VARIATION IN PROXIMATE COMPOSITION OF RIGHT AND LEFT FILLETS OF ROCKFISH (SEBASTODES PINNIGER) AND DOVER SOLE (MICROSTOMUS PACIFICUS)

ABSTRACT

Individual proximate analyses were made on right and left fillets of 10 rockfish and 10 dover sole. No significant differences were found in the moisture, oil, and protein composition of the right and the left fillets from these 20 individual fish.

BACKGROUND

A sample for studies on proximate composition usually is prepared from the entire edible portion of a fish. This procedure insures a representative sample of that fish. Such samples, however, are expensive. If the same results could be obtained with one fillet, the cost of the sample, of course, would be cut in half. If the whole fish was bought, the second fillet could be used for other studies.

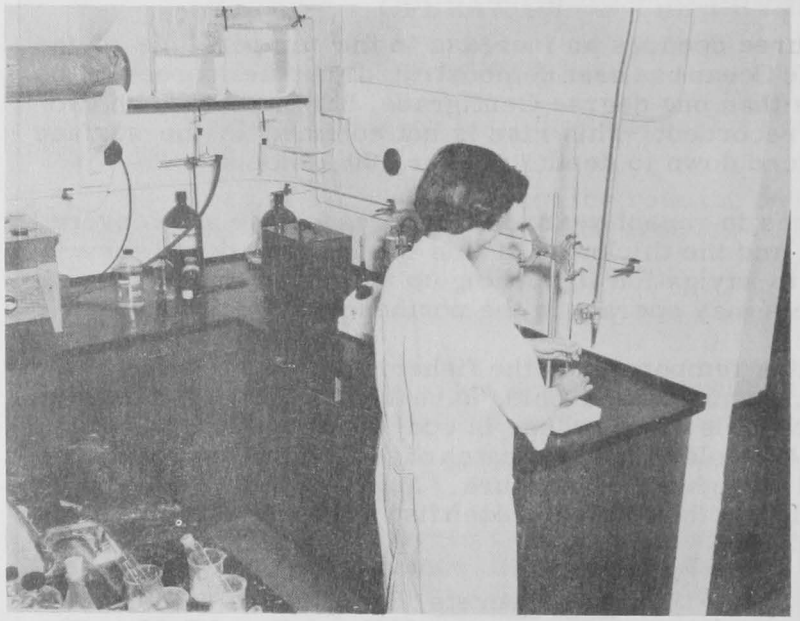

Fig. 1 - Titration for nitrogen determination.

Paired fillets often are used in technological studies, such as freezing, storage, and taste tests. If the fillets are known to be identical--especially in oil content--greater reliance can be placed upon the results. Studies on differences between the paired fillets--or the lack of differences--are being conducted over a period of time. Thus the Oregon Seafoods Laboratory, under an arrangement with the U. S. Fish and Wildlife Service, has analyzed paired fillets of two species to obtain the results reported in this paper.

SAMPLES AND PROCEDURE

The species of fish used in these tests were rockfish and dover sole. The rockfish were chosen as an example of a symmetrical fish of low-oil content, whereas

the dover sole were chosen as an example of an unsymmetrical fish of low-oil content. The particular fish used in these tests were caught off the coast of Oregon and were landed at Astoria in a strictly fresh condition. Ten fish of each species were filleted. The individual fillets were analyzed for their moisture, oil, and protein contents by procedures described by the American Association of Official Agricultural Chemists (1950).

Fig. 2 - Weighing fish samples for the determination of moisture.

RESULTS AND DISCUSSION

Results on the right and the left fillets of the rockfish are reported in table 1. Results on the right and left fillets of the dover sole are reported in table 2. The right fillet of dover sole is the top or dark side; the left fillet is the bottom or light side.

The composition of the rockfish fillets was typical of a non-oily fish. Averages of the moisture, oil, and protein values were the same for both the right and the left fillets of the fish.

