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Freeze-Dried Foods and Tomorrow's Consumer*

by

Kermit Bird

We live in an age when "What's new?" is no longer an informal greeting, but actually is important as a question. New foods of last year are old hat today. New food processes of today may be passe tomorrow. Let us examine one of these new food processing methods, freeze-drying, and see if we may foretell its future.

Freeze-dried foods have been on the American market for four or five years. Few of them, however, have been on grocery store shelves as individual items. Some of these have been available in soups. Others are in stews. A number of them are available in sporting goods stores for campers, hunters, fishermen and for other special users. The writer believes that a few of them will be available at a later date in the current year as freeze-dried grocery items, packaged separately. A number of market tests are being conducted across the United States with this hope in mind. At this point there comes a need for considering what freeze-drying is and how it is different from other food processing methods. It is also fitting to discuss some of the advantages and limitations of the process.

Freeze-drying is a food processing method in which water is removed from frozen foods. The water removing process is called sublimation, and it is an interesting and different method of dehydration. Food to be freeze-dried is prepared in the usual manner. If it is a vegetable it is taken out of the husk or the pod. If it is a meat it is generally deboned or defatted. Then quite often these items are cooked or blanched to cut down on the growth of some of unwanted micro-organisms and enzymatic action. The food is quick-frozen in the usual manner. It is then put into a vacuum chamber and dried. During the drying process it is kept frozen at all times. This latter point is important, for if the food melts, the process of sublimation will not be taking place. During the drying, heat is applied, and the heat, in combination with the vacuum, draws the water vapor out of the ice so that the water does not go through the liquid stage. This type of drying permits the food to be left in its original shape, size and form.

Freeze-dried foods retain more of the color, nutrients, and flavors of the original food than is possible through using any other drying system. The disadvantage, at present, is that freeze-drying is costly. Most freeze-driers of today find that their costs range from about 8 cents up to 30 cents per pound. This amount is high when we compare it with roller-drying or spray-drying which costs less than 1 cent per pound.

In order to understand freeze-dried foods and tomorrow's consumer, one needs a picture of what tomorrow's consumer may be like.

*Prepared for presentation to a group of home economists at Savannah State College, Savannah, Georgia, July 6, 1964.

The writer's ideas about the housewife of the future are generated by observing several teen-age daughters in the kitchen. Reared in an age when mixes (cake, ice cream, pudding, bread, and muffin mixes) are an accepted thing, these youngsters may give one an image of tomorrow's housewife. My mother would have felt it beneath her dignity to use a mix. She herself did the mixing, and I reflect with fond remembrance delicious homemade items including corn meal bread, bran muffins, corn starch puddings, and countless other home-made dishes. My wife uses old fashioned cookbook methods, too, but since she is a working housewife, she has come to use mixes when she needs to cook in a hurry, or when a particular mix has been recommended. The daughters, I observe, use prepared items naturally. With them it is not a question whether to choose a recipe or a mix. Rather it is the problem of which brand mix to use. The conclusion I arrive at is that these teen-agers are different in their cooking habits from previous generations. They are not disdaining convenience as mother would, nor are they deliberately choosing convenience as the present generation does. They accept convenience as a way of preparing meals. This is what is sometimes called "built-in-maid service."¹

There is another emerging type of convenience that needs to be mentioned in connection with prepared dishes. In this country there is now and there has been an acute shortage of chefs, or well-trained experienced cooks. The food processing industry has recognized the need for high quality cooking know-how, both in institutions and in the home. Newly designed prepared foods are now being "created" by highly trained chefs. These products are coming on the institutional and retail grocery market in increasing numbers.

Tomorrow's freeze-drying industry. In terms of input product of frozen food, the freeze-drying industry in 1962 was about 6½ million pounds. In 1963 there were a little over 11 million pounds of frozen foods, freeze-dried, and it is predicted that there will be about 19 million pounds of foods freeze-dried by 1964. This is about 13 million pounds of water evacuated and 6 million pounds of dried food as in end-product. We are anticipating that by 1970 about 250 million pounds of frozen food will be dried using the freeze-drying method. This sounds like a lot of food to be freeze-dried, but compared with some of our other drying methods, it is small. Even comparing it with some of our other drying methods, this is a small proportion.²

¹Harp, Harry and Dunham, Denis, *Comparative Costs to Consumers of Convenience Foods and Home-Prepared Foods*, MRR 609, June 1963, 91 pages. ERS USDA, Washington, D.C.

²For example, in 1963 we dried about 44 million pounds of eggs, 54 million pounds of beef, 122 million pounds of Irish potatoes, 284 million pounds of whey, 79 pounds of whole milk, 2 billion pounds of skim milk, and 87 million pounds of buttermilk. Note that skim milk and potatoes make up the large volume of artificially dried items at present.

