



## SODIUM CONTENT OF FISH

Is fish suitable for low-sodium diets: A chemist of the U. S. Bureau of Commercial Fisheries, Seattle, Wash., presented the following information on the sodium content of fish meat at the 42nd Annual Meeting of the American Dietetics Association in Los Angeles, Calif., on August 27, 1959.

Foods, to be acceptable for use in low-sodium diets, should contain considerably less than 0.1 grams of sodium per 100 grams of food, since some menus restrict the maximum daily intake of sodium to 100 milligrams. The majority of meat foods--including red meat, poultry, fowl, fresh-water fish, and salt-water fish--have values well below this limit.

Practically all fresh-water fish have a sodium content of 40 to 80 milligrams per 100 grams of meat with a general average of 59. The same average is found for most species of salt-water fish, and the range is about the same also. Their sodium content is usually lower than most fresh-water species.

Such factors as species, size, sex, and season of capture contribute to a wide variation in the sodium content of fish meat. But, the variations are not sufficiently large to prevent the use of fish meat in sodium-restricted diets.

Canned fish is usually salted to suit the average taste. This product has a sodium content of 600 to 800 milligrams per 100 grams. But the unsalted canned product is found to have practically the same sodium content as is found in fresh fish. The so-called "dietetic pack" may, therefore, be produced from all species commonly used for canning.

Although many factors contribute to variation in sodium content of fish meat, the values usually lie within the range of 40 to 80 milligrams per 100 grams, unless sodium has actually been added. Since large quantities of practically all species of fish are readily available that have not had sodium added, fish can be used in sodium-restricted diets to provide interest and variety.



## STANDARD FOR FROZEN SALMON STEAKS

In the development of voluntary standards for fishery products, the U. S. Bureau of Commercial Fisheries technological group maintains an active liaison with its inspection and certification group. The standard that is developed and the inspection procedures therein must be practical from the inspector's standpoint and still realistically reflect the quality level of the product.

The laboratory work on a standard for frozen salmon sticks is essentially complete. It is likely that this standard will be in effect by the beginning of 1960.

After the completion of the written standard, the Bureau customarily carries out a grading survey to test the applicability of the standard. Based on the examination of 391 sample units (249 retail size units and 142 institutional size units) taken from processors' warehouses the following findings were noted:

(1) The average point score for the retail size units was 82 points, and for the institutional-size units 88 points. These data indicated that the quality of the institutional size pack was significantly better than the retail-size pack.

(2) The principal factor contributing to the Grade "B" and "Substandard" classification was flavor, primarily rancidity of the fatty portion.

(3) The percentage glaze, free drip, and cook drip were not considered as factors of quality in grading of the frozen salmon steaks inasmuch as meaningful relationships could not be established.

An example of the close liaison maintained between the standards development and product inspection groups is demonstrated by the following:

The control of net package weights was found to be a serious problem in this survey. Our inspection personnel in following up on this problem during routine checking of net weight noted that the glaze water used in glazing salmon steaks was occasionally at some elevated temperature at the start of the steaking operation. As the steaking progressed, the temperature of the glaze water was continuously lowered until equilibrium temperature was attained. Adjustment for glaze pickup to meet net weight requirements if based on the initially warmer glaze water, resulted in underweights as the glaze water temperature dropped, due to the greater pickup of glaze at these lower temperatures. Thus, in order to control the percentage of glaze and thereby glaze allowance and net weight the inspector found it necessary to routinely check glaze water temperature in order to protect the processor against excessive overweights or underweights.



## VALUE OF FISH-BODY OIL IN REDUCING CHOLESTEROL LEVELS

Relief for persons with high cholesterol levels in blood serum is indicated by oil research projects now under way. The findings are the result of a series of research projects on fish-body oil conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratories and by the Hormel Institute of the University of Minnesota under a Bureau contract.

Bureau officials hope that their efforts will encourage clinical testing by responsible medical research staffs to evaluate the results obtained to date and to further explore the application of these results to conditions which may cause or aggravate atherosclerosis and kindred diseases. Bureau officials further state that the research has opened the way for the development of a food supplement composed of those fractions of fish oil which are the most effective in lowering the blood cholesterol level.

These discoveries were incidental to a Bureau basic research program to "take fish oil apart, molecule by molecule, and see just what it contains." Once the unique blood cholesterol depressent effects of fish oils were noted, research programs were inaugurated to explore them. Technicians state that there is still considerable basic research needed to fully explore the properties of fish oils.

The key findings of the research are (1) the abundance of what is known as "unsaturated" fatty acids in the body oils of many species of fish, and (2) proof that the

feeding of these "unsaturated" fatty acids to test animals reduced the cholesterol levels in direct proportion to the degree of unsaturation.

The term "unsaturated" in this instance applies to those fats in which there are carbon atoms which have not combined to the fullest possible extent and which are capable of uniting with certain elements or compounds to change the character of the fat.

A "saturated" fat, such as lard, congeals at low temperatures. An "unsaturated" fat does not congeal readily. This is the property which permits fish to move freely in waters of low temperatures.

Bureau research has shown that about half of the body oil of most species of fish is unsaturated and about 10 percent of it is highly unsaturated. This latter portion of the fish oil contains 5 or 6 unsaturated carbon atoms per "chain," compared with only two such atoms in vegetable oil. In other words the potential of fish oil in reducing the cholesterol level is approximately three times that of vegetable oils.

Second only to the Bureau findings that unsaturated fish oils readily reduce the blood cholesterol levels is the development of a method to separate the highly unsaturated 10 percent from the rest of the oil. It is this method which makes it possible to utilize only the essential part of fish oil in reducing cholesterol levels. Thus the patient would take only one-tenth of the calories contained in the whole oil.

The process of separating the unsaturated fatty acids from the rest of the oil requires some very definite conditions to maintain the value of the product and avoid possible toxicity, Bureau officials state, adding that this is another reason why the findings should be clinically tested.

Among the fish which have liberal amounts of body oils are salmon, mullet, mackerel, and herring. Menhaden is not now used as food fish but it yields considerable amounts of highly unsaturated oils.



#### COOKIES MADE FROM ALGAE

Cookies can be made from algae, the green scum that floats on ponds, Edith Katherine Schuele, a 15-year-old Memphis, Tenn., high school junior told the annual meeting here of the American Medical Association at Atlantic City, N. J.

Edith, who won the top AMA award at the National Science Fair in Hartford, Conn., in May, displayed at the meeting cookies, cinnamon pinwheels, French bread and cheese swirls that she made from algae.

The use of algae in foods, she said, increased the protein content 20 percent and the fat content 75 percent.

Edith said she grew the algae, spun it in a centrifuge, and heated it to obtain a powder. It tastes like broccoli, she noted.

Currently algae is being considered as a food that could be grown aboard rocket ships for space crews on their trips. One tablespoon of algae equals the nutritional value of one ounce of steak. (Food Field Reporter, July 20, 1959.)