

SEAFOOD AND PUBLIC HEALTH

WEDNESDAY—NOVEMBER 13, 1963

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Sanitation Maintenance in Plants Producing Fishery Products Under Inspection by the U.S. Department of the Interior

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Abstract

This paper reports how, through the fishery inspection service of the U.S. Department of the Interior, sanitation is helping the fishing industry to carry out its aim of bringing to the consumer products that are as tasty as when they were taken from the sea.

INTRODUCTION

THE U.S. FISHING INDUSTRY has a vital interest in sanitation, not only from the health and welfare point of view, but also from the point of view of profits. A product processed under sanitary conditions is more palatable. Accordingly, the demand by the consumer increases, which makes possible a larger margin of profit.

For both the consumer and the processor to benefit, however, a reliable way must be found for the processor to signal to the consumer that special care has been taken in regard to sanitation and other factors involved in making available a product of high quality. One such signal that the consumer will rely on is the shield of inspection of a Government agency.

In the case of fishery products, the inspecting agency is the U.S. Department of the Interior. One of the essential conditions that the Department has stipulated for its participation in this program is the strict adherence to the highest standards of sanitation. The purpose of the present paper is to report on the maintenance of sanitation in plants processing fishery products under USDI inspection.

This program could not be started until a suitable legal basis had been established. It then developed rapidly, owing in large part no doubt to the fact that the industry has accepted both the Department's aims and its methods of maintaining sanitation. In any such program, there must, of course, be some means of enforcement. Accordingly, the main topics considered in this paper are the following: (1) legal basis for USDI inspection, (2) development of the USDI inspection program, (3) aims of the program, (4) maintenance of sanitation, and (5) enforcement of sanitation.

LEGAL BASIS FOR USDI INSPECTION

It is through the Bureau of Commercial Fisheries that the U.S. Department of the Interior administers its voluntary program of inspecting and certifying fishery products. This program was originated by the U.S. Department of Agriculture, the basic authority for the program being derived from the Agricultural Marketing Act of 1946. In 1956, Congress enacted legislation known as the Fish and Wildlife Act. This act called for the transfer to the U.S. Department of the Interior of certain functions relating to fisheries, including the authority to inspect, identify, and certify fishery products.

DEVELOPMENT OF THE USDI INSPECTION PROGRAM

With the legal aspects settled, basic research was started to develop the appropriate standards, and the inspection service was organized. In this section, we first consider the initial activities and then those that are current.

Initial Activities

Inspection and grading services by the Department of Interior were started in July, 1958. At the outset of the fishery inspection program, 10 fishery products inspectors were transferred from the Department of Agriculture. These inspectors formed the nucleus of the new USDI inspection force. Congress provided a small appropriation to get the program started, but since that time, industry has borne the entire cost of this voluntary inspection program.

Current Activities

Industry's voluntary acceptance of this program reflects its confidence in the Bureau of Commercial Fisheries and in the Bureau's desire to serve and assist it. Currently there are official U.S. grade standards for 14 fishery products. These standardized products include fish sticks, fish portions, and fish blocks; haddock, cod, ocean perch, sole, and flounder fillets; halibut and salmon steaks; raw breaded shrimp and raw headless shrimp; and fried scallops.

During the past year, over 210 million pounds of fishery products were inspected and certified. Of this amount, 184 million pounds were packed under continuous inspection. The other 26 million pounds were lot inspected. This volume of inspected products represents 32% of all the domestically produced fish products for human consumption, exclusive of canned products. To handle this volume of inspection required the efforts of 51 inspectors located in 17 states throughout the country. Inspection services are now provided in 43 processing plants on a continuous basis. In addition, lot inspection facilities are located in nine major producing and marketing areas throughout the nation.

AIMS OF THE INSPECTION PROGRAM

In this section, we consider the broad objectives of the program and then the specific services performed by the inspector.

Broad Objectives

The broad objective of the fishery inspection service is to aid all segments of the industry in the orderly marketing of wholesome products of high quality. During the past two years, the Bureau has found that a definite need exists to strengthen services to the consumer. To meet this need, we have made our

product standards more exacting and have placed more emphasis on better plant sanitation.

We believe that a program geared to the needs of the industry and to the desires and expectations of the consumer will achieve our goal of increased production and consumption of fish of high quality. This achievement benefits both our citizens and our fishing industry.

Specific Services Performed by the Inspector

Essentially, there are two services carried out simultaneously by our inspectors in the routine performance of their duties at processing plants operating under USDI continuous inspection: (1) to apply the appropriate standard or specification, and (2) to assure the sanitation of the products.

