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# GOT MILK? CHANGES IN PASTEURIZATION ON THE HORIZON FOR MILK PROCESSING EXTENDING SHELF-LIFE

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In 1864, Louis Pasteur invented the process that we recognize today as pasteurization.<sup>[i]</sup> Pasteur was a French chemist who had, at that time, had already contributed to the studies of health and science with his revolutionary explanation of germ theory in 1859.<sup>[ii]</sup> Because of Pasteur's growing fame, Napoleon III approached Pasteur with the problem that French wine, which was prized around Europe, was spoiling before it would reach its destination.<sup>[iii]</sup> After a series of experiments, Pasteur discovered that by heating the wine to fifty-five degrees it would kill the bacteria without destroying the taste.<sup>[iv]</sup> This process was later applied to milk and solidified Pasteur's importance to the health and sciences. Since that time, the process of pasteurization has not fundamentally changed. The most common type of pasteurization in the United States is referred to as High Temperature-Short Time (HTST).<sup>[v]</sup> This process uses metal plates and hot water to heat the milk to at least 161°F for no less than fifteen seconds.<sup>[vi]</sup>

Throughout the world, researchers have been working on ways to extend the shelf-life of milk in order to cut down on waste as well as allow transportation of milk over longer distances. Researchers at Purdue University have recently reported their findings from a new pasteurization method that will extend the shelf-life of milk from three weeks to six.<sup>[vii]</sup> By increasing the temperature of the milk by ten degrees for less than a second, more than ninety-nine percent of the bacteria is eliminated.<sup>[viii]</sup> This additional Low Temperature- Short Time (LTST) method is done in addition to pasteurization and significantly reduces the amount of bacteria that is left over from the pasteurization process.<sup>[ix]</sup> Nothing is added to the milk and there is no difference in the color, taste, or smell.<sup>[x]</sup>





So why is this process so important to the future of pasteurization? First, it cuts down on waste.[xi] Even with a three week shelf-life, nearly 17 billion pounds of milk is wasted in the United States each year.[xii] Second, milk contains calcium and magnesium that are important nutrients for combating malnutrition.[xiii] This development could have incredible advantages for parts of the world that have limited access to fresh milk. For instance, shelf-life in Uganda is a mere one day. [xiv] In many African countries, producers do not have access to pasteurization or refrigeration causing milk to spoil very early.[xv] By extending shelf-life, access to milk and the nutrients it provides will be easier and more practical. Third, this process does not require any additional energy. [xvi] The LTST process has an in-line connection to the traditional pasteurization processing, providing enough energy to run the system effectively without additional heat energy.[xvii] This results in a reduction in cost as well as energy input all while maintaining the quality of the product and increasing microbial reduction.[xviii]

[i] *Louis Pasteur: The man who led the fight against germs*, British Broad. Co., <http://www.bbc.co.uk/timelines/z9kj2hv>. (last visited Feb.4, 2017).

[ii] *Id.*

[iii] *Id.*

[iv] *Id.*

[v] *Pasteurization*, Int'l. Dairy Foods Ass'n., <http://www.idfa.org/news-views/media-kits/milk/pasteurization>. (last visited Feb. 4, 2017),

[vi] *Id.*

[vii] Brian Wallheimer, *Rapid, low temperature process adds weeks to milk shelf life*, Purdue Univ., (July 19, 2016), <https://www.purdue.edu/newsroom/releases/2016/Q3/rapid,-low-temperature-process-adds-weeks-to-milks-shelf-life.html>.

[viii] *Id.*

[ix] *Id.*

[x] *Id.*

[xi] Nadia Whitehead, *Why you shouldn't take your milk's three week shelf life for granted*, Nat'l. Pub. Radio, (Aug. 5, 2015), <http://www.npr.org/sections/thesalt/2015/08/05/429347700/why-you-shouldnt-take-your-milks-three-week-shelf-life-for-granted>.

[xii] *Id.*

[xiii] *Id.*

[xiv] *Id.*

[xv] *Id.*

[xvi] Phillip Myer, Kyle Parker, Andrew Kanach, Tengliang Zhu, Mark Morgan, Bruce Applegate, *The effect of a novel low temperature-short time (LTST) process to extend the shelf-life of fluid milk*, Springer Plus, (May 31, 2016), <https://springerplus.springeropen.com/articles/10.1186/s40064->

016-2250-1.

[xvii] *Id.*

[xviii] *Id.*

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