WHAT IS PASTEURIZATION, IT'S HISTORY AND BENEFITS

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The majority of consumers in the United States have heard or at least seen the term "homogenized & pasteurized," which is most likely learned in grade school from the half pint milk cartons, but not necessarily understood.

In layman's terms, pasteurization is a way to process many types of food products in a way that greatly reduces or eliminates the potential and **harmful** viable pathogens that can be present in a food item as well as increase shelf life. I emphasize **harmful**, due to the fact that the pasteurization process may also reduce, effect or eliminate beneficial nutrients.

Synonymously, freezing food items is also an effective way of increasing shelf life and promoting food safety, but instead of eliminating the harmful pathogens, you are slowing or halting the growth of organisms into large and dangerous levels. Similar outcome, but a different way of achieving the goal.

We are a frozen dessert driven organization and the majority of items in this category contain dairy milk from the United States

1 ^Hornsey, Ian Spencer (2003). A History of Beer

(Holstein, Brown Swiss, Guernsey, Ayrshire, Jersey, Milking Shorthorn)

so let's focus on the process for milk products and frozen dessert mixes. Technically, pasteurization is the process of heating a fluid to a specific temperature for a definite period of time without allowing recontamination during the heat treatment process and then cooling it immediately.

Two (2) major benefits are:

1. Destroy disease causing microorganisms (pathogens) that may be present in milk thereby increasing in food safety.

2. Destroy spoilage microorganisms and enzymes that may contribute to reduced quality and shelf life.

Historical records indicate that the process of heating wine to extend shelf life are seen in China since AD. 11171, and is also documented in Japan by 1568 in the diary Tamonin-nikki.

However, the most recognized and modern version of pasteurization was invented by French chemist and microbiologist Louis Pasteur, hence the name pasteurization.

Louis along with Claude Bernard completed their first test on April 20, 1864 to originally prevent wine and beer from souring. Applying the process to milk came much later in 1886 and is typically associated with Franz von Soxhlet2, a German agricultural chemist.

These ideas and processes bloomed in the late 1800s as a way to reduce milk borne illnesses and infant mortality.

During this period of industrial revolution and population growth, increased milk production and longer distribution routes led to problematic outbreaks of typhoid fever, scarlet fever, septic sore throat, diphtheria and diarrheal diseases.

Statistically, in 1938 all milk products accounted for 25% of all food and waterborne illnesses, but now account for less than 1%.

Keeping our customers safe and happy is most likely the number one goal for you and the food industry as a whole and pasteurization plays a major role within the dairy and frozen dessert markets.

There are basically four (4) fundamental types of processing/pasteurizing fluid type food products; VAT, HTST, UHT and Aseptic.

Chronologically, they follow the evolution of technology and our ability to process larger volumes of product as well as increased pathogen killing efficiency.

Below is a chart detailing the parameters of each process:

2 ^Franz Soxhlet (1886), Munich Medical Weekly,

Type	**Storage**	**Temp**	**Holding**
VAT, Batch	Refrigerated 10 Day Shelf Life	145-155°F	30 Minutes
HTST High Temperature Short Time	Refrigerated 21 Day Shelf Life	161-212°F	01-25 Seconds
UHT Ultra-High Temperature	Refrigerated 60-120 Day Shelf Life	280°F	2 Seconds
Aseptic	Room Temperature 270 Day Shelf Life	275-302°F	4-15 Seconds

In the United States, the city of Chicago was the first to adopt regulation in 1908 that required all milk products sold within the city limits to be pasteurized. By 1924, the federal government enacted the Standard Milk Ordinance, now called the Grade A Pasteurized Milk Ordinance (PMO) to help states adopt voluntary guidelines and programs.

This program is far reaching and is administered by the U.S. Department of Health and the Federal Drug Administration. Maybe some streamlining could save the citizens some tax dollars?

In 1947 Michigan followed suit and became the first state to require milk pasteurization for all products sold within its' borders. Today, each individual state regulates milk processing, but they must meet or exceed the federal standards set forth by the PMO.

Now that we understand the functional process, let's take a close look at the possible pathogens that can cause health complications, ranging from low fever to possible death. Sources include water, soil, environment and infected or sick animals.

The most commonly known diseases caused by pathogens are Listeria, Q Fever, Salmonella, Scarlet Fever, Typhoid Fever and Tuberculosis, which can cause a range of issues when concentrated or exposed to the immune depressed such as infants the elderly and previously compromised health systems such as cancer or pneumonia.

I would be remiss if I didn't mention that there is a small population of people in the U.S. that openly accept raw milk as a superior source of nutrition versus the pasteurized version.

Having the opportunity to speak directly with such an advocate has given me some interesting insight and support for the claim.

To start, heat destroys harmful organisms but can also cause harm to helpful nutrients such as iodine, calcium and vitamin C, which are undeniably beneficial.

The other side of the equation is that raw milk originating from a healthy animal in a healthy environment, handled in a pristine manner and consumed quickly can be considered safe.

Additionally, humans raised solely on raw milk, even if a pathogen is introduced, can build a physical tolerance to harmful organisms. Food for thought!

Looking forward to the 2019 season and wishing everyone a successful year!