MedCrave
Step into the World of Research

Journal of Microbiology & Experimentation

Opinion

Open Access

CrossMark

Chain of cold food

Volume 4 Issue 3 - 2017

Carla Pagano
Engineer in food, Argentina

Correspondence: Carla Pagano, Engineer in food, Avenida Escalada 1817, Buenos Aires, Argentina, Tel 0111561270830, Email carlapag@yahoo.com.ar

Received: March 16, 2017 | **Published:** March 23, 2017

Opinion

The cold chain is the system formed by each of the steps that constitute the process of refrigeration or freezing necessary for the perishable or frozen food to reach the consumer safely. It includes a whole set of elements and activities necessary to guarantee the quality and safety of a food, from its origin to its consumption. It is called "string" because it is composed of different stages or links. If any of the points in the cold chain were compromised, all of it would be affected, damaging the quality and safety of the product. On the one hand it facilitates the microbial development of both altering microorganisms and disease-causing pathogens, and the alteration of the food by degrading enzymatic reactions.

Cold on microorganisms

When the temperature is reduced, so does the rate of development of the vast majority of microorganisms, preventing a population increase (a group of microorganisms, the psychrophilic, which develop at low temperatures). The cold acts on the metabolism of microorganisms slowing (cooling) to stop (freezing), but does not eliminate them (although it can be seen some microbial mortality, the cold is not hygienizing, as it is the intense heat).

Between -4ºC and -7ºC the growth of pathogenic microorganisms is inhibited. These microorganisms are dangerous to health because they are producers of diseases through infections or toxins that can lead to poisoning.

At -10ºC inhibits the growth of the altering microorganisms responsible for the degradation of food.

At -18 °C, all reactions responsible for browning of food are inhibited. This temperature is set as the freezing standard for the international cold chain.

At -70 °C all the enzymatic reactions are canceled, so that in theory the food would be preserved indefinitely.

If a frozen food thaws, even partially, or a refrigerated one stops being it and increases its temperature, although it is during a few minutes, its environment becomes more favorable and, therefore, the microbial activity resumes. If we reduce the temperature again the activity will again be inhibited but the population of microorganisms will be much larger than before the increase in temperature. A new defrost will re-activate them. The greater the number of microorganisms, the greater the probability that the food will deteriorate or that they will constitute a sufficient population to cause food poisoning.

Critical factor

Temperature is a critical factor in food production and distribution systems that must be rigorously controlled. In the cold chain three fundamental stages take place:

i. Storage in chambers or cold stores in the production center.

ii. Transport in special vehicles.

iii. Distribution platform and sales centers.

The chain has weaker links, such as the loading and unloading time during transport, which takes place between the different stages: at the exit of the production or storage center, at the distribution platform and at the points of sale. In addition, it is necessary to add the elapsed time between the discharge and its location in the assigned place and the time between which the product is introduced in the cart of the purchase and arrives at the fridge-freezer of the final consumer. For the strict control of temperatures in all phases must be counted with both specific technical resources and trained personnel. Traditional technical resources include refrigerated warehouses and freezers, all with temperature reading and recording devices, special refrigerated vehicles with thermal controllers and a recording system or containers of isothermal materials that minimize possible fluctuations in temperature. The most advanced temperature management systems include automated surveillance in real time GPS transport to the centralized control of temperature levels in cold stores at large retail outlets that can be monitored and corrected to distance. The personnel must also have adequate training to control, monitor and record all data related to temperature control, in addition to knowing the protocol applicable in case of breakage of the cold chain.

The design of product logistics should be done by temperature and not by type of food. For example, a lettuce and a ready-prepared IV range salad belong to the same type of food but have different needs regarding their holding temperature, so the distribution will be done separately. It is of no use that the manufacturer and the distributor put special care in maintaining the chain of cold if soon the consumer does not take the appropriate measures. The purchase must begin with non-perishable products, continue with the fresh ones and end up refrigerated and frozen at the last moment, place the refrigerated foods and especially the frozen ones in isothermal bags with cold accumulator that maintain the appropriate temperature until arriving at our home. Once there, they must be inserted at the same time in the refrigerator or freezer as appropriate.

We as producers must ensure that the cold chain of all perishable foods is met to ensure its safety and thus meet its expiration date from the arrival of the raw materials that require it until its distribution. And as consumers we must make sure we buy the perishables in large supermarkets and fulfill that cold chain until consumption.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgments

None.

Funding

None.