SALMON CANNERY TRIMMINGS

PART I - RELATIVE AMOUNTS OF SEPARATED PARTS

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ABSTRACT

DATA ARE PRESENTED ON THE RELATIVE AMOUNTS OF SEPARATED PARTS (HEADS AND COLLARS, HEARTS, MISCELLANEOUS FINS, TAILS, LIVERS, EGGS, MILT, AND DIGESTIVE TRACTS) WHICH CAN BE RECOVERED FROM THE STANDARD CANNERY BUTCHERING AND TRIMMING EQUIPMENT FOR EACH OF THE FIVE SPECIES OF SALMON, NAMELY, PINK, RED, CHUM, SILVER, AND KING.

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INTRODUCTION

Every year nearly 100 million pounds of salmon trimmings, a potential source of animal food, vitamins, amino acids, sterols, and other valuable biochemicals, are discarded by the Alaskan salmon canneries. This wastage can be expected to continue until procedures for profitably utilizing the trimmings are developed. Already the waste (about 20 percent of the total) from a few canneries is being used by shore and floating reduction plants to produce fish meal and oil. Possibly the waste from a few additional canneries could be handled profitably by similar plants. The bulk of the waste, however, will not be used until new processes and products are developed. In fact, several processes are required, for each cannery has its own individual problems.

Methods for preparing two nutritious food products from the edible parts of salmon cannery waste have been reported (Anderson and Piskur 1944). For esthetic reasons, these products were never commercialized. Methods have been investigated for the alkali extraction of oil from various parts of the waste, as well as from the whole waste (Anderson 1945; Butler and Miyauchi 1947; Carlson and Magnusson 1948). An excellent literature survey of the salmon waste utilization possibilities has been prepared by Jones and Carrigan (1947). They suggested that the most promising are processes which use only certain parts of the trimmings, for instance, livers for the production of vitamin concentrates, eggs as a source of cholesterol (Jones, Carrigan, and Dassow 1948), milt for production of amino acids, and the digestive tract as a source of enzymes. As yet, no one process appears sufficiently profitable to warrant the high cost of hand, or even mechanical, separation. However, the simultaneous separation and processing of several parts might be economically feasible.

Published information on the amounts of each part which could be recovered from the standard cannery butchering and trimming equipment was quite incomplete. Therefore, on several occasions during the 1946 and 1947 canning seasons, special efforts were made to secure and separate representative samples of the trimmings from each of the five species of salmon:

