

Water recovered from whey can be used for clean-in-place procedures

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Water scarcity is a serious issue and a concern among the dairy industry, as declines in the availability of water could decrease food supply and increase food price. Water is necessary for many applications, including equipment cleaning, which can use 1 to 60 liters of water per kilogram of processed milk. Given the amount of water needed and concerns regarding resource scarcity, researchers from the University of Nebraska-Lincoln sought to find a method to recycle and reuse water from whey for clean-in-place systems. Their findings provide scientific evidence of the safety of reuse of reconditioned water in food processing plants, contributing to building a culture of water conservation and sustainable production throughout the food supply chain.

Current regulations indicate that only potable water may be used to clean food contact surfaces and equipment surfaces, but reconditioning and reuse of water is a promising alternative currently acceptable for initial cleaning of fruits and vegetables as well as scalding of meat and poultry. In their study, University of Nebraska researchers Yulie Meneses and Rolando Flores tested wastewater from whey of Cheddar cheese by subjecting it to reverse osmosis and ultrafiltration, as well as an additional step of spray drying. The resulting reconditioned water was used to clean stainless steel surfaces that had a biofilm, with promising results from both bacterial counts and scanning electron microscopy analysis.

"Using the combined ultrafiltration and reverse osmosis system, 47% of water can be recovered from whey," lead author Yulie Meneses said.

"This demonstrates the viability of our method for wastewater, as the cleaning efficiency was comparable to [potable water](#) in clean-in-place systems," added project leader Rolando Flores.

Further, by incorporating spray-drying and condensation into the process, recovery of additional water can be achieved; after suitable treatment, that water could also be used in cleaning applications or other activities with high water demand.

"Sustainable production and manufacturing is a priority for the dairy industry. This new research demonstrates that an unwanted by-product of dairy manufacturing (whey) can be processed to generate clean water, saleable food, and additional revenue for dairy manufacturers," said *Journal of Dairy Science* Editor-in-Chief Matt Lucy.

Because of its potential in terms of revenue and conserving natural resources, these wastewater reclamation techniques are highly interesting. More research is required, however, to further elucidate risks and broader environmental issues as they relate to the techniques in this study.

More information: "Feasibility, safety, and economic implications of whey-recovered water in cleaning-in-place systems: A case study on water conservation for the dairy industry," by Yulie E. Meneses and Rolando A. Flores, *Journal of Dairy Science*, Volume 99/Issue 5 (May 2016)

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