

# Frozen Food – Good or Bad

## Abstract

People have been freezing food as a means of preservation as early as 1000 B.C., when the Chinese used to store food in ice cellars. Freezing food preserves it from the time it is prepared to the time it is eaten. Since early times, farmers, fishermen, and trappers have preserved their grains and produce in unheated buildings during the winter season. Freezing food slows down decomposition by turning residual moisture into ice, inhibiting the growth of most bacterial species. In today's times, a hectic working schedule, there is hardly any time or energy left for cooking. This is the time when frozen foods become a life-saver. While those short on time may choose to overlook the pitfalls, if any, of using these foods, people mindful of healthy living may have their doubts. The paper presents pros and cons of frozen food.

**Keywords:** Ice-Cellars, Preservation, Frozen, Life-Saver.

## Introduction

It was in the mid 1920s that Clarence Birdseye, an engineer from the USA, designed a quick freezing unit which would instantly freeze the food without damaging its texture. He is considered the father of frozen food industry which has had tremendous global growth. In the food commodity industry, there are two processes: mechanical and cryogenic (or flash freezing). The freezing kinetics is important to preserve the food quality and texture. Quicker freezing generates smaller ice crystals and maintains cellular structure. Cryogenic freezing is the quickest freezing technology available due to the ultra low liquid nitrogen temperature  $-196^{\circ}\text{C}$  ( $-320^{\circ}\text{F}$ ).

Preserving food in domestic kitchens during the 20th and 21st centuries is achieved using household freezers. An initiative by a supermarket group in 2012 (backed by the UK's Waste & Resources Action Programme) promotes advising the freezing of food "as soon as possible up to the product's 'use by' date". The Food Standards Agency was reported as supporting the change, providing the food had been stored correctly up to that time.

## History

By 1885, a small number of chicken and geese were being shipped from Russia to London in insulated cases using this technique. By March 1899, the "British Refrigeration and Allied Interests" reported that a food importing business, "Baerselman Bros", was shipping some 200,000 frozen geese and chickens per week from three Russian depots to New Star Wharf, Lower Shadwell, London over three or four winter months. This trade in frozen food was enabled by the introduction of Linde cold air freezing plants in three Russian depots and the London warehouse. The Shadwell warehouse stored the frozen goods until they were shipped to markets in London, Birmingham, Liverpool and Manchester. The techniques were later expanded into the meat packing industry.

From 1929, Clarence Birdseye introduced "flash freezing" to the American public. Birdseye first became interested in food freezing during fur-trapping expeditions to Labrador in 1912 and 1916, where he saw the natives use natural freezing to preserve foods. The Icelandic Fisheries Commission was created in 1934 to initiate innovation in the industry, and encouraged fishermen to start quick-freezing their catch. Íshúsfélag Ísfirðinga, one of the first frozen fish companies, was formed in Ísafjörður, Iceland by a merger in 1937. Other experiments, involving orange juice, ice cream and vegetables were conducted by the military near the end of World War II.

## Aim of the Study

The present scenario of life, day to day workout, changing lifestyle triggers many aspects of life, out of which, food and eating habits are important. The present paper aims to make everybody aware of frozen food which directly affects health in good or bad way.

## Discussion

The following paper presents some aspects of frozen foods:



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**Preservatives**

Frozen products do not require any added preservatives because microorganisms do not grow when the temperature of the food is below  $-9.5^{\circ}\text{C}$  ( $15^{\circ}\text{F}$ ), which is sufficient on its own in preventing food spoilage. Carboxymethylcellulose (CMC), a tasteless and odorless stabilizer, is typically added to frozen food because it does not adulterate the quality of the product.

**Technology**

The freezing technique itself, just like the frozen food market, is developing to become faster, more efficient and more cost-effective.

Mechanical freezers were the first to be used in the food industry and are used in the vast majority of freezing / refrigerating lines. They function by circulating a refrigerant, normally ammonia, around the system, which withdraws heat from the food product.

Cryogenic or (flash freezing) of food is a more recent development, but is used by many leading food manufacturers all over the world. Cryogenic equipment uses very low temperature gases – usually liquid nitrogen or solid carbon dioxide – which are applied directly to the food product.