Table 1 - Proximate Composition of Right and Left Fillets of 10 Rockfish (Sebastodes pinniger)

Data on Whole Fish				Proximate Composition of Right & Left Fillets					
Fish				Moisture		Oil		Protein	
Sample	Length	Weight	Sex	Right	Left	Right	Left	Right	Left
No.	Mm.	Gm.		(Percent)					
1	502	1951	F	79.3	79.4	1.28	1.24	19.1	19.0
2	513	1909	F	79.2	79.2	0.94	0.94	18.7	18.8
3	519	2050	F	79.7	79.6	1.05	1.10	18.6	16.6
4	527	2014	F	78.9	78.8	1.10	0.92	19.3	19.0
5	472	1519	M	78.6	78.5	1.34	1.35	19.3	19.5
6	475	1728	M	78.2	78.4	1.72	1.83	19.4	19.2
7	509	1965	M	79.1	79.3	1.04	0.93	18.8	18.7
8	512	1779	M	79.9	79.7	0.88	0.90	18.3	18.2
9	531	2073	M	79.5	79.7	1.00	0.95	18.5	18.5
10	541	2270	M	80.9	80.8	0.60	0.65	17.8	17.8
Avg.	510	1926	-	79.3	79.3	1.10	1.09	18.8	18.7

The dover sole fillets had high moisture, low oil, and low protein contents. Samples 3 and 10 should be noted because they had a "jellied" condition similar to that described by Templeman and Andrews (1956) for the American plaice (Hippoglossoides platessoides Fabricus). Fish in this condition are not marketable, and fishermen attempt to avoid areas where they are found. Sample 3 is unusual in that it contained 90 percent moisture and only 8.6 percent protein.

In none of these fish were differences of a magnitude to interfere with results of experiments using paired fillets. Statistical analyses of the differences between

Table 2 - Proximate Composition of Right and Left Fillets of 10 Dover (Microstomus pacificus)

Data on Whole Fish				Proximate Composition of Right & Left Fillets					
Fish				Moisture		Oil		Protein	
Sample	Length	Weight	Sex	Right	Left	Right	Left	Right	Left
No.	Mm.	Gm.		..... (Percent)					
1	339	362	F	82.1	82.5	0.95	0.87	16.4	15.9
2	430	759	F	82.9	83.0	0.69	0.65	15.7	15.4
3 1/	458	808	F	89.4	90.5	0.34	0.31	8.9	8.3
4	478	1107	F	83.5	84.4	0.73	0.64	14.3	14.0
5	488	1025	F	82.5	83.7	0.60	0.59	15.5	14.8
6	355	408	M	83.6	83.5	0.74	0.68	14.8	15.0
7	385	543	M	85.0	85.3	0.68	0.57	13.5	13.3
8	413	686	M	84.9	83.8	0.71	0.79	13.5	14.0
9	415	714	M	84.1	84.2	0.57	0.52	14.4	14.6
10 1/	438	784	M	84.5	84.8	0.54	0.63	13.6	12.8
Avg.	420	720	-	84.3	84.6	0.66	0.63	14.1	13.8

1/These fish had a "jellied" condition that made them unsuitable for marketing.

right and left fillets of both species showed what visual observation of the results indicated--that no significant differences in moisture, oil, or protein existed between the right and the left fillets of either species.

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1956. Jellied Condition in the American Plaice Hippoglossoides platessoides (Fabricus). Journal of the Fisheries Research Board of Canada, vol. 13, no. 2, March, pp. 147-182.

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FISH COMPOSITION STUDIES

There are approximately 200 species of fish and 40 species of shellfish taken for food and appearing on the United States dinner tables. These fish vary in protein, fat, or ash content, but all have a low level of carbohydrate content. Modern diets based on balanced nutritive values as well as appetite appeal, require knowledge of the chemical composition of the foods involved. Diets containing fish are no exception, and to attain this knowledge the U. S. Fish and Wildlife Service has instituted a continuing study of the protein, fat, mineral, and vitamin content of all species of fish taken for food. The relative amounts of these various components may vary with the species of subspecies, geographical area of capture, sex, season of the year and, to some extent, with the individual fish. The data serve also as a means of determining the probable frozen storage life of the processed fish, commercial yield after processing, and probable potential value of the waste products. The fat content, particularly, is of the utmost importance in determining storage life.

For these studies samples of the different species of fish are being obtained by the Service's several technological laboratories from Service exploratory fishing vessels and from local fishing vessels and fish processors. Replicate samples of each species are being collected at various times of the year in order to detect any seasonal variations that might occur in composition of the fish.

