SANITARY PROBLEMS IN THE PROCESSING AND DISTRIBUTION OF FROZEN FOODS

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Before discussing the sanitary problems in the processing and distribution of frozen foods, it might be well to review briefly the history of the frozen food industry. The freezing of foods as a means of preservation is not new. At least in real northern climates it is probably as old as man. However, the frozen food industry is comparatively recent in origin.

DEVELOPMENT OF THE INDUSTRY

Fish was first frozen commercially about 1865, however it was not until 1922 that packaged haddock fillets were frozen for the retail market. The slow freezing of poultry also came into use about 1865; followed by meat about 1880 and small fruits for remanufacture about 1905.

The commercial quick freezing of vegetables and fruits for the retail market started about 1929. Frozen foods, packaged in consumer size cartons, constitutes the largest portion of the quick freezing industry as it exists today.

In the early days of the industry, little consideration was given to the quality of the food being frozen or to the methods of preparation, processing and freezing, or to distribution. Hence it is easy to understand why the general public considered frozen foods to be products of inferior quality.

There was many a sad consumer experience with poor quality “cold storage” merchandise that had been frozen not as quality products, but only to remove fresh produce of questionable quality from an already glutted market.

Starting about the middle twenties, certain fishery companies began to be very careful of the quality of the fish selected for freezing and the sanitary conditions under which the product was packed. This was a most important step, but the public was still skeptical and was slow to accept these products. Later on, the term “frosted” was coined and this probably was to get away from the stigma attached to “cold storage goods.” At the same time, more careful attention was being given to the selection, handling, preparation, freezing, storage, and marketing of “frosted foods” and the products began to sell.

The industry had a slow beginning during the years of the depression, and it was 1939 before any rapid expansion took place. Starting about 1943, and for the four years following, the frozen foods industry made about as much progress in the number of freezing plants built and the variety of products frozen as formerly would have taken place in a period of ten years. The war years gave impetus to this mushroom growth.

Today the quantity of food frozen commercially exceeds 2,000,000,000 pounds. This figure excludes ice cream, which would bring the total to nearly 5,000,000,000 pounds.

DEVELOPMENTAL PROBLEMS

The circumstances attending the recent rapid growth gave rise to serious additional problems for the industry as a whole. People entered the field lacking technical training and experience. Labor was difficult to secure, and to

keep throughout an entire packing season, and the high cost of raw products led many processors into the practice of packaging poor quality merchandise. The result was consumer complaints and a setback to the industry.

The industry has been slowly crawling out from under the burden of an over-stocked quantity of unsatisfactory merchandise. A number of "get-rich-quick" companies have fallen by the wayside. At present, the industry appears to be established once more, and should continue to expand. However, unless all those in the industry take the necessary precautions to pack under sanitary conditions and are careful of the quality of frozen foods that they offer, the reputation of the industry as a whole will suffer, and the demand for the products will fall off again. Continued success will depend upon the ability of the packers to produce and market frosted foods substantially the equivalent of the better grades of fresh foods. Frosted foods compete more directly with fresh foods than with canned foods, and if the quality of frosted foods is not maintained, the customers will again turn to fresh foods.

Freezing does not improve the appearance or flavor of any product whether fish, meat, poultry, fruit, or vegetable. To produce frozen foods of high quality requires technical direction and control through each step of the process from the planting of vegetables, breeding of chicks and the like to the processing, packaging, freezing, warehousing, and retailing of the finished frozen product.

Sanitation may be defined as the adoption or carrying out of hygienic measures designed to protect or to secure health. Proper sanitation is not only good economy, but also is of primary importance in producing a high quality product.

Federal law requires frozen food packers to give careful attention to all aspects of sanitation. The Food, Drug, and Cosmetic Act of 1938 under Section 402 (a) (3) states that a food shall be considered to be adulterated "if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food." Section 402 (a) (4) hold special significance for processors since it rules that any food may be deemed to be adulterated "if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health." Foods which are adulterated within the meaning of the sections quoted are subject to seizure if shipped in interstate commerce.

On this basis, modern plant sanitation is no longer simply a matter of good housekeeping, but requires the practice of combining general cleanliness and tidiness with adequate technical control of micro-organisms and infestation. In nearly every condemnation of a food plant considered to be insanitary, emphasis has been placed upon one or more of the following: (1) the presence of rats and/or mice; (2) the presence of flies and/or other insects; (3) filthy toilets; (4) polluted water; (5) decomposed or insect infested raw materials; (6) improper or insufficient cleaning of equipment; (7) improper disposal of waste materials; and (8) unhygienic personal habits of employees.

