

One Pager! Advancement of Frozen Technology

○ The Importance of Refrigeration

There are two major reasons for freezing and preserving food at temperatures lower than -18°C .

1. To prevent microbes from reproducing

Every food has water. This water is used by microorganisms to degrade the various elements in the meal, causing the food to spoil. However, freezing water prevents bacteria from accessing the water and halting decomposition, and allowing food to be consumed safely. Furthermore, several bacteria that are cold resilient are unable to function at temperatures below -10°C .

2. To prevent food degradation

The drying process can also decrease the activity of bacteria, but also dries out the food and reduces its quality. Because it is critical to maintaining moisture, freezing is utilized.

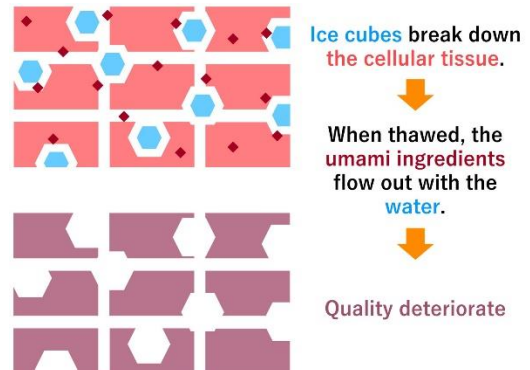
○ Types of Freezing Technology

• Air Blasting Method

Cold air is blasted into the freezer to reduce the temperature and freeze the food. This is the most well-known freezing technique, and it is also used in the freezer section of most refrigerators.

• Quick Freezing

This is a technique that reduces the crystal growth in food. This process solved the issue of ice crystals harming food and allowing nutrients to be lost along with water while thawing, which was an issue with previous technologies.



• Brine System

This is a way of freezing food by putting it in a special liquid and using an endothermic reaction when the liquid evaporates. It is necessary to use a liquid that is not harmful to the human body.

• Proton Freezing

Proton freezing is a new technique that employs magnets and electromagnetic waves to regulate the size of ice crystals created in food while freezing it quickly with cold air.

○ Freezing Technology in Many Fields

Because frozen foods must be stored at temperatures below -18°C even during transit, the supply chain employs the cold chain, a logistical approach that maintains fresh foods and medications at low temperatures during manufacturing, shipping, and consumption. As a result, the amount of wasted frozen food is significantly small, so food loss can be reduced. Furthermore, fresh items may be sent to urban areas, resulting in regional rejuvenation. The freezing technique is also being used in medicine to preserve donated blood.