



### Progress on Projects, May 1953

BYPRODUCTS: Vitamin Content and Nutritive Value of Fishery Byproducts: Analyses were made of samples of tuna and herring meal for niacin content. The results were:

| Sample       | Number of Samples | Moisture (Percent) |       |       | Fat (Percent) |      |      | Niacin (Micrograms per gram on moisture-and-oil-free basis) |      |      |
|--------------|-------------------|--------------------|-------|-------|---------------|------|------|---|------|------|
|              |                   | Max.               | Min.  | Avg.  | Max.          | Min. | Avg. | Max.  | Min. | Avg. |
| Tuna Meal    | 17                | 9.60               | 3.18  | 6.17  | 10.20         | 7.08 | 9.06 | 201   | 120  | 153  |
| Herring Meal | 4                 | 11.44              | 10.65 | 11.14 | 9.92          | 9.76 | 9.85 | 79  | 63   | 70   |

(Seattle)

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FEEDING STUDIES WITH MENHADEN OILS: During the past few years there has been considerable interest in the possibility of adding animal or vegetable oils and fats to poultry and swine feeds. This has been partially due to the relatively large quantities of oils and fats available on the market, and also because oil or fat added to manufactured mixed feeds would make them less dry and dusty. The latter would encourage greater consumption of feed and greater production of meat, eggs, or other products within a given time.

Several feeding experiments have been reported showing that it is possible to add vegetable oils and certain animal fats to diets without adversely affecting the health of the animals or birds. It was believed that fish body oils could be fed in like manner so a program of feeding studies with broilers was started late last fall at the Fishery Technological Laboratory, College Park, Maryland.

The studies were limited to feeding commercially-hatched cross-bred broilers in battery brooder cages a modified broiler diet recommended by the U. S. Department of Agriculture (Circular 788, February 1948). This basal diet (No. 2) consisted of ground yellow corn, 60.4; soybean meal, 22.0; fish meal, 5.0; meat meal, 6.0; alfalfa meal, 5.0; steamed bonemeal, 1.0; manganized salt, 0.4; vitamin A and D feeding oil, 0.2; and riboflavin concentrate, 0.05; all by weight to equal 100 parts. The groups were fed centrifuged menhaden oil, settling menhaden oil or corn oil at levels of 0, 2, 4, 6, or 8 percent in replacement of an equal weight of ground yellow corn in the basal diet. No adjustment was made to equalize the small differences in the protein content of the diets. Additional comparable groups receiving 0, 6, and 8 percent centrifuged menhaden oil were fed diets to which was added 2 milligrams of niacin and 5 milligrams of alpha tocopherol per pound of feed, and 2½ percent of dried brewer's yeast replaced an equal weight of ground yellow corn. These vitamin additions were based on recommendations made by Dr. M. L. Scott of Cornell University to prevent the formation of enlarged hocks of turkeys and ducks.

Each cage measuring 24 by 28 inches contained about 19 birds at first. It was necessary to thin the chickens out from time to time as they grew until finally at 7 weeks most of the chickens were killed and dressed. The groups receiving 0, 2, and 8 percent centrifuged menhaden oil, 8 percent settling menhaden oil, and 8 percent corn oil were kept for 12 weeks. These groups were kept in order to find out what effect the highest levels of oil had over the period that commercial broilers are usually fed.

The total average live weights for the 16 groups during the 7-week period and 6 groups for the 12-week period were:

|                   | <u>Grams</u> | <u>Pounds</u> |
|-------------------|--------------|---------------|
| Initial .....     | 35           | .08           |
| Four weeks .....  | 360          | .8            |
| Six weeks .....   | 624          | 1.4           |
| Seven weeks ..... | 778          | 1.7           |
| Twelve weeks:     |              |               |
| Cockerels .....   | 1776         | 3.9           |
| Pullets .....     | 1415         | 3.1           |

These data indicate that the growth rate of the chickens was satisfactory. A study of the weights of individual chickens indicates that there were probably no significant differences between groups except possibly for the one that received 8 percent of settling menhaden oil. Even so the average for this group was only 35 grams lower than the total average at 4 weeks, 50 grams lower at 7 weeks, and about 200 and 100 grams lower, respectively, for cockerels and pullets at 12 weeks. These lower weights were apparently due to eating less feed since the pounds of feed per pound gain, namely, 2.4 for 7 weeks and 2.7 for 12 weeks (all gains made by the chickens) were very good. The range for all groups was from 2.4 to 3.1. The group receiving no oil had the highest feed requirement at 12 weeks, namely, 3.1; the requirement for this group was 2.5 pounds of feed per pound of gain at 7 weeks. The additional niacin, alpha tocopherol, and yeast did not affect either the growth or efficiency of utilizing feed.

