

# Potential spoilage microbe found in microfiltered milk

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A new filtration process that aims to extend milk's shelf life can result in a pasteurization-resistant microbacterium passing into fluid milk if equipment isn't properly cleaned early, Cornell food scientists have

found.

Microfiltration—a [processing technology](#) that extends shelf-life by using semipermeable membranes to keep out undesirable microbes—is now being used in Europe and coming soon to U.S. dairies. But without proper cleaning of equipment early in the process, a tiny microbe called microbacterium can wind up in milk, the researchers found.

The results were published Sept. 8 in an article titled "Microbacterium Represents an Emerging Microorganism of Concern in Microfiltered Extended Shelf-Life Milk Products" in the [Journal of Dairy Science](#).

"Our work demonstrates the importance of cleaning milk-processing equipment before the pasteurization process," said Nicole H. Martin '06, M.S. '11, Ph.D. '18, assistant research professor in dairy foods microbiology in the Department of Food Science, College of Agriculture and Life Sciences. She is the associate director of Cornell's Milk Quality Improvement Program.

"Fluid milk processors often rely on the pasteurization process to apply the final kill-step for organisms," Martin said, "but we're showing that to achieve a longer shelf-life with this newer technology, processors should thoroughly clean the intake equipment for raw milk long before they pasteurize. In other words, they should do everything they can to remove these microbes prior to processing."

Conventional fluid milk products now have a refrigerated shelf life of 14 to 21 days, but adding microfiltration to the process gives grocers and consumers a chance to extend shelf life to 60 days—and a chance to reduce food waste.

The current technology used to extend the shelf life of fluid milk is high-temperature pasteurization, which can result in undesirable

flavors—such as "cooked" notes that milk drinkers disdain.

Microfiltration, with membrane pores that measure 0.8 to 1.2 microns, offers a gentler alternative to high heat treatment. The newer technology uses less energy and maintains the milk flavor and also gains the extension of shelf-life through the removal of bacteria via the microfiltration process.

In their research, the Cornell scientists examined whole milk and skim milk processed using microfiltration, pasteurized, and subsequently refrigerated at 3°C (38°F), 6.5°C (43°F) and 10°C (50°F) for 63 days. Analysis showed significant differences in bacterial concentrations for the microfiltered milk held at different temperatures, but no difference in milk with different fat levels.

An unexpected finding was the identification of microbacterium as a major contributor to the bacterial population in microfiltered, extended shelf-life milk, the researchers wrote, suggesting that on-farm and pre-pasteurization bacterial harborage sites need to be considered.

"As the [dairy industry](#) moves toward longer distribution, people do want to drink dairy protein and they want a high-quality product," Martin said. "Dairies are shipping further than before and we want consumers to have a great experience. Extended [shelf-life milk](#) delivers that quality product to consumers, but we need to be aware of the barriers and address them."

**More information:** T.T. Lott et al, Microbacterium represents an emerging microorganism of concern in microfiltered extended shelf-life milk products, *Journal of Dairy Science* (2023). [DOI: 10.3168/jds.2023-23734](#)

Provided by Cornell University

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