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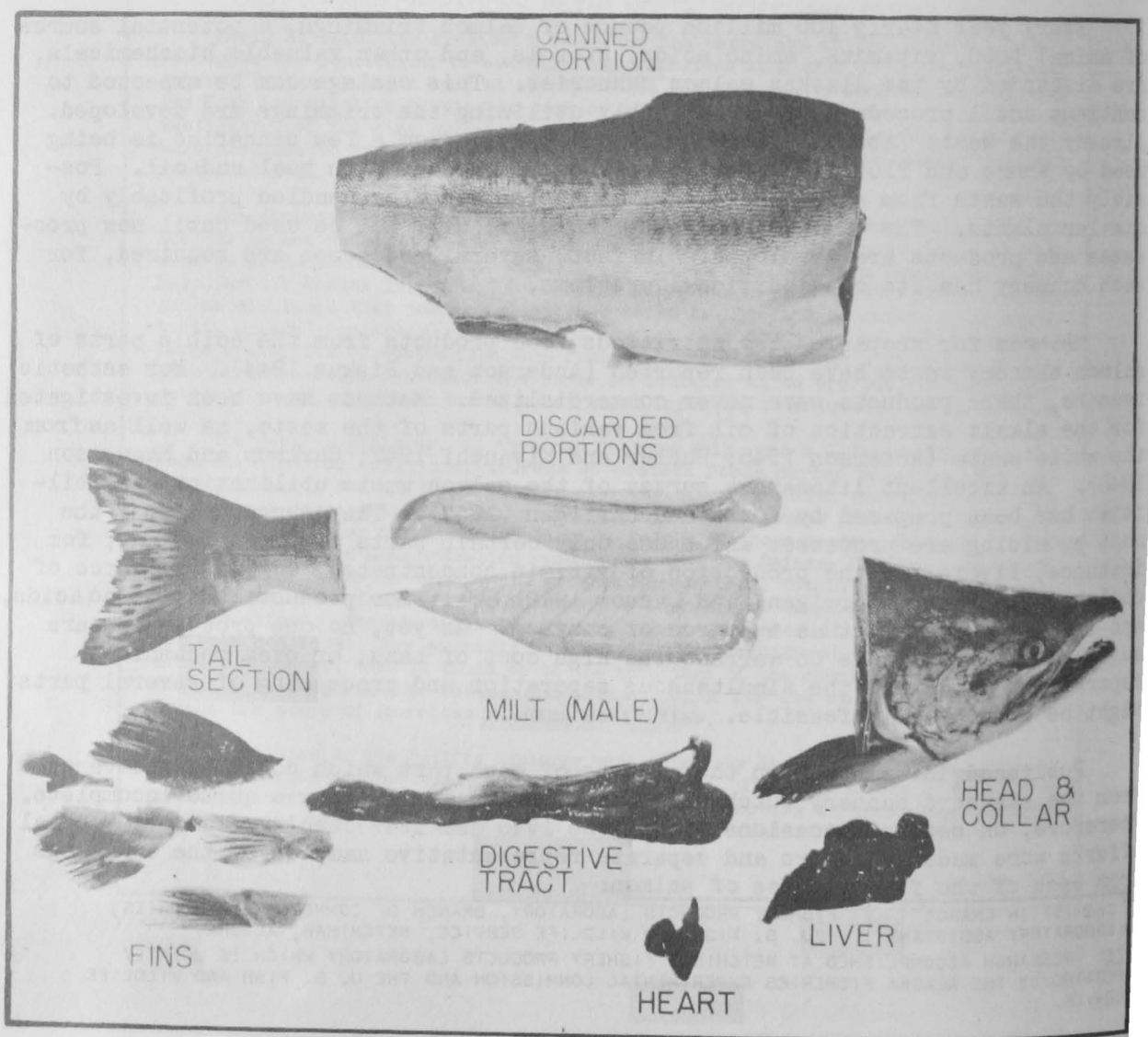
NOTE: RESEARCH ACCOMPLISHED AT KETCHIKAN FISHERY PRODUCTS LABORATORY WHICH IS JOINTLY OPERATED BY THE ALASKA FISHERIES EXPERIMENTAL COMMISSION AND THE U. S. FISH AND WILDLIFE SERVICE.

Pink, or humpback (Oncorhynchus gorbuscha)
Red, sockeye, or blueback (O. nerka)
Chum, fall, or dog (O. keta)
Silver, or coho (O. kisutch)
King, chinook, or spring (O. tshawytscha)

COLLECTION AND SORTING OF SALMON CANNERY WASTE

In 1946, the trimmings were collected in a 12-inch diameter wire-mesh basket by placing it directly in the chutes coming from the header and the "iron chink" (trimming and cleaning machine). Collections that year were made from four of the canneries accessible to Ketchikan by road: Ketchikan Packing Co., P. E. Harris & Co., New England Fish Co., and Wards Cove Packing Co. In 1947, all samples were secured from the Ketchikan Packing Company cannery. In the latter year, larger baskets, 16 by 16 by 10 inches, were held under the end of the chute. In both years, each sample studied weighed at least 100 pounds. Because a larger basket was used, the 1947 samplings were probably the better. Actual counts of heads, tails, egg sacs, and milts indicated that fairly uniform and representative samples were secured.



At the laboratory, each sample was carefully and quantitatively sorted into eight parts: heads plus collars, hearts, fins, tails, livers, eggs, milt, and digestive tracts. During the sorting operations, small amounts of liquid always separated, and there were small quantities of solid material too broken to identify. These two portions, which were comparatively small were discarded.

