NEW YORK CITY DEPARTMENT OF HEALTH 100

Administrative Microbiological Standards for Sanitary Control of Frozen Foods

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AT THE 1956 annual meeting of the Association of Food and Drug Officials of the United States, the rapid growth of the production and sale, without controls, of frozen ready-to-eat foods was pointed out as a potential public health problem. Several State and local agencies were apprehensive about this situation. Microbiological studies of frozen ready-to-eat foods supported inspectional evidence of poor sanitary practices in many instances. Also, it was known that in many cases production was controlled by certain manufacturers who could not be depended on to assure safety of these products without careful official supervision.

The association recognized the need for a code to guide regulatory agencies in the control of the sanitary quality of frozen ready-to-eat foods. Consequently, association officials met with industry representatives to develop a suitable body of rules and, if possible, microbiological standards. Although their suggested codes for the sanitary control of manufacturing plants, equipment, freezing, and transport were generally agreed on, the microbiological yardstick is still being developed.

Administrative Yardsticks

Buchbinder and associates had conducted initial studies for the New York City Department of Health as early as 1949 (*1*). Subsequently, a program of sampling, laboratory examination, and application of administrative microbiological standards as an educational device was inaugurated. Ready-to-eat frozen foods were sampled at the retail level. When bacterial counts were found to exceed the administrative standard, the distributors and manufacturers were notified. Often both manufacturers and distributors wished to review their practices and laboratory techniques with the health department. Some even requested permission to observe the laboratory procedures performed by the department. This interest was stimulated merely by the application of administrative yardsticks to measure the sanitary quality of frozen ready-to-eat foods that were being distributed in local markets.

Beginning in 1958, improvement was observed in the sanitary quality of frozen ready-to-eat foods. At that time, the New York City Department of Health adopted the following administrative microbiological criteria for these products: total plate count, less than 100,000 colonies per gram; coliform, less than 100; coagulase-positive staphylococci, 0; and enterococci, 1,000.

According to a 1959 report of the department (*2*), "In addition to the overall satisfactory picture, it can be reported that compliance with the more stringent standard of 50,000 col/gm total plate count, broached as a possible more suitable alternative to 100,000 col/gm subsequently adopted, was well within the range of the former figure.

"Good correlation was also in evidence when

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comparing plate count with other criteria (coliform, staphylococci, enterococci). Hence, although 16 percent of the samples were 'unsatisfactory' with respect to criteria other than plate count (where the plate count was satisfactory), a review of the itemized listing shows that on the whole, any significant high count in coliform, staphylococcus and/or enterococci was generally accompanied by a high total plate count.

"It is noteworthy that this effective degree of compliance has been achieved, for the most part, operating 'at a distance,' essentially through correspondence, since most of the sources are outside the physically, geographical jurisdiction of the Department. Hence, it is essentially by dint of moral suasion, and 'educational' approach that the industry is importuned to accept our standards."

However, other factors may have also influenced the improvement; for example, the climate created by the hearings held by the Association of Food and Drug Officials of the United States to determine a guide for the States in the control of the manufacture and sale of frozen foods, the enactment of laws containing standards in at least one State, and the promise of more such laws in other States.

The results of microbiological examination of frozen food samples in New York City for 1958, 1959, and 1960 are shown in the table. The following is a summary of frozen and chilled ready-to-eat samples examined microbiologically in 1963.

Type	*Number*	*Satisfactory*	
		Number	*Percent*
Frozen	636	497	78. 2
Chilled	304	213	70. 1

Similar findings were observed elsewhere. Huber and associates (*3*) examined 1,282 samples of frozen meat and poultry products and potpies purchased for consumption by military personnel. They found that 86 percent of these samples had total plate counts of less than 50,000 per gram. At that time, the bacterial standard for frozen precooked food was less than 100,000 per gram for military purchase. Huber and associates suggested that "if the present trend continues, this maximum may be revised downward in future specifications." Of the 1,282 samples, 94 percent were coliform free or had less than 10 per gram, the limit in the military specification for frozen precooked foods. However, frozen food products for military personnel are produced under resident inspection of the U.S. Veterinary Corps and under controlled sanitary conditions (*4*).

Microbiological Standards

Some persons believe that microbiological standards should be set for all frozen foods. Others, such as Hucker and Pederson (*5*), feel that standards should be related to the nature of the product. Discussing such standards they said, "Regardless of academic discussion on the significance of microbiological counts in frozen foods, they are the only known indices of the condition of the food and the procedures of processing. For this reason, standards for frozen foods involve primarily a discussion of methods and the significance of microbiological examination.

"Inasmuch as sanitary standards cannot be general and all inclusive and still apply to specific foods, it is necessary to recognize at least five differences in categories of frozen foods; vis., vegetables, fruits, prepared precooked meals and related products, meats and certain dairy products."

