDY OF PHARMACEUTICAL AND OTHER INDUSTRIAL PRODUCTS FROM SALMON EGGS: This phase of the project is concerned with the fatty acids of salmon-egg oils. The objective is to

better characterize the fatty-acid content of the egg oil from pink salmon (O. gorbuscha) with particular emphasis on the more highly unsaturated fractions and also determine commercial outlets or products for which the fractions would be suitable.

Due to the complexity of the mixture of acids present in natural fats, no single method is universally applicable to their separation. In addition, any operation involved in the identification of the component acid fractions that induces oxidation, polymerization, or possibly isomerization, has been regarded with question. Therefore, the experimental procedures were selected with these conditions in mind and were conducted under as mild conditions as possible.

The oil was prepared as follows: The salmon eggs were ground then passed through a screen to remove the shells. The screened mass was mixed with two volumes of warm 2-percent salt solution to obtain a mixture with a temperature of 95° F. to 100° F. The mixture was allowed to stand for two hours at 95° F. to 100° F.; filtered through a 50-mesh copper screen; and finally centrifuged to separate the oil.

Table 1 - Fractional Crystallization from Acetone* of the Fatty Acid Methyl Esters of Oil from Pink-Salmon Eggs

Fraction	Percentage Weight	Iodine Value
Fraction insoluble at -20° F.	7.4	4
Fraction soluble at -20° F. but insoluble at -50° F.	3.3	5
Fraction soluble at -50° F. but insoluble at -83° F.	10.9	108
Fraction soluble at -83° F.	78.4	290

* 450 gm. of the methyl esters were dissolved in 4 l. of acetone.

A 390-gram sample of this oil was taken for the preparation of the methyl esters of the fatty acids. A yield of 358 grams of fatty acid methyl esters was obtained.

The mixed esters were separated into four groups by fractional crystallization from acetone at low temperature. The yield and iodine value of each fraction is summarized in table 1.

The individual groups separated by fractional crystallization at low temperature were further separated by fractional distillation under reduced pressure. The saponification number and iodine value was determined of each of these fractions obtained by vacuum distillation. From these values, the composition was calculated of the groups obtained by fractional crystallization from acetone at -20° F. and -50° F. (table 2).

Table 2 - Composition* of the Fractions Separated by Crystallization from Acetone

Item	Fraction insoluble at -20° F.	Fraction soluble at -20° F. but insoluble at -50° F.
	Percentage Weight	Percentage Weight
Methyl myristate	3.1	32.1
Methyl palmitate	76.2	50.1
Methyl stearate	14.8	5.6
Methyl tetradecenate	-	1.1
Methyl hexadecenate	0.4	2.3
Methyl oleate	1.1	-
Residue (unanalyzed)	4.4	8.8
	100.0	100.0

*Calculated according to the method described in Hilditch, "The Chemical Constitution of Natural Fats."

An effort is also being made to determine the composition of the fraction crystallized from acetone at -83° F. and of the filtrate. The molecular weights and iodine values of these fractions are summarized in table 3.

Table 3 - Composition of the Fractions Separated by Crystallization from Acetone

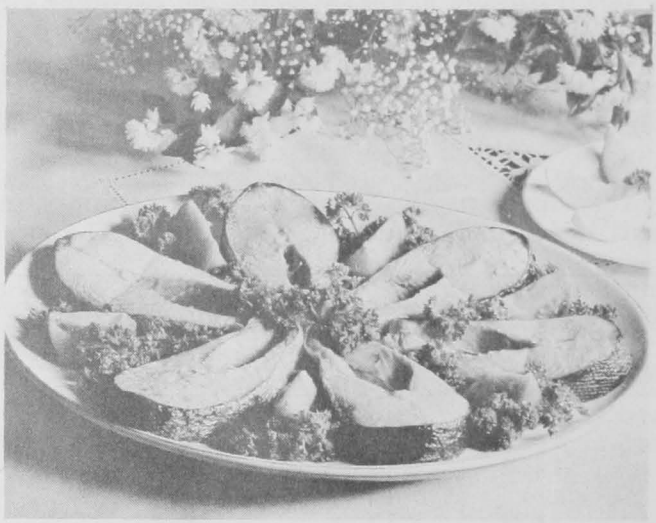
Iodine Value	Fraction Soluble at -50° F. but Insoluble at -83° F.		Fraction Soluble at -83° F.	
	Percentage Weight	Molecular Weight	Percentage Weight	Molecular Weight
0-80	18.4	245-279	3.7	255
80-168	74.7	288-329	20.1	278-284
168-300	4.2	351	18.9	298-306
300-340	-	-	41.1	317-341
Residue	2.7	428	16.2	362

(Ketchikan)

SALMON IS IN GOOD SUPPLY

Salmon, one of America's favorite foods, is plentiful and moderately priced this spring season, says the U. S. Fish and Wildlife Service.

Salmon well deserves its popularity. Its color makes an attractive plate, its flaky meat has its own delicious flavor, and it is high in the important nutrients that we need every day--principally protein, minerals, and vitamins.



Although most of the salmon are caught during the summer and fall, some are taken during the spring. They are available to consumers throughout the year by various methods of preservation. The traditional preserving methods are canning, smoking, and salting. However, in the last few years increasingly large quantities of salmon are frozen and marketed as steaks and fillets. Homemakers should look for frozen salmon in their local markets.

Baking or broiling probably are the favorite ways to cook salmon steaks, whether fresh or frozen, although they can be boiled or poached as well. Here is one favorite recipe tested by the Service's home economists:

BROILED SALMON EPICUREAN

2 pounds salmon steaks
1 teaspoon salt
Dash of pepper
1 teaspoon rosemary leaves
2 tablespoons white vinegar
3 tablespoons salad oil

Sprinkle both sides of steaks with salt and pepper. Add rosemary and vinegar to the salad oil; shake well, and let stand at room temperature for an hour or longer; strain. Dip fish in oil mixture, and place on a preheated, greased broiler pan about 2 inches from the heat. Broil 5 to 8 minutes or until slightly brown. Baste with oil, and turn carefully. Brush other side with oil, and cook 5 to 8 minutes more or until fish flakes easily when tested with a fork. Serve immediately. Serves 6.