In addition there is a very large drying industry for fruit. In 1963, we dried 22 thousand tons of dates, 88 thousand tons of prunes, 18 thousand tons of figs, 252 thousand tons of raisins, about 12 thousand tons of apples, 9 thousand tons of apricots, 6 thousand tons of peaches, 1 thousand tons of pears, and over 300 thousands tons of citrus pulp.

The freezing industry is much larger than the dehydration industry, and in recent years about 7 billion pounds of frozen foods have been frozen. The canning industry generally runs about 3 times larger than the freezing industry, and in the last few years from 21 to 22 billion pounds of foods have been canned.

The main uses for freeze-dried foods of the future will be in re-processing. This means that they will be used in mixes such as blueberries in the blueberry mix or they will be one or more ingredients in a mix such as a stew, curry, or soup. They may even be used in some of the Chinese dishes or the foreign or more exotic items. Restaurants, vending machines, hospitals, and other away-from home eating establishments may use them in the institutional or the food service industry and the armed forces may use freeze-dried items in their regular mess menus, in emergency and combat and for special purposes like the space program. Almost all foods planned for space flights are freeze-dried. Other uses for freeze-dried foods are found in the civilian market for specialty items such as camping and for grocery items sold at retail. Probably the last use holds our greatest interest today.

A look at some of the items that are now or have been recently market tested can reveal how freeze-dried foods will be used in the future. About a year ago one of the major meat companies in the United States market tested some freeze-dried mushrooms. This product was available in certain East Coast cities. One could buy them just as he would buy canned mushrooms. They could be taken home and stored on the pantry shelf. Freeze-dried strawberries packed with cornflakes have been market tested by one of the major cereal companies and the writer has eaten these strawberries. He judges them to be quite satisfactory. He also predicts that there will be a future market of this type, not only for strawberries, but also for peaches, raspberries, blueberries, banana slices, and other fruits and berries. On the West Coast, freeze-dried chives are now being sold. There may be a future for freeze-dried seasonings, flavorings, and spices. To offset higher cost of processing, these items have the advantage of retaining more of the flavor elements, and in this type of product, retention of flavor is essential. Another item being market tested at present is freeze-dried coffee. It has been marketed in Italy for a year or more, and indications are that this item is going to be a freeze-dried product in which volume will be fairly high. A similar type product is freeze-dried tea. This product has also been sold in several locations in Europe, and it may be market tested in this country sometimes in the future. In the Midwest there have been market tests of freeze-dried cottage cheese, and this product appears to be of a very high quality, despite our not having conducted objective tests of it. Market tests of cream cheese, cheese dips, and sour cream have also been made and ice cream is being developed. Some of these products have a good future. Vegetables that have been tried include peas, green beans, asparagus, and some members of the cabbage family such as broccoli, cauliflower, and brussels sprouts. In general, processing costs have been too high for most vegetables.

The housewife and freeze-dried foods. "What advantages do freeze-dried foods offer to tomorrow's housewife?" "Why would she be interested in using them?" In the first place freeze-dried foods offer a convenience in the sense that they can be stored for long periods of time with little deterioration. Most freeze-dried foods are rehydrated quickly when one compares them with other dried items. In this sense they are more convenient. They are probably not so convenient as today's canned foods, nor are they as convenient as most frozen foods. Frozen foods do have an inconvenience of having to be stored in a freezing chest or in the frozen food cabinet of a regular refrigerator. The quality aspect is another reason why many of these freeze-dried foods will be preferred. Up to the present, frozen foods give us the highest quality of any of our processed foods. They come closer to fresh foods than any other form of processing. Canned foods have a high quality, too. But quite often the canning itself changes food so that it has a different texture or a cooked taste. Freeze-dried foods have special uses and most housewives like to have some items in the cupboard which would allow them to prepare some of the more exotic type dishes. Freeze-dried foods may be used for this purpose. They may have the built-in-chef-service typical of the foods of tomorrow. Of course, frozen and canned foods can also be prepared food items, and many of them are.

The author predicts that tomorrow's housewife will use freeze-dried foods in increasing numbers. Although there are indications that chicken, beef, ham, pork, perhaps even veal and lamb will be important freeze-dried items in the near future, at this time the writer is unable to make an exact statement as to which of these foods will be available in the immediate future. Fruit items will include many of the berries along with deciduous fruits such as peaches and apricots. Tropical fruits like bananas, avocados, and papayas will also be included. Vegetables will include asparagus, broccoli and cauliflower, and the writer looks forward to some of the cheeses and other dairy products. Without question he thinks that freeze-dried coffee and tea will be large volume items and probably many unknown and unthought of foods will be important to tomorrow's housewife.

The freeze-dried foods of the future and tomorrow's housewife are growing up. These new consumers will provide a market, and the new foods will fill a convenience niche need.