Freeze-Dried Food Encyclopedia Article

Freeze-Dried Food

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Freeze-Dried Food

Freeze-drying is a process of food preservation in which the food is flash frozen and placed in a refrigerated vacuum chamber, where the water is removed from the food. The vacuum causes the water to sublimate, or change directly from a frozen solid into vapor, which is whisked out of the vacuum chamber. Because the ice sublimates rather than melts, the food's tissues do not collapse. The food retains its original shape, but is lighter and spongelike.

Because freeze-dried food is extremely porous, it readily reabsorbs water and quickly returns to a condition very close to its original shape and color. The low temperatures at which the process is carried out produce fewer changes in the food than in more traditional drying methods. Freeze-dried food keeps its flavor, texture, and nutrients better than dried food. In its dried form, it is very light and can be stored indefinitely at room temperature. However, freeze-drying is an expensive process because of energy costs, so only foods of high value or for specialized uses are preserved this way.

The process of freeze-drying seems to have originated in Sweden in the 1930s as a method for drying biological materials used in the drug industry. It became important during World War II as a means of preserving plasma and penicillin. After the war, the process was applied to various foods by Americans E. W. Flosdorff and George Speri Sperti, among others. The process worked best on liquids, such as coffee and orange juice; thinly sliced items, such as meat and potatoes; and small vegetables, such as peas.

Freeze-drying has been most successful for instant coffee, since spray-drying coffee at high temperatures damages the flavor. Freeze-dried foods are highly popular among campers, backpackers, military personnel, and astronauts because they are light, compact, and retain superior flavor.