Pasteurization: Definition and Methods

Pasteurization: A process named after scientist Louis Pasteur which uses the application of heat to destroy human pathogens in foods. For the dairy industry, the terms "pasteurization", "pasteurized" and similar terms shall mean the process of heating every particle of milk or milk product, in properly designed and operated equipment, to one (1) of the temperatures given in the following chart and held continuously at or above that temperature for at least the corresponding specified time:

Temperature	Time	Pasteurization Type
63ºC (145ºF)*	30 minutes	Vat Pasteurization
72ºC (161ºF)*	15 seconds	High temperature short time Pasteurization (HTST)
89ºC (191ºF)	1.0 second	Higher-Heat Shorter Time (HHST)
90ºC (194ºF)	0.5 seconds	Higher-Heat Shorter Time (HHST)
94ºC (201ºF)	0.1 seconds	Higher-Heat Shorter Time (HHST)
96ºC (204ºF)	0.05 seconds	Higher-Heat Shorter Time (HHST)
100ºC (212ºF)	0.01 seconds	Higher-Heat Shorter Time (HHST)
138ºC (280ºF)	2.0 seconds	Ultra Pasteurization (UP)

*If the fat content of the milk product is ten percent (10%) or more, or if it contains added sweeteners, or if it is concentrated (condensed), the specified temperature shall be increased by 3ºC (5ºF). Provided that, eggnog shall be heated to at least the following temperature and time specifications:

Temperature	Time	Pasteurization Type
69ºC (155ºF)	30 minutes	Vat Pasteurization
80ºC (175ºF)	25 seconds	High temperature short time Pasteurization (HTST)
83ºC (180ºF)	15 seconds	High temperature short time Pasteurization (HTST)

The original method of pasteurization was vat pasteurization, which heat milk or other liquid ingredients in a large tank for a at least 30 minutes. It is now used primarily in the dairy industry for preparing milk for making starter cultures in the processing of cheese, yogurt, buttermilk and for pasteurizing some ice cream mixes.

The most common method of pasteurization in the United States today is High Temperature Short Time (HTST) pasteurization, which uses metal plates and hot

water to raise milk temperatures to at least 161° F for not less than 15 seconds, followed by rapid cooling. Higher Heat Shorter Time (HHST) is a process similar to HTST pasteurization, but it uses slightly different equipment and higher temperatures for a shorter time. For a product to be considered Ultra Pasteurized (UP), it must be heated to not less than 280° for two seconds. UP pasteurization results in a product with longer shelf life but still requiring refrigeration.

Another method, aseptic processing, which is also known as Ultra High Temperature (UHT), involves heating the milk using commercially sterile equipment and filling it under aseptic conditions into hermetically sealed packaging. The product is termed "shelf stable" and does not need refrigeration until opened. All aseptic operations are required to file their processes with the Food and Drug Administration's (FDA) "Process Authority." There is no set time or temperature for aseptic processing; the Process Authority establishes and validates the proper time and temperature based on the equipment used and the products being processed.

Source: IDFA, June 2009