FROZEN PACKAGED HALIBUT VOLUNTARY STANDARDS DISCUSSED AT MEETING

A public meeting to discuss the first proposed draft for voluntary standards for frozen packaged halibut was held on April 1, 1958, at the Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash.

In attendance were 10 representatives of the fishery industry, a representative of the National Fisheries Institute, and technical personnel of the Seattle Technological Laboratory. All halibut producers, processors, and related members of industry were invited by an advance notice which appeared in the Bureau of Commercial Fisheries Market News Service "Fishery Products Reports."

Local industry displayed a positive, helpful, and interested approach toward the development of a realistic and meaningful standard by their numerous questions, discussions, and critical evaluation of each of the various quality factors considered. The proposed standard for determination of grade is based on (1) the evaluation of quality factors rated by score points in the frozen, thawed, and cooked states and (2) the evaluation of the quality factors of flavor and odor in the cooked state, but not rated by score points; the dual results thus obtained fix the maximum grade limit that the product can achieve.

Copies of the latest draft are available upon request from the Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash.

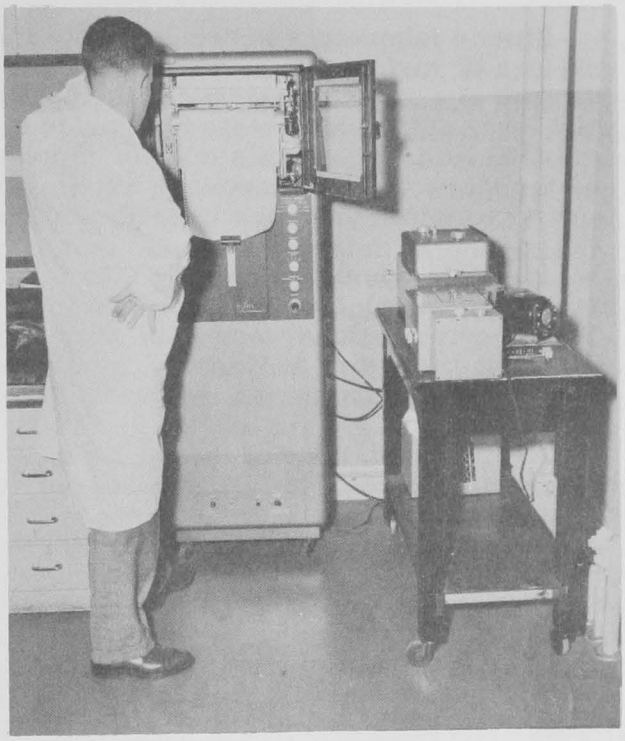
Funds made available by Public Law 466 (83rd Congress), commonly referred to as the Saltonstall-Kennedy Act, have been used to expedite progress on the Bureau's program for the development of voluntary Federal standards. The National Fisheries Institute, acting as a contract research agency for the Bureau, has supplied the industry liaison essential to the standards program and has furnished consulting services at meetings and conferences on these standards.

PROGRESS IN FISH-OIL RESEARCH

In the past, the bulk of the fish oil produced by the United States fisheries went into the manufacture of paint and soap. With the development and use of synthetic substitutes for oil in these products, the major part of American-produced fish oil is exported to Europe, where it is made into margarine. Should unanticipated develoments upset or eliminate this market, new uses would have to be found for fish oils, or they would undergo a drastic reduction in price. The present research program of the U. S. Bureau of Commercial Fisheries is aimed at developing uses for fish oil that could replace the European margarine market, should this become necessary.

The characteristics and the potential uses of fish oils long have been subjects of great interest to research workers in the Bureau. The unique composition and structure of fish oils, consisting of long-chain fatty acids with many double bonds, present a challenge to the oil chemist and to the food technologist. Most uses for which fish oils are employed at present make no use of these properties. In many cases, the characteristics of fish oils even are considered a distinct disadvantage.

Instead of trying to overcome the alleged disadvantages of fish oils in order to make them competitive with animal and vegetable oils, Bureau chemists decided to take advantage of these unique properties and to investigate their potential for the manufacture of industrial and pharmaceutical products. Development of these products requires an extensive research program.



RUNNING A SPECTROGRAM ON A FRACTION OF ALKALI-ISOMERIZED LONG-CHAIN FATTY ALCOHOLS FROM FISH OIL.

Less is known about the chemical structure of fish oils than is known about the structure of animal or vegetable oils. The reasons for this are (1) the complex nature and instability of fish oils and (2) lack of funds to pursue the investigation.

In 1955, with the availability of more adequate funds from the Saltonstall-Kennedy Act of 1954, the U. S. Bureau of Commercial Fisheries was able to expand this research. Since that time, 21 projects in 16 different laboratories have been undertaken. Twelve of these projects essentially are basic investigations of the structure and reactions of fish oils, whereas the other nine projects are designed to develop practical uses for fish oils and for the compounds manufactured from them.

The basic research projects are varied. They include analyses of (1) the composition, structure, and chemical reactions of fish-oil fatty acids, (2) the composition of the fish-oil components other than fatty acids, and (3) the physiological effect on animals of ingesting fish oils or their components. The fundamental information developed from these investigations forms the foundation for an intelligent applied research program.