Application of standard or specification. The first of these two services is to apply the appropriate product standard or specification. This duty is carried out by examining the product during each stage of its production as well as in its final packaged form to determine that all of the specific requirements of the U.S. Grade standard or specification have been met.

Assurance of sanitation. The second of the two services carried out by our inspectors, and the one of primary interest to this group, is to assure that the products are prepared and packaged under the best possible sanitary conditions. The attributes of wholesomeness and high quality in fishery products, or any food product for that matter, are not acquired but rather are maintained. Good sanitary practices and operations at the processing plant are extremely helpful in maintaining the inherent and original characteristics of fish and shellfish that were present at the time of harvest. Thus, in the performance of continuous inspection, our inspectors point out and recommend ways to correct factors that may contribute to an unsanitary condition in the plant and that may result in the packing of a product containing foreign material that is injurious to health or is repulsive.

MAINTENANCE OF SANITATION

In this section we consider the USDI sanitation requirements, the underlying philosophy of the sanitation program, and the improvements resulting from the establishment of this program.

USDI Sanitation Requirements

The USDI requirements for good sanitation in plants operating under continuous inspection cover two broad areas: (1) plant facilities, and (2) plant operating procedures.

Plant facilities. Prior to starting continuous inspection in a processing plant, our inspectors make a survey of the plant to determine whether it satisfies certain minimum sanitary and physical requirements.

The major factors that may contribute to unsanitary conditions and upon which our inspectors place great emphasis in conducting a survey of the facilities are as follows: a. building structure—facilities, premises, and general overall condition; b. water supply; c. equipment and machinery; d. plant lighting and ventilation; e. storage areas for raw materials, ingredients, finished products, and packaging materials; f. floor drainage and waste disposal systems for water-soluble waste and solid waste; g. adequate toilet facilities; h. adequate washing facilities; i. absence of insects and indications of rodent in-

festation; j. plant management's attitude toward maintenance of a program that will meet the sanitation requirements.

Operating practices. In addition to the condition at the plant, the operating practices, including the personal hygiene of the workers, are important factors in a sanitary operation. The Bureau has set forth specific requirements in its regulations pertaining to these areas as well as to those previously mentioned. The requirements applying to operating procedures are as follows:

- a) All operations shall be strictly in accord with clean and sanitary methods and shall be conducted as rapidly as is practical.
- b) All operations shall be carried out at temperatures that will not cause any significant increase in bacterial content, or deterioration, or contamination of the products.
- c) All products and ingredients shall be subjected to continuous inspection throughout each processing operation.
- d) All products not fit for human food shall be removed and segregated prior to any further processing operations.
- e) All procedures employed in the processing of products, beginning with the raw material to completion of the packaged product, shall be such as to result in a clean and wholesome product.
- f) All ingredients shall be fit for human food.
- g) No person known to be affected with any disease in a communicable form, or known to be a disease carrier, shall be employed in a processing plant under continuous inspection. This provision shall also apply to any person having an infected wound or open lesion on an exposed portion of his body.
- h) In areas where products and ingredients are exposed, all persons shall: (1) wear clean and appropriate clothing; (2) wash hands prior to starting work and prior to resuming work following each absence; and (3) take all necessary precautions to prevent contamination of the product with any foreign or esthetically objectionable material.

Underlying Philosophy

The Bureau's philosophy regarding its sanitation program is that the program must be continuous and must be a cooperative venture with the managers of the participating plant.

Continuous process—We believe that any worthwhile sanitation program must be based on the concept that the maintenance of sanitation is a continuous process. Our inspectors devote continuous attention to the maintenance of sanitary plant and processing conditions as an integral part of the services they perform. The USDI inspector clearly recognizes that one of his primary functions is to see that the amount of product classified as defective, owing to an unsanitary operation, is held to the minimum.

Experience has shown that the maintenance of good sanitary conditions makes a positive contribution to production in terms of value to the processor. The added discipline brought about by a good sanitation program spreads to other phases of the operation. The inspector's positive attitude in that regard, together with support by plant management, improves the attitude and efficiency of the workers in the plant, minimizes losses brought about by spoilage of materials, and reduces the cost of operation.

Cooperative venture—In the administration of the inspection program, the Bureau establishes standardized operating guidelines when these are required to meet the needs of a particular situation. Two years ago, we found it neces-

sary to establish guidelines on the subject of effective sanitation maintenance in the plant. These were developed with the full cooperation and assistance of the processing firms in which they are now being applied.

