
Frozen Food Science and its Development

Preserving food has been commonly known throughout our history as humans. Consider that before the advent of refrigeration, which was originally devised in the 18th century, but was not perfected and widespread until the 20th century, most of civilisation had to make do without refrigeration and freezing. Freezing food is one of the simplest method of food preservation. Because it is s closest in taste and nutrition to fresh foods. Freezing, in food processing is a method lowering the temperature to inhibit microorganism, so that microorganisms can not grow and spoil the food. The method has been used for centuries in cold regions, and a patent was issued in Britain as early as 1842 for freezing food by immersion in an ice and salt brine (Sun, 2016).

The easy and convenient home meal solutions provided by frozen food products make our life-styles seem a bit easier with the help of technology as equipment for refrigeration by following what trends today and developing it in the future. Freezing or cooling is one of the oldest and most widely used methods of food preservation that began when people want to keep the food as long as the winter season. Which allows preservation of texture, taste, and nutritional value in foods better than any other preservation method. The freezing process is a combination of the beneficial effects of low temperatures at which chemical reactions are reduced, microorganisms can not grow, and cellular metabolic reactions are delayed. For developing countries, the application of freezing preservation is favorable with several main considerations. The availability of different types of equipment for several different food products results in a flexible process in which degradation of initial food quality is minimal with proper application procedures. As for cost distribution, the freezing process and storage in terms of energy consumption constitute approximately 10 percent of the total cost (Kyureghian, 2010).

Refrigeration is the elimination of heat from a material at a temperature higher than the temperature of its surroundings (eksoterm and endoterm reaction principles). Begin at the suction point of the compressor, fluid in a vapor state is compressed into the compressor where an increase in temperature and pressure takes place. And the fluid goes through the condenser where it decreases in energy by giving off heat and converting to a liquid state. After the phase, a change occurs inside the condenser, fluid flows through the expansion valve. Finally, the liquid-gas mixture flows through the evaporator where it is converted into a saturated vapor state and removes heat from the environment in the process of cooling. With this last stage the loop restarts again (James, 2014)

The frozen food industry is highly based in modern science and technology that developing. The future growth of frozen foods will mostly be affected by growth in population, personal incomes,

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relative cost of other forms of foods, changes in tastes and preferences, and technological advances in freezing methods are some of the factors concerned with the future of freezing technology. Today a further expansion of the industry is primarily dependent on the ability of food processors to develop higher qualities in both process techniques and products regarding increasing demand for frozen foods. Improvements can only be achieved by focusing on new technologies and investigating poorly understood factors that influence the quality of frozen food products (Nunmer, 2002).

In the following years, scientists and researchers continuously worked to achieve success with commercial freezing trials on several food commodities. Today, freezing is the only large-scale method that bridges the seasons, as well as variations in supply and demand of raw materials such as meat, fish, butter, fruits, and vegetables. From a technical point of view, the freezing process is one of the most convenient and easiest of food preservation methods, compared with other commercial preservation techniques. Depending on the government regulations, especially in developing countries, energy cost for producers can be subsidized by means of lowering the unit price or reducing the tax percentage in order to enhance production. Therefore, in determining the economical convenience of the process, the cost related to energy consumption should be considered. The mechanism of refrigeration is a part of the freezing process and freezing storage involved in the thermodynamic aspects of freezing. According to the second law of thermodynamics, heat only flows from higher to lower temperatures. Producing the highest quality at the lowest cost possible is highly dependent on the technology used.

As a result, developments in freezing technology in recent years have mostly been characterized by the improvements in mechanical handling and process control to increase freezing rate and reduce cost. Therefore, the theory of the freezing process and the parameters involved should be understood clearly.

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