In the tables each datum on the amount of a part is presented as a percentage of the total weight of the eight identified parts. The composition of the

Table 1 - Composition of Samples of Salmon Cannery Waste

Species	Year	No. of samples	Composition Ranges in Percentages							
			Heads & collars	Hearts	Fins	Tails	Livers	Eggs	Milt	Digestive tracts
Pink	1946	5	51.7-62.5	0.7-0.9	5.6-21.0	2.3-10.0	1.3-4.9	5.8-18.3	1.7-11.3	1.0-15.0
	1947	5	53.0-60.7	0.8-0.9	6.8-9.4	6.1- 8.5	4.4-5.1	5.0- 8.4	3.9- 5.5	7.2-11.7
Red	1946	4	41.7-64.9	0.8	4.4-7.9	6.5-11.6	3.5-7.0	2.9-23.2	3.0-17.0	2.7-10.6
	1947	2	64.8-70.5	0.8	7.0-8.5	6.7- 7.2	3.4-4.0	3.7- 6.1	1.1- 2.1	6.2- 7.1
Chum	1946	4	43.7-49.9	0.6-0.7	3.6-7.9	4.5- 8.0	4.6-6.0	14.2-29.6	2.7-11.0	5.7- 9.7
	1947	3	58.6-63.3	0.7-0.8	5.5-6.5	3.8- 4.4	4.6-5.2	7.8- 9.9	4.1- 6.3	7.6- 9.7
Silver	1946	4	54.1-74.2	0.9	2.3-5.9	4.8-10.5	2.9-4.0	3.1- 9.6	1.9- 7.4	8.8-16.9
	1947	2	58.9-60.7	0.7	6.7-7.3	2.0- 2.8	5.2-	8.9-10.4	6.6- 7.3	6.9- 9.5
King	1946	3	46.2-51.4	0.7	3.7-6.6	5.0- 5.9	2.5-4.9	5.2-30.9	1.3- 7.1	7.7-25.5

cannery waste, of course, varies throughout a single season, depending considerably on the maturity of the fish; for instance, late in the season the eggs and milt become more important fractions of the total waste. Some variations from year to year and area to area are to be expected. The proportions of recoverable waste parts also depends on the freshness of the fish going through the butchering machinery and the care with which the machinery is adjusted. The data presented must be considered as simply the best estimates obtainable by the procedures employed at Ketchikan during 1946 and 1947. Possibly, the ranges reported in Table 1 are of more significance than the averages shown in Table 2.

Table 2 - Average Composition of 1946 and 1947 Salmon-Cannery-Waste Samples

Part of Fish	Average Composition of Total Waste, Species of Fish				
	Pink	Red	Silver	Chum	King
	Percent	Percent	Percent	Percent	Percent
Heads and collars	56.6	58.6	59.9	52.5	49.4
Hearts	0.8	0.8	0.8	0.7	0.7
Fins	9.1	6.7	5.5	5.4	5.1
Tails	7.2	7.7	6.1	5.0	5.4
Livers	4.2	4.7	3.9	5.3	3.6
Eggs	8.3	9.9	7.4	17.0	14.6
Milt	4.6	5.2	5.2	6.0	3.9
Digestive tracts	9.2	6.4	11.2	8.1	17.3

OBSERVATIONS ON USE OF SALMON CANNERY WASTE

In 1949, the total quantity of salmon cannery trimmings utilized was greater than in any previous year. Yet it amounted to barely 20 percent of the total trimmings available in Alaska, and essentially all this was used to produce meal and oil. The trimmings from canneries producing 80 percent of the salmon pack of Alaska were discarded. At the frequently used and fairly accurate figure of 25 pounds of trimmings per standard case of canned product (48 pounds per case), the 3,500,000 cases produced by these canneries (about 100) indicates that 87,500,000 pounds of salmon material were wasted. This was roughly distributed as follows:

Type of Salmon Waste	Pounds	Type of Salmon Waste	Pounds
Heads and collars	49,000,000	Livers	4,000,000
Hearts	700,000	Eggs	8,500,000
Miscellaneous fins	7,000,000	Milt	4,300,000
Tails	6,000,000	Digestive tracts	8,000,000

To secure an estimate of the amount of each waste part available at an "average" cannery, producing 35,000 cases of canned salmon, the above figures need only be divided by 100.

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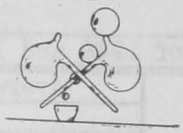

FISHERY BYPRODUCTS INDUSTRY

DO YOU KNOW.....

That the press liquor from fish reduction processes is run through evaporators and concentrated until a product with a content of 50 percent solids is obtained. This concentrate is a very good source of the animal protein factor and vitamin B_{12} important for producing more economical weight gains in poultry and swine and increasing the hatchability of eggs . . .