The operating guidelines on effective sanitation maintenance require cooperative action on the part of the Bureau and of the plant managers.

The Bureau developed and established a standardized sanitation check sheet for use by USDI inspectors. The design of the score sheet is sufficiently versatile that it can be used to evaluate one or more specific areas in the plant at different times during the day. A copy of each completed score sheet is furnished to the plant manager as a record of existing sanitary conditions and practices as observed at a specific time.

The Bureau, as a continuing practice, also makes available any new information dealing with the principles of sanitation and recommended plant operating practices to the managers of all USDI inspected plants.

Many of the firms operating under USDI inspection have specified a management representative to supervise the plants' sanitation program as part of this cooperative effort to maintain a high level of sanitation in the plant. The Bureau recommended that this be done in order that someone in a position of authority in the plant should be responsible for this important function. We believe that the delegation of sanitation maintenance to a person of lesser authority in a plant results in an inadequate job. USDI inspectors work cooperatively and directly with the designated plant sanitarians on all matters pertaining to sanitation.

Resulting Improvement

The overall maintenance of sanitation has increased considerably in many of the firms producing fishery products under inspection by the U.S. Department of the Interior. The Bureau, however, does not deserve the whole credit for the improvements made in these plants, as they have been accomplished through cooperative efforts with the industry.

The following are a few of the improvements that have been noted during the past two years:

- 1) Better attention is given to the handling of raw materials.
- 2) More thorough and effective clean-up operations are carried out after production has been discontinued.
- 3) Effective insect and rodent control programs have been implemented at plants on a regular basis.
- 4) Spot clean-ups have been started.
- 5) More attention is being given to the adequacy and use of handwashing facilities.
- 6) Specific personnel have been designated solely to clean-up activities during processing operations.
- 7) Product flow lines have been rearranged for more rapid movement of products to frozen storage.
- 8) Bacteriological analyses are routinely performed as an indication of the conditions under which the product was produced.
- 9) Employee awareness of good sanitation has been emphasized and stressed by plant management.

ENFORCEMENT OF SANITATION

Insofar as the program is concerned, the enforcement of sanitation is a separate concern of the USDI. The program, however, benefits from a work-

ing arrangement with the Food and Drug Administration. In this section, we first consider the measures taken by USDI and then the relation with FDA.

USDI Measures

USDI certificates of inspection are withheld from all products that are produced under conditions, practices, or operations determined to be unsanitary in accordance with USDI regulations. The use of any promotional devices and inspection shields on the labels of such products is also disallowed.

USDI inspection services may be suspended or terminated completely at plants where good overall plant sanitation practices are not applied or maintained on a routine basis. Frequently recurring adverse sanitation reports are used as a basis for suspending or terminating inspection services.

Relation with FDA

The Bureau and the Food and Drug Administration have certain related objectives in the areas of plant sanitation and product quality in carrying out their respective service and regulatory activities. Because of this relatedness of missions, an agreement has been consummated between the two agencies outlining working arrangements that are being followed, thereby permitting each agency to discharge its responsibilities effectively. To eliminate any difference in the interpretation of what constitutes good sanitation, the Bureau and FDA representatives jointly examined and interpreted the criteria that support a good sanitary environment. The results indicated that both agencies employ very similar criteria for measuring the adequacy of sanitation in processing plants.

With regard to sanitation, the managers of the firms operating under USDI inspection have been made aware of our working arrangements with the Food and Drug Administration. We have made it clear, however, that our service is not intended to provide immunity from the mandatory regulations enforced by the Food and Drug Administration.

Antimicrobials From Sea Food

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Abstract

Antibacterial and antiviral agents have been isolated in our laboratory from the abalone (*Haliotis rufescens*), the oyster (*Ostrea virginica*), the clam (*Venus mercenaria*), the sea snail (*Tegula gallina*), the queen conch (*Strombus gigas*) and the squid (*Loligo pealii*). Two methods were used for these isolations, namely DEAE cellulose ion-exchange chromatography and dilute acetic acid extraction. The final products obtained were usually white powders, readily soluble in water, nondialyzable, stable at a temperature of 95C for 45 minutes, and resistant to digestion by trypsin and pepsin. They were precipitated by all the protein precipitants. Acetic acid extract of shucked oysters was used for most of our experimental studies. This extract contained an antibacterial factor (designated as paolin 1) and an antiviral factor (designated as paolin 2); they could be separated by chromatography. The extract was not toxic for Swiss white mice. By oral route, doses of 1, 2, and 4 g/kg of body weight were well