There were no significant differences between groups in respect to deaths, lameness, feathering, or color of skin and shanks that could be ascribed to the diets fed. About 5½ percent of the chicks died from all causes. There were from 2 to 5 lame birds in each group, and these had one or both legs affected with hock disability. This was probably partly due to the ½-by-½-inch screen floor that was used which permitted the hocks of young chicks to get caught in the meshes. There was only one cripple after about the fifth week. There was only one case of what appeared to be encephalomalacia, and this bird happened to be in the group that was fed no added oil. The color of the skin and shanks was very satisfactory.

So far as the live chickens were concerned, the results looked very good for feeding the fish body oils. When the chickens were eaten there was another story. Even the lowest amount feed, namely, 2 percent of centrifuged or settling menhaden oil, gave a fish flavor to the meat. This flavor was not limited to the fat, but was actually present in the lean meat of the breast and legs. It was not an off-flavor due to oil since all of the chickens receiving corn oil, irrespective of the level fed, were rated as satisfactory. The fish flavor was due to some flavor ingredient in the menhaden oil. Even though some of the taste-testers did not agree and thought that chickens receiving even the higher levels tasted all right, it is not commercially safe to recommend even the lowest level which was fed.

Feeding experiments are now under way in which levels of centrifuged menhaden oil from 2 to 0 percent by ½-percent increments are being fed. The results of this

test should determine a safe level which may be recommended. Of course, there is also a possibility that the fish oils may be treated so as to remove the flavor ingredient, but this would increase the cost of the oil and reduce the likelihood of it being used. (College Park)

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REFRIGERATION: Freezing Fish at Sea, Defrosting, Filleting, and Refreezing the Fillets: VESSEL: The brine-freezer machinery was completed and installed in the new brine tank. Preliminary mechanical tests did not indicate any serious defects; however, extensive dockside trials will be conducted before the first test-fishing operation. (Boston)



### CRAB MEAT IS FAVORITE FOR SUMMER MEALS

Crab meat, which has long been recognized for its distinctive flavor and its variety of uses, is in plentiful supply in the food markets during the summer.

"Ready-to-use" crab meat--fresh cooked, frozen, or canned--is especially in demand for summer salads and crab cakes.

Several species of crabs are taken by American fishermen. In New England the rock crab is the commercial variety, while the blue crab is found from New York to Texas and is the most important crab on the Atlantic Coast. On the Pacific Coast, the dungeness crab is the best known. From northern Alaska waters come the giant king crabs.



Crab meat from blue crab is packed in the following forms: "Lump meat" is the white from the large muscles in the back; "flake meat" is the remaining white body meat; and "claw meat" is the brownish meat from the claws. White meat is preferred for salads, while the darker meat is usually used in crab cakes or patties. From the other varieties of crabs the meat from all parts is usually packed together.

Here's a recipe for a delicious and nutritious salad developed and tested by the home economists of the U. S. Fish and Wildlife Service.

#### CRAB RAVIGOTE

- |                                    |  |
|------------------------------------|--|
| 1 POUND CRAB MEAT                  | 1 TABLESPOON CHOPPED PARSLEY                     |
| 2 TABLESPOONS CHOPPED SWEET PICKLE | 2 TABLESPOONS CHOPPED ONION                      |
| 2 TABLESPOONS LEMON JUICE          | $\frac{1}{2}$ CUP MAYONNAISE OR SALAD DRESSING   |
| $\frac{1}{2}$ TEASPOON SALT        | $\frac{1}{2}$ TABLESPOONS CHOPPED STUFFED OLIVES |
| DASH PEPPER                        | $\frac{1}{4}$ TEASPOON PAPRIKA                   |
| 1 HARD-COOKED EGG, CHOPPED         | $\frac{1}{4}$ PIMIENTO                           |

Remove any shell or cartilage from the crab meat. Combine pickle, lemon juice, seasonings, egg, parsley, onion and crab meat. Fill 6 crab shells or individual casseroles with mixture. Combine mayonnaise, olives and paprika; spread over tops of shells. Chill. Garnish with pimiento strips. Serves 6.