The applied research projects also are varied. They include investigations of the value of fish oils or their derivatives (1) in poultry and swine feed, (2) as fungicides and insecticides in agriculture, (3) as a basic ingredient in the manufacture of resins, (4) as leather lubricants, and (5) as ore-flotation agents. Work also is being done on improving methods of processing fish oils.

During the relatively short period since 1955 when the stepped-up research program on fish oils got under way, a number of papers have been written. In addition to those that are in the process of being prepared, 32 papers either have been published, or are in press.

REPORT ON DEVELOPMENT OF FUNGICIDES FROM FISH OIL

This investigation has been under the supervision of Dr. Boris Sokoloff, Director of the Southern Bio-Research Laboratory, assisted by I. Chamelin, Akira Kato, George Renninger, and Maxwell S. Simpson.

The object of the investigation was to modify whole crude fish oil in relatively simple ways, without purification or separation of active ingredients, so as to increase the anti-fungal activity of the oil to an effective level.

Simple laboratory screening tests for fungicidal activity were developed using cultures of various fungi isolated from citrus trees and fruit. At later stages, pure cultures of a selected group of fungi and bacteria of pathological significance were used for the screening tests to provide a wider spectrum for determining general antibiotic activity. In this manner more than 170 fish-oil preparations were tested, and the more active compounds were also used in limited tests on citrus seedlings to determine whether they caused detrimental effects on foliage.

Ideally a compound costing less than 25 cents a pound was desired which was stable, water-soluble, nontoxic, and biologically active at 0.1 percent concentration. Various combinations were tried of saponification, chlorination, and sulfation of the crude fish oils, with addition of chemicals such as ammonia, formalin, several metallic hydrides, and metal ions to the process.

As indicated, none of these preparations or mixtures was purified to the extent that identification of the individual chemical compounds was possible. Because of the complexity of the fatty-acid mixture in the crude fish oils, this step would have been too expensive and time consuming to consider with the funds granted for the investigation. The contractor was successful in materially increasing the fungicidal and fungistatic properties of fish oils as evidenced in laboratory screening tests. However, it was found in the course of testing on citrus seedlings that none of the compounds was satisfactory enough to justify pilot-plant scale preparations and more extensive field tests. Most of the active fish-oil compounds were not water soluble or proved to have toxic effects on the plants, and the emulsified preparations were unstable and had poor distribution and penetration due to their oily nature. The water-soluble compounds unfortunately were usually low in antifungal activity.

One preparation--essentially a crude fish oil treated with ammonium hydroxide in acetone, saponified with sodium hydroxide, and then mixed with a small amount of potassium borohydride--was judged to be fairly satisfactory. The unknown chemical composition of this preparation and the probable difficulty in adapting the laboratory procedure to pilot-plant processing led to the decision to terminate the work at this stage.

However, the officials of the U. S. Food and Drug Administration have emphasized the hazards of toxic residues from insecticides and fungicides on fruits and vegetables. Most of the newer organic pest control chemicals are highly toxic and very low tolerances have been set, or in some cases no residue is permissible. Fish-oil compounds on the other hand are essentially nontoxic to humans. It is the opinion of the contractor that this fact will eventually counterbalance the relatively high cost and low activity of fish-oil derivatives, and that these may yet be developed to compete with the new synthetic compounds for insect and fungi control, especially for leafy vegetables and mature fruit.

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TECHNICAL NOTE NO. 44 - INDUSTRY TESTS SHOW BRINE-FROZEN HADDOCK TO BE OF GOOD QUALITY

Practical commercial tests now in progress show that whole and eviscerated haddock, brine-frozen at sea and kept in frozen storage for 8 months, produced good-quality marketable frozen fillets. This test is being further continued to see if the frozen fish can be held even longer in cold storage and still produce high-quality fillets.

The East Boston Technological laboratory of the U. S. Bureau of Commercial Fisheries initiated this commercial-scale test in July 1957, to stimulate further interest in freezing fish at sea among vessel operators and shore-plant processors. The test is designed to acquaint the industry with the commercial-handling of fish frozen at sea. This test will also provide additional information on the length of time the whole and eviscerated fish can be held in frozen storage, at a high level of quality, prior to being processed into fillets. The latter point is of major importance in the practical commercial application of the freezing-fish-at-sea process.

VIEW OF THE BOSTON FISH PIER.

In July 1957, the Bureau's experimental trawler Delaware returned to the Boston Fish Pier with 54,000 pounds of round and eviscerated haddock that were brine-frozen at sea. The fish were glazed with fresh water during unloading and put directly into a cold-storage warehouse. Nineteen dealers in the Boston area, who indicated a desire to take part in these tests, have been removing large lots of these fish from storage at bimonthly intervals. The fish are being thawed and filleted and the fillets packaged, refrozen, and marketed in the customary manner.

A total of 36,000 pounds of the brine-frozen fish have been handled in this manner since the beginning of this study. Oral and written accounts of the observations made by the processors show that fillets prepared from brine-frozen haddock stored at 0° F. for 8 months, while slightly darker in color than fillets prepared from iced fish, are still of good quality. Examinations conducted at the Laboratory on similar samples of fish apparently substantiate these observations. The color of the brine-frozen haddock fillets, which is associated with the freezing process, was not considered to be objectionable in marketing these fillets in the frozen fish trade.

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