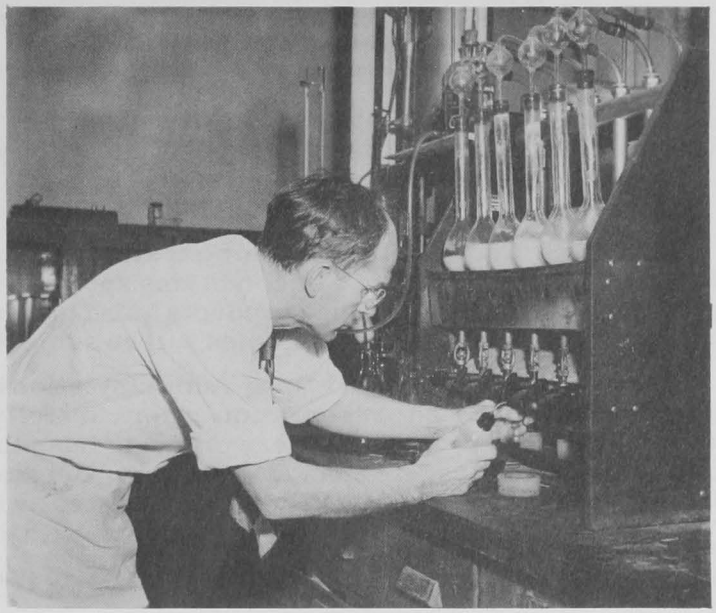

Fig. 1 - Chemist determining the protein content of fishery products.

A typical fish under study is the ocean perch (Sebastes marinus) being studied at the Service's Boston Fishery Technological Laboratory. Though this fish became commercially important 22 years ago, there exists today very little information on the proximate composition and especially seasonal variations in its composition. Samples of the ocean perch have been collected periodically since February 1956. The physical analysis was performed by removing the fillets from each fish and then skinning the fillets. The average skinless fillet yield has been 27.7 percent, thus leaving an offal yield of 72.3 percent. The average proximate chemical analysis of the skinless fish fillets is: water, 79.6 percent; protein, 18.1 percent; fat, 1.7 percent; and ash, 1.1 percent. The average analysis of the offal is: water, 70.5 percent; protein, 16.1 percent; fat, 7.1 percent; and minerals, 6.3 percent. So far, insufficient data have been obtained for the ocean perch to determine the effect of seasonal variations on composition of these fish.

Such data are necessary to determine the protein, carbohydrate, and fat content of diets. The data show that ocean perch fillets have, at least during certain seasons of the year, a relatively low fat content. In common with other fish products, ocean perch fillets contain practically no carbohydrate or sugar components.

ANTIBIOTICS FOR FISHERY PRODUCTS PRESERVATION

STATUS OF USE IN THE U. S.: The recent series of news items about the use of antibiotics to extend the storage life of food items, including fish protected by refrigeration, has caused considerable confusion in the fishing industry over the present status of the use of antibiotics in fishery products.

The use of such materials as antibiotics in food handling and processing is subject to approval by the U. S. Food and Drug Administration. Winton B. Rankin of that agency recently made this statement on the present status of the use of antibiotics in foods from the standpoint of the Federal Food, Drug and Cosmetic Act:

1. They may be used so that no residues remain in the food. This is acceptable.

2. They may be used so that residues remain in the uncooked food provided:

a. The food is always cooked;
b. The cooking destroys the antibiotics;
c. The official tolerance has been established under the Food, Drug, and Cosmetic Act for the residue that remains in the uncooked food;
d. The residue is within this tolerance.

3. Antibiotics have been proposed for uses that will leave some of the chemical in the food as it is eaten. Their safety under these conditions has not been established. They should not be used in this way until we know more about the effect of the residues on man and micro-organisms.

The U. S. Food and Drug Administration has not approved the use of antibiotics in fish and fishery products. The conditions spelled out above have not been fulfilled for any fishery product. Any such products found to contain antibiotics before an appropriate tolerance has been established will be subject to seizures by that Agency.

The Canadian Food and Drug Administration has given approval for the use of certain antibiotics for fish preservation under carefully defined and controlled circumstances. However, fish or fishery products from that source or any other that are found to contain antibiotics, if detected while in import status, will be refused entry into the United States or, if already in the United States, will be subject to seizure by the U. S. Food and Drug Administration in conformity with the applicable legislation.