The dairy industry has been most progressive in outlining and studying the many sanitary problems connected with their particular field of the food industry.

Sanitary Requirements

All of these problems may be classified under one or both of the general headings of Sanitation and Quality Control. The technical problems confronted in freezing and packaging may differ with each type of product, but in general the practices recommended will form the nucleus of quality packing procedure.
Likewise, much credit must be given to The National Canners Association for fostering and promoting sanitation in their industry. As early as 1913, they appointed a Committee on Sanitation which recommended a set of sanitary requirements for canneries. In 1923, they adopted a most comprehensive Sanitary Code and during the past 10 years they have issued a series of publications on sanitation.

It is regrettable that the frozen food industry has not been as active in establishing similar regulations.

**Personnel Training**

One of the basic points underlying sanitary problems in the processing and distribution of frozen foods is the lack of education on the part of producer and distributor. Starting at the top of the ladder it is most difficult to convince management of the need of sanitary measures and of the adherence to a sanitary code. Management often considers sanitary maintenance as an unnecessary cost, or at least many of them seem to begrudge the money that might be spent to improve sanitary conditions, especially so in regard to the everyday cost of a good “clean up” crew. Practical sanitarians do not ask for a tile-walled palace, for one can keep even a barn in a tidy condition. Likewise the good old-fashioned mop, if properly used, is just as effective as the more modern cleaning devices. Hence to a considerable degree, the cost of maintaining a sanitary food plant can be simple or elaborate, depending on the assets of the company and within those limits it is almost a guarantee of repeat sales and profits. In addition there is always the personal satisfaction of one knowing that he has done a good job.

Plant superintendents and other supervisory personnel have a tendency to be over cost conscious and attempt to cut corners in every way possible. True it is part of their job to keep operating costs at a minimum but it is no longer good economy when food is packed under insanitary conditions resulting in consumer complaints and possibly even seizure by the Food and Drug Administration. Condemnation procedures can be mighty costly legal problems.

Getting down to the working clean-up crew itself, there is always the tendency to assign old, decrepit, and otherwise poor labor to these jobs. A good clean-up crew requires the service of strong able-bodied men, as theirs is a tough assignment. These men should be given a thorough “on the job” training program and should be made to realize their responsibility. They must have pride in their work and be taught that their job is not menial but very essential to the production of a high quality product. When they do this well they should be complimented on their efforts, and when otherwise, they should be told wherein they failed and be taught how to do a good job.

The clean-up crew foreman should be above the average in intelligence for supervisory personnel. Unless the plant is a large one he need not be a graduate sanitarian, but he should be well versed in sanitary techniques, including its various ramifications. In these same small plants it is anticipated that there is a food technologist or plant sanitarian who has full knowledge of the underlying principles of sanitation and a knowledge of microbiology and bacteriological technique through which one can locate the hidden danger spots of possible contamination.

**Distribution**

Education is also needed on the part of the distributor of frozen foods. It might be reasoned that sanitary problems here seem to fall more in the category of quality control but the two are so closely related, each influencing the other, that it is usually impossible to draw a line of demarcation between the two.

Distribution starts with the time the frozen product leaves the packers’ hands.
and ends when the same package is sold to the housewife or institutional user. This covers a long range of handling involving shipping, warehousing, shipping again, and finally retailing, and during each of these steps there are problems of a sanitary nature. In shipping, care must be taken to select a suitable type of refrigerator car or refrigerator truck, namely one that will not permit excessive increases in temperature thereby resulting in bacterial growth and spoilage.

Refrigerated storage rooms should be properly constructed of impervious materials and be held at the proper temperatures required by the product in storage. All frozen foods should be held at a temperature of 0° F. or below. Under no condition should frozen foods be stored at a temperature higher than 5° F. Cold storage rooms should be free of all foul and bad odors at all times. Containers of frozen foods should be properly stacked, but never directly on the floor of the holding room. Strips of wood, commonly known as dunnage, should be laid on the floor, or floor racks should be used so that the first layer of cases is about 2 or 3 inches above the floor. Low temperature holding rooms should not be overloaded, and should be kept clean at all times. Broken packages and containers should be kept in barrels or crates and be kept separate from the rest of the piles.

