

FROZEN FOOD

The Invention of Frozen Food?

The 'quick freezing' method was invented by Clarence Birdseye in 1924. Birdseye was working as a fur trader in Canada when he discovered that the fish he and local Inuits caught froze almost immediately after being taken from the water, and that the fish tasted the same as it did fresh, when thawed months later. He theorized that if food was frozen quickly after it reached 'freshness', it would retain its taste and texture.

Prior to this, foods were frozen at a slow rate, causing large ice crystals to form (this ruptured the cell membranes of the food – when the food defrosted, the crystals melted, water leaked out, and the flavour and texture left the food with this water).

Birdseye had to develop methods of actually achieving a quick freeze; his first method involved holding packaging between two metal belts that were chilled to -40/-45F, using a calcium chloride solution, and his second, which became more popular, involved holding the packaged food under pressure between two metal hollow plates chilled to -25F by the evaporation of ammonia. Birdseye had to invent multiple products and develop various processes as part of this method; for example, blanching prior to quick freezing to capture the best taste and nutrition while eliminating bacteria, and creating cellophane to see the frozen food, and also the idea of freezing the food in the packaging it would remain in (this packaging was most suited to being made of waxed paper and paperboard). Birdseye actually developed his quick freeze method with an investment of just 7 dollars – he used an electric fan, buckets of brine, and cakes of ice! He ended up filing 168 patents.



How Did The Invention Spread?

In 1929, The Goldman Sachs Trading Corporation, and the Postum Company (which became the General Foods Corporation) bought Birdseye's patents and trademarks, for 22 million dollars. In 1930 they introduced the first quick-frozen vegetables, fruits, seafoods, and meat were sold to the public under the name Birds Eye Frosted Foods. Initially they were only sold in 18 stores, to see if consumers would be interested in this different approach to food. Although they did sell, few grocery stores wanted to purchase the expensive refrigerated display cases required, so his invention was limited to (though very successful with, and was deemed essential by) large-scale commercial producers who wanted to transport their products over long distances. In 1934 a new low temperature display case was introduced to retailers by American Radiator Corporation (commissioned by Birds Eye), which Birds Eye leased.

In 1936 frozen orange juice was introduced, and in 1937, Lloyd J Harriss test-sold frozen pies. It was also in 1937 that the first frozen food was sold in Britain – asparagus, by Smedleys of Wisbech. Packaging as well as lack of uptake for the display cases meant that frozen food was still not very popular.

However, during WWII, the US government enacted stringent controls on metals used in cans, as well as employing rationing. This led to the rise of frozen foods, because from an industry perspective, they were packaged in cellophane, paperboard, and waxed paper, and from a customer perspective, required fewer ration points. Frozen orange juice in particular was reintroduced, and frozen applesauce was extremely popular.

What About After?

After the war, many more frozen foods were sold, including the first frozen chip, or French Fry, in 1947 (by J.R. Simplot Co)! In 1948 Snow Crop sponsored the weekly 'Show of Shows' program, and the first frozen food advert appeared on television.

Moving on, because technology had vastly improved since the war, the 1950s involved fridges and freezers becoming household appliances for the average family. As a result, frozen food became much more popular! Fish Fingers were first sold by Birds Eye in 1952 (1955 in the UK). Frozen ready meals were also developed (the first was a complete meal of turkey, mashed potatoes, and peas, produced by Swanson). Other notable inventions were boil-in-bag food pouches, first introduced by Seabrook Farms in 1957, and frozen waffles, by Quaker Oats Company, in 1959.

As the range of frozen food began to expand, growing rapidly, it adapted to current trends. In the 60s rising health concerns and interest in nutrition is reflected in the creation of reduced calorie frozen food and ready meals branded by Weight Watchers, and the convenience of the microwave, which became part of most households in the 70s and 80s, is echoed in the changes in packaging and advertising (for example, foil trays could not be used as they are not suitable for microwaving, and companies began marketing their products as 'quick cooking').

In modern society, consumers are becoming even more concerned with sustainable environmental methods, and diets such as veganism. We see new frozen products being developed almost daily, from plant-based nuggets to high protein ice cream. Technology for quick-freezing has also changed. Cryogenic freezing, also known as 'flash freezing', uses low temperature gases applied directly to food, and allows products to be frozen even more quickly, with better flavour and higher nutritional value.

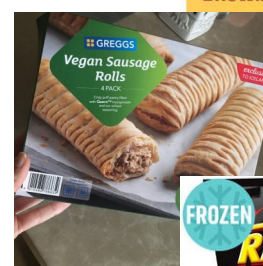
How does frozen food compare to fresh?

Since the mid 2000s, worries have been raised around the nutritional content, cost, quality, and sustainability of frozen food. Some interesting information around some of these debates:

Active packaging and bacteria: 'active packaging' is another name for intelligent or smart packaging – these use technology to react or respond to external stimuli. For example, antimicrobials can be incorporated into the plastics used in packaging to prevent growth of harmful microorganisms. Other examples include temperature indicators, oxygen absorbers, moisture controlling devices, and carbon dioxide controllers.

Vitamin loss: there have been concerns for many years of nutrients being lost in the process of freezing food. However, many studies have been carried out to test this, with evidence showing that actually, few vitamins are lost!

Food preservation: research has shown that freezing is an effective form of food preservation because the pathogens that cause food spoilage are killed or paused from growing, due to the low temperature. However, pathogens are more able to survive cold temperatures than hot, so there is the danger that pathogens that have been deactivated rather than killed, will become active when the food thaws.



Vitamin C	Mixed views – one study has indicated a vitamin loss of 10%, though this was during the blanching, cooling, and washing stages, rather than the freezing. Another study showed that the same vitamin concentration loss occurs when fresh vegetables are cooked.
Vitamin B1/Thiamin	Loss of 25% is normal as easily soluble in water and destroyed by heat. Again – some is lost when fresh vegetables are also cooked.
Vitamin B2/Riboflavin	Little research, but is similar to vitamin C.
Vitamin A/Carotene	Vitamin loss seems to occur during the extended storage process.