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Pasteurization and the risks of consuming unpasteurized dairy products

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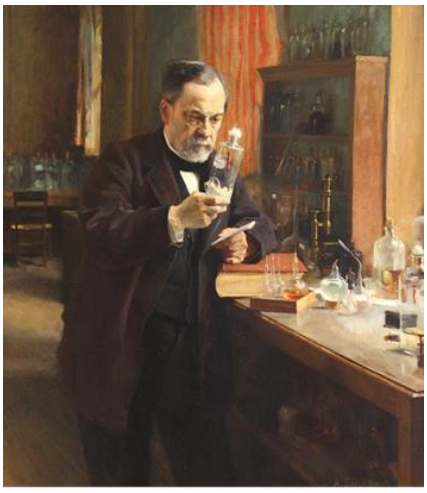
Pasteurization – parboiling beverages to increase shelf life and make them safer for human consumption – is a groundbreaking discovery that has prevented diseases and saved countless lives. Science-based evidence clearly shows the significant safety advantage of pasteurized over unpasteurized dairy products. This article will discuss the facts and benefits of pasteurization and the risks of consuming unpasteurized dairy products.

A brief history of pasteurization

In the 1800s, France experienced unexplained, abnormal fermentation of wine and beer. French scientist Louis Pasteur discovered that heating could prevent these beverages from turning sour. Pasteur's contribution was to define the time and temperature that would kill most of the bacteria that caused spoilage, without changing its taste. He patented the process and called it pasteurization. The process was initially used to preserve beer, but in 1886 German chemist Franz Soxhlet suggested pasteurization could be used for raw milk. By applying this process to raw milk, death and incidence of milk-borne diseases such as tuberculosis, brucellosis, scarlet fever and typhoid fever declined dramatically.



Portrait of Louis Pasteur at his laboratory. Painted by Albert Edefelt in 1885.

When, how and why is milk pasteurized?

Within a few hours after harvesting and cooling at dairies, milk is transported to processing plants where it is pasteurized and processed to make different dairy products. By the Pasteurized Milk Ordinance, the terms "pasteurization," "pasteurized" and similar terms mean the process of heating milk or milk products, in properly designed and operated equipment, to a specified temperature for a corresponding amount of time[1] (Table 1).

Product	Type of pasteurization	Temperature	Time	Shelf life
Pasteurized Milk 	Batch (vat or low heat) pasteurization	145°F	30 minutes	
	High Temperature Short Time (HTST) pasteurization	161°F	15 seconds	2 to 3 weeks
		191°F	1 second	
		201°F	0.1 seconds	
		212°F	0.01 seconds	
Ultra-Pasteurized Milk 	Ultra-high-temperature (UHT) pasteurization	280°F	2 seconds	1 to 3 months (until opened)

Table 1. Types of pasteurization. Different heat processes for specific periods are used to kill germs in milk that may cause disease and spoilage. Adapted from PMO, 2017.

Milk is pasteurized to kill germs capable of causing disease, thus increasing food safety. However, it is important to maintain refrigeration of pasteurized milk as some dormant, more resistant forms of germs may survive and lead to milk spoilage. The development over the years of regulations, standards, protocols and advanced equipment has led to production of one of the most wholesome and safest foods available for people.

Risks of consuming raw dairy products: Just a stomachache or life-threatening?

People in the U.S. are demanding more minimally processed foods. However, consuming unpasteurized milk and dairy products may pose serious health risks, including disease and death, compared with safer, nutritious pasteurized milk and dairy products[2].

Unpasteurized milk and cheese cause 840 times more diseases and 45 times more hospitalizations than pasteurized dairy products [2]. According to a study from the Centers for Disease Control and Prevention (CDC), from 2009 to 2014 unpasteurized milk and cheese was only consumed by 3.2% and 1.6% of the U.S. population, respectively; yet it caused 96% of diseases from consuming contaminated dairy products[2]. The study's authors predicted that if consumption of unpasteurized milk or cheese doubled, outbreak-related diseases would also double[2]. One of these diseases, Hemolytic Uremic Syndrome, is caused by some strains of the bacteria *E. coli* which can be life threatening. More information and three short testimonial videos about people experiencing this disease after drinking unpasteurized milk can be found at: https://www.cdc.gov/foodsafety/rawmilk/raw-milk-videos.html.

We strongly recommend consuming only heat-treated (e.g., pasteurized) dairy products. Almost all alleged benefits of consuming raw (or unpasteurized) dairy products have been refuted and are greatly outweighed by the scientifically proven health risks[3]. Consuming raw dairy products does not have any advantage for those suffering milk allergies or lactose intolerance[3]. Many studies have shown that pasteurization does not significantly change the nutritional value of milk and dairy products, but it does substantially increase its safety[3].

References

[1]U.S. Public Health Service, Food and Drug Administration. 2017. Grade "A" Pasteurized Milk Ordinance. FDA, Washington, D.C.

[2]Costard, S., L. Espejo, H. Groenendaal and F.J. Zagmutt, 2017. Outbreak-related disease burden associated with consumption of unpasteurized cow's milk and cheese, United States, 2009–2014. Emerging infectious diseases, 23(6):957.

[3]Claeys, W.L., S. Cardoen, G. Daube, J. De Block, K. Dewettinck, K. Dierick, L. De Zutter, A. Huyghebaert, H. Imberechts, P. Thiange, Y. Vandenplas and L. Herman. 2013. Raw or heated cow milk consumption: review of risks and benefits. Food Control 31:251-262.