The Refrigeration Research Foundation, under the able direction of H. C. Diehl, has done much to foster these principles and to educate the warehousemen throughout the country in the proper handling of frozen foods.

The retailers need to be educated on the proper handling of frozen foods. Frozen foods are perishable products and therefore must be kept at low temperatures at all times. Many a retailer has been known to place frozen foods in non-refrigerated locations and later to refreeze the thawed or partially thawed product. Retail cabinets must be kept in a sanitary condition and be kept free of broken and soiled packages. A good appearing cabinet containing orderly stacks of frozen merchandise does much to increase sales.

Sanitation

Another problem facing the packer is the selection of a suitable detergent to do a particular job. Many purchasing agents are at the mercy of high pressure salesmen due to the fact that they do not know where to turn to obtain information on the relative value of the many types that are on the market. Unfortunately the frozen food industry has never seen fit to support studies of this nature, in contrast to the dairy industry who are so much on their toes, that we often learn, of a new detergent through studies that have been made to determine its suitability and adaptability to the sanitary problems of the dairy industry.

Even within the frozen food industry there are examples of progressiveness and regressiveness. The fish freezing industry has long appreciated the value of chlorination, yet only in very recent years have packers of fruits and vegetables shown any interest in such sanitary measures.

Some problems of sanitation arise before the products are delivered to the processing plant. For instance in the case of shellfish, the quality of the waters from which they are taken is of primary importance. From a bacteriological standpoint, shellfish waters must meet the same standards as those for drinking water. Some frozen shellfish are given no heat treatment and are eaten raw. One big problem in fish handling is the use of forks. A satisfactory product is obtained as long as the forking is confined to the head, but the procedure is most insanitary when the fish is stabbed through the viscera.

Some vegetable raw material delivered to the plant may be infested with insects, such as worms and plant lice on broccoli and brussel sprouts. Careful inspection is necessary to prevent
products in these conditions from being packed. Besides rejection at the plant, measures should be taken to keep infestation down to a minimum long before the product is harvested.

The problem of rodent control is not one of easy solution, as the use of poisons is dangerous in food producing establishments. Sewage disposal is another problem that is difficult to solve as most freezing plants have a seasonal operation and therefore the expense of settling tanks and the like is hard to justify. Like in all food plants, the frozen food processing plant has the usual problems of plant sanitation, water supply and personal hygiene.

Some sanitary problems of the frozen food industry fall in the field of the analytical laboratory. Berries are subject to mold growth if held prior to freezing, especially during warm and humid weather. The presence of mold might not be visible to the eye yet the finished product could well be subject to seizure by the Food and Drug Administration. If a packer has a food technologist on his staff he can check his raw material, but by what method? The Association of Official Agricultural Chemists gives methods for the detection of mold and rot fragments but the methods are most unsatisfactory. There is an excellent thesis problem for some graduate student.

Many packers run bacteria counts on their finished products, but unfortunately the industry has never agreed on a standard method, nor is there any agreement on what the count should be and still fall within the realm of good sanitary practice. One maximum count cannot be set for all frozen products any more than one could use the acceptable count for milk as the acceptable count for water. Off flavors are detected by taste tests only. Maybe some day it will be possible to have a chemical method.

The sanitary problems in the processing and distribution of frozen foods are many and varied. Only by continual research and education can they be solved and even then it will require considerable time. In the mean time it is hoped that the packers and distributors will adhere to the basic principles of sanitary practices.

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New Dairy Industry Department in Florida

A new department has been created at the University of Florida and the Florida Agricultural Experiment Station in which both dairy manufacturing and dairy production activities have been combined. It will be known as the Department of Dairy Husbandry and Dairy Manufactures.

Dr. E. L. Fouts, who has been Dairy Technologist at this institution since 1940, has been named head of this new department. He has received degrees from Purdue University, Oklahoma A. and M. College, and Iowa State College. He has had considerable practical experience in dairying in several sections of the United States.

The new department has excellent facilities for teaching and research in dairying. A well equipped Dairy Products Laboratory contains modern equipment for the processing of milk and the manufacture of ice cream and other dairy products. The newly constructed dairy production unit is located on 1,200 acres of land suitable for research in dairying.

The production staff members are Dr. R. B. Becker, Dr. Sidney Marshall and Prof. P. T. Dix Arnold. The members of the manufactures staff are Prof. L. E. Mull, Prof. W. A. Krienke, and Prof. L. R. Arrington.