Among all the frozen food products, the ready-to-eat foods seem to have the greatest potential effect on public health, and much of the energies of the industry committees and the committee of the association of regulatory agencies charged with the study of standards should be concentrated in this area. The administrative standards of the New York City Department of Health are applied to frozen ready-to-eat foods, particularly those which carry instructions to heat just long enough to make the food palatable. Other workers (*6*) have reported that such instructions sometimes result in inadequate reduction of bacterial counts and in some instances inadequate destruction of pathogens.

Establishment of standard methods for microbiological examination as well as uniform interpretation of the results of examination is a primary need of programs aimed at regulation of frozen ready-to-eat foods. Currently,

standards for examination of these foods are being considered by the American Public Health Association, the Association of Official Agricultural Chemists, and others. Until such methods are developed, however, successful use of administrative standards depends largely on the confidence of the community in its health agency.

The former Surgeon General, Luther L. Terry, at the Third Annual Bronfman Lecture, stated: "The health official should have a greater hand in the decision-making process itself. He can no longer deliver his professional judgment and then leave the arena to other community leaders because more than health considerations are involved."

It was necessary for the New York City Department of Health to take the initiative in applying administrative standards to frozen ready-to-eat foods because these foods were proved not uniformly clean and experience had shown that this condition could be corrected. This administrative decision seems to have been correct, not only because it is widely endorsed by workers in the field but because of the uniform agreement among these workers that the sanitary quality of frozen ready-to-eat foods has improved. Although Elliott (*7*) argued against a uniform standard, he nevertheless held that "Standards should be applied first to the more hazardous types of food on an individual basis after sufficient data are accumulated on expected bacterial levels with consideration for variations in composition, processing procedures and time of frozen storage."

In a discussion before the 1962 International Conference on Microbiological Quality of Foods, Shiffman stated (*8*): "For the most part, regulatory microbiological standards for foods have been based either on arbitrary indices which have been established and modified through subsequent experience, or have been arrived at retrospectively based on performance studies of food products already on the market. This does not say that standards derived in this way are not valid. We do not have to wait until all uncertainties are settled before proposing microbiological criteria. Legislative bodies, courts and administrative practice do not require perfect knowledge; they do require the absence of capriciousness. . . . Whenever the administrator receives a laboratory report, he must make some interpretation as a guide for action. One cannot escape from criteria, be they implicit or explicit."

In April 1964 Peterson and associates reported that "Frozen convenience foods do not represent a public health hazard; they become inedible before they develop large populations of hazardous organisms. Competition by saprophytic organisms during defrost restricts the growth of certain pathogens in these frozen prepared dinners" (*9*). However, the removal of frozen convenience foods from consideration as a potential health hazard cannot find strong support among regulatory agencies. The study cited dealt primarily with the microbiological and organoleptic aspects of certain frozen convenience foods that were subjected to defrosting and refreezing procedures. It did not take into account the sanitary quality of the foods before initial freezing. But the findings of this study did support the need for microbiological standards to reveal incipient decomposition as

Results of microbiological examination of frozen food samples, New York City, 1958–60

Samples	1958		1959		1960	
	Number	Percent	Number	Percent	Number	Percent
Total	240	----------	278	----------	144	----------
Satisfactory for all criteria	153	63.7	201	72.3	90	[1] 62.5
50,000 or less total plate count	165	64.1	222	79.5	95	66.0
100,000 or less total plate count	192	80.0	244	78.8	110	76.4

[1] During 1960 the sanitary quality of the food samples generally remained unchanged with the exception of frozen shellfish, primarily imported cooked shrimp, which was found unsatisfactory in many samples.

well as other hazards. The prevention of the sale of frozen ready-to-eat foods that become inedible shortly after they are defrosted is the duty of the control agency.

Discussion

The seemingly low incidence of illness caused by ingestion of frozen ready-to-eat foods, such as frozen or chilled potpie containing chicken, meat, or fish; chicken a la king; beef, veal, or lamb stew; lobster Newburg; Chinese-style foods; pastries; and crabmeat or shrimp, does not lessen the need for official surveillance.

Many ready-to-eat foods are capable of supporting abundant growths of micro-organisms. Moreover, microbiological examination of several hundred samples of these foods by the New York City Department of Health showed contamination by organisms that are significant in sanitation control. The consensus of quality control workers is that these products are potentially hazardous and they should be closely supervised by the manufacturers throughout all phases of processing.

Although many manufacturers have elaborate quality control programs, their main concern is whether the product has a suitable shelf life. But there are other considerations, and the public's health is not a minor one. Since control by industry is voluntary at present, less-responsible manufacturers may allow wider latitude in quality control, while the least responsible may not recognize the need for any standard.

To assure the safety of ready-to-eat foods, control agencies should require that sound sanitary practices are followed and that certain perishable foods meet a microbiological level indicative of clean production and proper handling. The methodology and interpretation of results should be standardized. An advisory code on proper methods of production, handling, and distribution was developed in 1962 by the Association of Food and Drug Officials of the United States, and several States have enacted legislation following the pattern of this code.

Administrative standards for frozen ready-to-eat foods have been effective for New York City, and they may serve as guides for both the food industry and the regulatory bodies in other locations that have interest in this area of food control.

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