



January 1951

CANNING: In order to determine any color changes in the oil of canned salmon prepared from frozen fish, preliminary spectrophotometric data were obtained for samples of the free oil from canned pink and sockeye salmon. Composite samples of the free oil from six cans of the control and also the packs stored for 16 weeks were diluted suitably with carbon tetrachloride and the spectral transmission was determined with the Beckman spectrophotometer. No significant differences were found between control and experimental samples for each species examined within the visual spectrum range. Further spectrophotometric tests will be carried out as the regular quality examinations are made. (Ketchikan)

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REFRIGERATION: Preliminary studies on the cooking of shrimp were made utilizing side-stripe shrimp (Pandalopsis dispar) frozen on the exploratory vessel John N. Cobb during the recent shrimp investigation.^{1/} Judging from these preliminary studies the optimum cooking conditions for thawed side-stripe shrimp would be two minutes in 10-percent brine. Excessive shrinkage and salt penetration were found with cooks for long periods. Use of shorter cooks or lower concentrations of salt in the brine resulted in flat flavor. Samples of shrimp from each method of cooking were frozen in vacuum-sealed 1/2-lb. flat cans for storage studies.

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Examination was made of six packs of frozen shrimp prepared aboard the vessel John N. Cobb and stored at 0° F. for 7 weeks. The frozen, cooked meat of coon-stripe shrimp (Pandalus hysinotus) was preferred by the taste panel to that of side-stripe shrimp. There was little difference between the quality of shrimp frozen raw (headless) and that frozen as picked, cooked shrimp. Shrimp that were given additional cooking in a 10-percent salt solution before freezing were definitely tough and had a slight off-flavor. Brine-cooked shrimp which were treated with a 2-percent ascorbic acid solution before freezing were slightly superior to brine-cooked shrimp not treated with ascorbic acid. (Ketchikan)

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Further storage tests were carried out with various species of Pacific Coast rockfish. At the present time, after five months of storage at 0° F., the Sebastes alutus (long-jawed rockfish) and Sebastes marinus (Atlantic Coast rosefish) are still far superior in palatability to the other species, but even these two are beginning to show a definite discoloration and some slight traces of rancidity. The

^{1/}SEE COMMERCIAL FISHERIES REVIEW, JANUARY 1951, PP. 34-5.

Sebastodes pinniger (orange rockfish) and Sebastodes miniatus (vermilion rockfish) have reached a stage where they are practically inedible. All the other species are at an intermediate stage, having developed considerable discoloration and moderate rancidity. (Seattle)

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NUTRITION: Eight samples of hatchery diets submitted by the Washington State Game Department were assayed for riboflavin, niacin, biotin, and vitamin B₁₂. Work was begun on the assay of 26 diets used by the Service's Leavenworth hatchery. Some experimental work was carried out on methods of extraction on vitamins, particularly vitamin B₁₂, on different types of hatchery feed. It was found that when dealing with relatively dry products, such as fish meal or diets containing considerable quantities of such dry products, autoclaving of the sample was necessary in order to extract all of the vitamins. However, when wet products, such as salmon eggs were used, autoclaving decreased the yield of vitamins extracted. Accordingly, it is necessary to use a different extraction technique for the different types of products being analyzed. (Seattle)

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PRESERVATION: A new series of preservation tests for salmon eggs was begun, using different quantities of sodium bisulfite. Former results were confirmed that 0.5 percent by weight of sodium bisulfite is required to preserve salmon eggs, but greater quantities of the bisulfite do not enhance the keeping quality. Another series was started to delve further into the method of mixing the bisulfite with the eggs. To date, no difference can be noted between samples in which the bisulfite was well mixed with the eggs and those in which the bisulfite was added without special mixing precautions. (Seattle)

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TECHNICAL NOTE NO. 8 -- PROCESSING CANNED KING AND DUNGENESS CRAB MEAT

To determine safe minimum processing times when Dungeness crab meat is packed in half-pound flat cans, heat penetration experiments with inoculated meat of this species of crab have been carried out by the American Can Company and the Hooper Medical Foundation. The latter found 98.2 minutes at 230° F. to be a minimum safe processing time and recommends 105 minutes at this temperature to allow a margin of safety. More recent experiments at the American Can Company resulted in the following recommendations for half-pound flat containers.

<u>Processing temperature</u>	<u>Processing time (minutes)</u>
230° F.	95
240° F.	60
250° F.	45

When the higher processing temperatures are used (240° F. and 250° F.), there is considerable danger of overcooking and scorching the crab meat unless the product is cooled promptly.

The National Cannery Association, basing its conclusions on the American Can Company experiments, recommends 95 minutes at 230° F. for Dungeness crab meat packed in half-pound flat cans. None of the above cited experiments or recommendations have been published.

