

Pasteurized versus Ultra-Pasteurized Milk – Why Such Long Sell-By Dates?

Background

Pasteurization and ultra-pasteurization are heat processes that are designed to kill bacteria in milk that may be harmful and/or may cause spoilage of milk products. Milk from farms is transported to dairy processing plants and is generally heat processed within a few days after milking to prevent spoilage and to prolong its shelf-life. The anticipated shelf-life of milk is reflected by its “sell-by” date or “code-date”, while many products remain fresh after this date (2-5 days). **The major differences between the milks are the intensity of the heat treatment and the packaging method.**

Pasteurization

“Pasteurization” is when milk has been heated to a minimum of 161°F for at least 15 seconds or 145°F for 30 minutes and packaged in clean & sanitized conditions. Some bacteria survive pasteurization, often in very low numbers, although they are not considered harmful and will generally not spoil milk under normal refrigerated holding conditions and times until later in shelf life (past code). Spoilage of pasteurized milk before its time is most often caused by bacteria that contaminate the milk after the pasteurization process and/or from improper refrigeration. Typical spoilage

bacteria found in milk do not cause illness, although the consumer will often find spoiled product to be offensive. The shelf-life of pasteurized milk under refrigeration, less than 45°F, can range from 12-21 days post processing. Holding pasteurized milk above 45°F will shorten the shelf-life dramatically. **Ideal storage temperatures for milk and dairy products are 34-38°F.** Once opened, pasteurized milk should be used as soon as possible for best quality and taste.



Ultra-Pasteurization

“Ultra-pasteurized” means that the milk is heated to a minimum of 280°F for a minimum of 2 seconds. This temperature and time combination is much more lethal to bacteria, killing virtually all of concern. Ultra-pasteurized milk is also packaged under near sterile conditions, which makes recontamination of spoilage bacteria rare. While ultra-pasteurized milk is processed to be free of spoilage and harmful bacteria, it’s not considered sterile because it is not hermetically sealed (i.e. canned).

Pasteurized vs. Ultra-Pasteurized and Aseptic (Ultra High Temperature) Milks

<u>Parameter</u>	<u>Pasteurized</u>	<u>Ultra-Past.</u>	<u>UHT</u>
Heat treatment	72°C (161°F)/15 sec.	138°C (280°F)/2 sec.	138°C (280°F)/2+ sec.
Bacterial kill	Some survival	Nearly “sterile”	Nearly “stable”
Recontamination	Possible/likely	Prevent/minimized	Prevent/minimized
Equipment	Sanitized/exposed	Sterile/closed	Sterile/closed
Fill equipment	Limit protection	Protected	Sterile environment
Package material	Paper, plastic	Paper, plastic	Hermetical seal
Package treatment	Untreated	Treated with H ₂ O ₂	Sterilized
Product storage	Refrigerated	Refrigerated	Shelf-stable
Shelf-life	10-21 days	30-90 days	6+ months

Want more information on [pasteurization](#) and the MQIP? Contact Nicole Martin (nicole.martin@cornell.edu) in the Milk Quality Improvement Program or visit our website <https://foodsafety.foodscience.cornell.edu/mqip/>

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