**Packaging**

Frozen food packaging must maintain its integrity throughout machine filling, sealing, freezing, storage, transportation, thawing, and often cooking. Boxes, cartons, bags, pouches, Boil-in-Bags, lidded trays and pans, crystallized PET trays, and composite and plastic cans are used for packaging frozen foods. Active packaging can extend shelf-life, maintain product safety, and help preserve the food over a longer period of time.

**Effects on nutrients**

1. **Vitamin A (Carotene):** There is little loss of carotene during preparation for freezing and freezing of most vegetables. Much of the vitamin loss is incurred during the extended storage period.
2. **Vitamin B<sub>1</sub> (Thiamin):** A vitamin loss of 25 percent is normal. Thiamin is easily soluble in water and is destroyed by heat.
3. **Vitamin B<sub>2</sub> (Riboflavin):** Not much research has been done to see how much freezing affects Riboflavin levels. Studies that have been performed are inconclusive; one study found an 18 percent vitamin loss in green vegetables, while another determined a 4 percent loss.
4. **Vitamin C :** Usually lost in a higher concentration than any other vitamin. A vitamin loss of ten percent occurred during the blanching phase with the rest of the loss occurring during the cooling and washing stages.

**Effectiveness**

Freezing is an effective form of food preservation because the pathogens that cause food spoilage are killed or do not grow very rapidly at reduced temperatures. The process is less effective in food preservation than are thermal techniques, such as boiling, because pathogens are more likely to be able to survive cold temperatures rather than hot temperatures. Foods may be preserved for several

months by freezing. Long-term frozen storage requires a constant temperature of  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or less.

**Defrosting**

Food is often defrosted in one of several ways:

1. at room temperature, this is dangerous since the outside may be defrosted while the inside remains frozen
2. in a refrigerator
3. in a microwave oven

**Quality**

The speed of the freezing has a direct impact on the size and the number of ice crystals formed within a food product's cells and extracellular space. Slow freezing leads to fewer but larger ice crystals while fast freezing leads to smaller but more numerous ice crystals. Large ice crystals can puncture the walls of the cells of the food product which will cause a degradation of the texture of the product as well as the loss of its natural juices during thawing. That is why there will be a qualitative difference observed between food products frozen by ventilated mechanical freezing, non-ventilated mechanical freezing or cryogenic freezing with liquid nitrogen.

**Conclusion**

It turns out that there are pros and cons to each choice, a couple of which had not occurred prior to studying the issue. Frozen fruits and vegetables are available throughout the year. This has made the concept of seasonal fruits and vegetables irrelevant. But the point is that Nature wanted all vegetables and fruits to grow and be available at the particular time of the year because these provide us with minerals and vitamins which we require most during that particular season for keeping good health. While searching for various ingredients on frozen food packets and after examination and comparing the foods, some points regarding the good and bad of fresh versus frozen are as follows :-

**Fresh Produce****Pros**

1. When locally or home grown, fresh, ripe produce is as nutrient-dense as it can be.
2. Generally better taste and texture than any other form, dried, canned or frozen.

**Cons**

1. Lose moisture and become susceptible to spoilage within days.
2. Significant loss of nutrient value begins to occur after 2 days.
3. Storage and travel to market can cause nutrient loss.
4. When not locally grown, picked before peak nutrient density has been reached.
5. More expensive.

**Frozen Produce****Pros**

1. Usually harvested at peak ripeness, which allows highest nutrient density to be achieved.
2. Flash frozen, which allows retention of most nutrient value.

3. Very little nutrient value is lost because fruits are not blanched before freezing.
4. It is less time consuming. Keeping in mind today's busy lifestyle, frozen food are considered as blessing as they are fast to cook and good to eat.
5. Frozen food doesn't create much of a mess. Cooking or defrosting this food is a cleaner process.
6. Generally less expensive than fresh.
7. Less waste due to spoilage.

**Cons**

1. Blanching to preserve color of vegetables and kill harmful bacteria denatures water soluble vitamins like C and B.
2. Some antioxidants may be reduced in strength due to freezing
3. May contain additives such as: sugar (fruits) or sodium, fat and preservatives (vegetables)
4. There are frozen foods which are very much spicy, that are not good for health.
5. Frozen food may cause ulcers, inflammation in the stomach, allergies and more.

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**Note**

Frozen Food are not a long-term solution to healthy eating. (Do you want to rely on these forever!!) The changing lifestyle, day to day workout, job, skipping the meals, health issues has given me idea to write about ready to eat food.