Some processors of both Dungeness and king crab meat have used shorter processing times than those cited above. Although a shorter processing time may tend to give a more acceptable product from the standpoint of color and texture of the crab meat, a definite danger exists that spoilage will occur. During recent years a number of commercial packs employing these shorter processing times have spoiled with considerable loss to the packers.

No heat penetration studies on inoculated packs have been carried out with king crab. In the absence of such experiments, the Fish and Wildlife Service recommends (in accord with recommendations of National Cannery Association and American Can Company) that the same minimum processing time recommended for Dungeness crab meat (95 minutes at 230° F. for half-pound flat cans) be used for king crab meat.

In several preceding publications (Fishery Leaflet No. 374, Research Report No. 7, and Fishery Market News, May 1942 Supplement) the Fish and Wildlife Service has indicated that shorter processing times than those cited above were satisfactory for Dungeness and king crab meat. Processing times mentioned in these publications were based either upon observations of practices prevailing in the crab-meat canning industry or upon experiments using crab meat that had not been inoculated with bacteria. Inasmuch as the only adequate heat penetration tests for West Coast crab meat are those cited above for Dungeness crab meat, the Fish and Wildlife Service is replacing all former recommendations for processing this species with those given above. Until adequate tests have been made with king crab meat, the recommendations for Dungeness crab meat are tentatively recommended for king crab meat.

—M. E. Stansby, Chemist-in Charge,
Fishery Technological Laboratory,
Seattle, Washington

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TECHNICAL NOTE NO. 9 -- CHARACTERISTICS OF OIL FROM COLD-RENDERED FUR-SEAL BLUBBER

This report presents data on the characteristics of oil from cold-rendered fur-seal blubber. To provide a sample for analyses, Government biologists on the Pribilof Islands, Alaska, collected in July 1949 about one kilogram of blubber from still warm bodies of several male fur seals (Callorhinus ursinus) 3 years of age. The sample of blubber was placed in a glass jar, frozen, and held in this condition until May of the following year when it was prepared for analyses at the Service's Seattle Technological Laboratory.

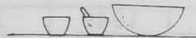
Fur-seal blubber is creamy white. It underlies the skin of the body and is thinnest on the head and limbs. Its total weight in the fur-seal body is about 10 pounds for a 3-year-old male.

Characteristics of Oil from Cold-Rendered Fur-Seal (<u>Callorhinus ursinus</u>) Blubber	
	Value
Moisture and other volatile matter (A.O.A.C.*)	Not measurable
Iodine number (A.O.A.C., Hanus)	108
Free fatty acid (A.O.A.C.)	1.58%
Saponification number (A.O.A.C.)	196.3
Specific gravity 25° C./25° C.	0.917
Unsaponifiable matter (A.O.A.C.)	0.64%
Index of refraction at 25° C.	1.4743
Vitamin A content (1894 x E ₃₂₈) ^{1/}	306 units per gram

^{1/}DETERMINED ON THE WHOLE OIL WITHOUT SAPONIFICATION.
 *NOTE: METHODS OF ANALYSIS OF THE ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS (A.O.A.C.),
 ED. 6 (1945), WASHINGTON, D. C.

The thawed sample was rendered by grinding in a power grinder which liberated the oil. The oil was filtered with suction through paper and then through a sintered glass filter. The oil was allowed to stand overnight at room temperature, whereupon it solidified. It was heated to 75° C. and filtered again through a sintered glass filter. This oil was used for the analyses (see table).

—William Clegg, Chemist,
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CANNED FISH AND BYPRODUCTS--1949

DO YOU KNOW...

That the 1949 pack of tuna and tuna-like fishes, which amounted to 7,290,320 cases (141,700,593 pounds), valued at \$97,710,325, was 252,562 cases greater than the 1948 production. However, canners received nearly 15 million dollars less for the pack than in the previous year. The 1949 tuna pack was the fifth consecutive record pack of these fish.

The 1949 pack of canned salmon amounted to 5,524,916 standard cases (265,195,968 pounds), valued at \$103,430,980 to the canners. Compared with 1948 this was an increase of 15 percent in volume, but a decline of 14 percent in value. Although the pack was the second largest in the past six years, it was far less than the 1935-39 average of 7,163,985 cases. Despite the sharp decline in the price of canned salmon in 1949, the pack was the third most valuable in history.

The 1949 pack of California sardines (pilchards) amounted to 3,768,212 standard cases (169,569,540 pounds), valued at \$21,334,825. Compared with the previous year, this was an increase of 42 percent in volume, but a decline of 3 percent in value. While the 1949 pack was the second largest in history, it was 1,238,942 cases less than the record 1941 production.

--Fishery Leaflet 577