TECHNICAL NOTE NO. 35 - IMPROVED WORKMEN'S STAND FOR PROCESSING PLANTS

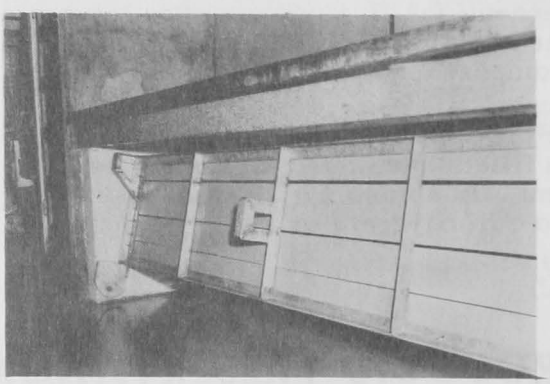

Fig. 1 - Lift-up standing grate. Note the bearing, at the lower left-hand side of the photograph, on which the grate rotates. Note also the support, in the center of the grate, to keep the grate from springing.

Fig. 2 - Placing grate in working position. Note the wooden stop on the left-hand wall.

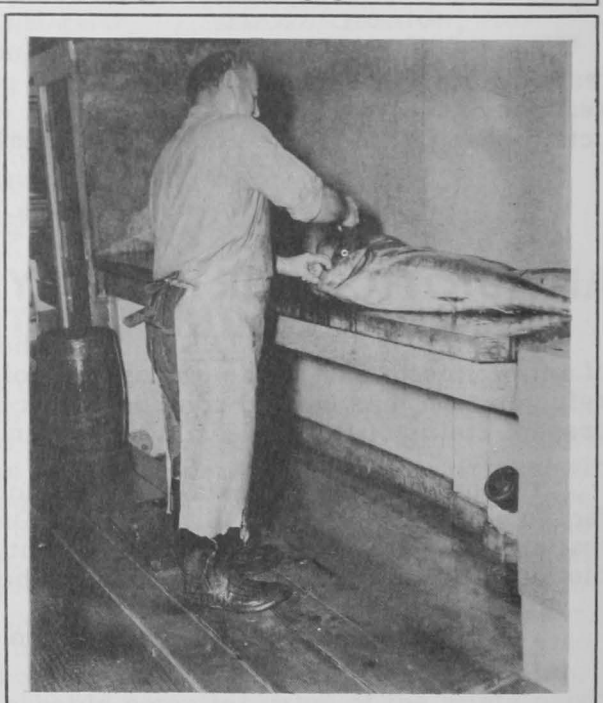

Fig. 3 - Grate in use. The top of the grate is protected by slip-proof paint.

This is a photographic report showing the details of construction and the method of employing a lift-up standing grate, which has proved both convenient to use and easy to clean. The grate was designed and constructed by Anton Stanovich of San Pedro, Calif.

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FEDERAL AID FUNDS USED TO INCREASE SPORT FISHING OPPORTUNITIES

If a fishing lake does not exist, make one. If a fishing site exists, make it available to the public. If the lake is there and if it is accessible to the public but it needs improvement, develop it.

In the course of putting these simple rules into effect, the various states spent more than $1,000,000 on Federal Aid land acquisitions for fishing purposes in the year ending June 30, 1956, Secretary of the Interior Fred A. Seaton announced October 14, 1956. Of this amount, $790,000 was Federal Aid funds.

During the year, approval was given 17 states for the construction of 31 lakes having a total of 2,500 surface acres, and to 20 states for the acquisition of 6,358 acres of land and the leasing of an additional 56,846 acres for fishing and access to fishing areas.

Federal Aid funds for the restoration of fish are obtained through a 10-percent tax on certain sport fishing equipment.

In addition to Federal Aid projects, the various states make or develop other fishing areas or provide access to existing fishing spots using only state funds or money raised by civic-minded individuals or groups.

In providing access to fishing areas, state fish and game departments must meet the peculiarities of their own state water and trespass laws, considering such things as the navigability of the stream or lake. In many instances the public is entitled to proceed up and down a streambed, either wading or afloat. Here the problem may be only access to the edge of the stream. In other places and under certain conditions, wading or floating is not practical or legal and the right to use the stream or bank must be acquired. The same general principles apply to lakes.