One Udder, Different Climates: Teat Dipping Around the World

Matching teat disinfection to climate and mastitis risk

Alvaro Garcia, DVM, PhD

A dairy cow in Wisconsin may leave the milking parlor into freezing temperatures and biting winds, while another in tropical Brazil faces high humidity, wet bedding, and persistent bacterial contamination. Thousands of kilometers farther south, cows grazing in New Zealand or Uruguay may encounter muddy tracks and rain-soaked pastures before returning to the milking shed. Although their environments differ, they all face the same challenge: preventing mastitis-causing organisms from entering the mammary gland.

Teat disinfection remains one of the most effective practices for reducing new intramammary infections, but environmental conditions influence product selection and application. Freezing temperatures increase the importance of skin protection, tropical humidity presents challenges involving contamination and product stability, and pasture-based systems require particular attention to teat coverage. The objective is not to identify one disinfectant for every dairy, but to select a formulation suited to the conditions in which cows are managed.



Clean cows come first.

Regardless of geography, effective teat disinfection begins with environmental hygiene. Manure-covered udders, contaminated tails, and wet hair increase the bacterial challenge before milking. Manzi et al. (2012), evaluating 1,931 teats, reported that worsening udder cleanliness was associated with approximately 47% higher odds of intramammary infection for each increment in cleanliness score. Poorer teat-end condition was associated with approximately 30% higher odds.

Udder hair clipping or carefully performed singing can facilitate cleaning, while trimming heavily contaminated tail switches may improve handling during milking. However, controlled studies have not consistently demonstrated reductions in bacterial counts or mastitis risk from these practices alone. Hair management should therefore complement, rather than replace, clean bedding, effective manure removal, and proper teat preparation. Tail docking is unnecessary.

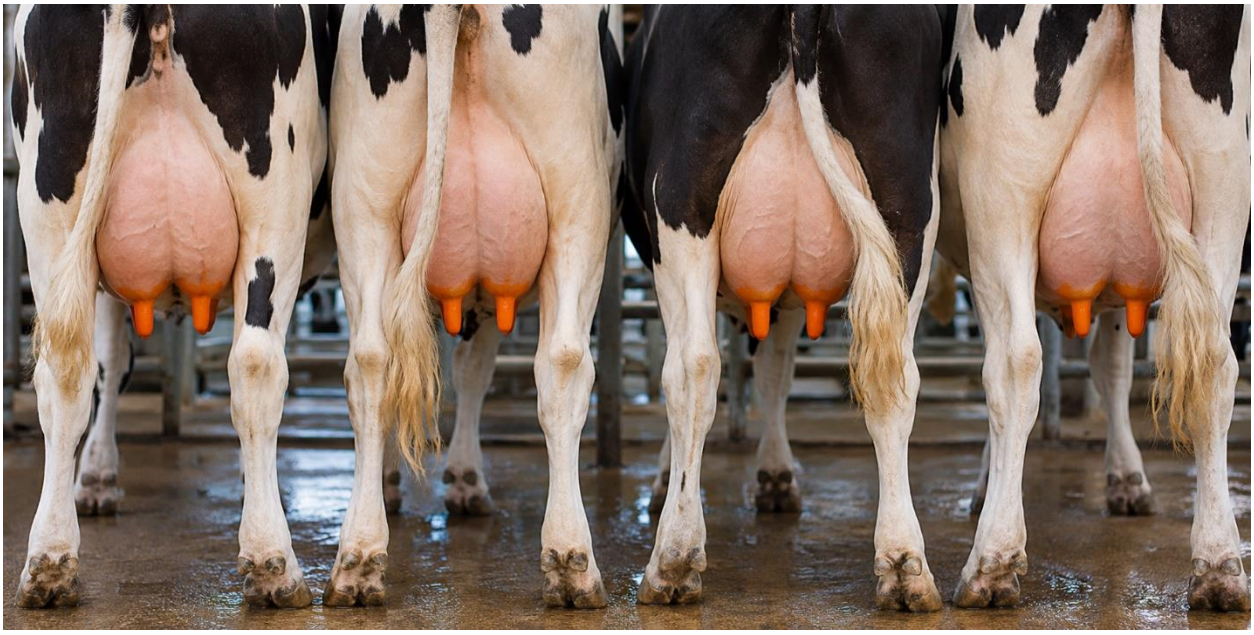
The disinfectant is more than its active ingredient.

Commercial teat disinfectants contain antimicrobial compounds such as iodine, chlorhexidine, chlorine dioxide, or organic acids. Their effectiveness depends on the complete formulation, including germicide concentration, contact time, stability, teat coverage, and skin-conditioning ingredients.

A systematic review by Vasquez et al. (2026), published in the *Journal of Dairy Science*, examined 41 teat disinfectant studies conducted between 2014 and early 2026. Only seven met the reviewers' criteria for high scientific merit. Most of these stronger studies demonstrated similar effectiveness between experimental and established products, with no germicidal ingredient consistently superior.

An important distinction is that reducing bacteria on teat skin does not necessarily demonstrate prevention of new intramammary infections. The latter provides more meaningful evidence of protection under commercial conditions.

The formulation must also preserve teat skin integrity. Lanolin, glycerin, sorbitol, and other conditioning ingredients help maintain skin flexibility and reduce irritation. Their usefulness depends on environmental conditions, but none is exclusive to a particular climate. More conditioner is not necessarily better because excessive concentrations may interfere with antimicrobial activity.



Different climates, different priorities

In Canada, northern Europe, the northern United States, and high-altitude dairy regions, winter increases the risk of teat chapping, cracking, and frostbite. Lanolin-containing formulations may help protect dry teat skin, while glycerin and sorbitol are also commonly used conditioners. Product selection should consider both skin protection and demonstrated antimicrobial effectiveness.

Morrill et al. (2019) compared a powdered chlorhexidine-based disinfectant with a foamed iodine-based product in 331 Holstein cows during a northern New York winter. Although the powdered formulation produced slightly better teat-end condition scores, cows receiving it had a 51% higher relative risk of developing a new intramammary infection. The findings demonstrate that healthier-looking teats do not necessarily indicate better protection against mastitis.

Freezing weather is not a reason to discontinue teat dipping. Under exceptionally severe conditions, the National Mastitis Council recommends allowing adequate disinfectant contact time before removing excess moisture from teats exposed to freezing temperatures. Winter formulations, dry bedding, and protection from wind are additional safeguards.

Tropical and equatorial environments. In Southeast Asia, equatorial Africa, Central America, and tropical South America, hot temperatures, humidity, and seasonal rainfall can increase environmental bacterial contamination. Disinfectant stability, storage conditions, dilution accuracy, and water quality become particularly important.

Commercial teat disinfectants containing iodine, chlorhexidine, chlorine dioxide, or organic acids may all be appropriate, provided their effectiveness has been demonstrated under practical dairy conditions. There is insufficient evidence to recommend one germicide universally for tropical dairies. Glycerin and sorbitol can help maintain teat skin condition, but high humidity alone does not justify increasing their concentrations. Maintaining clean resting areas, adequate drainage, and effective pre-milking preparation remains essential.

Pasture-based systems. In New Zealand, Uruguay, southern Australia, Argentina, and southern Brazil, cows may encounter muddy tracks, wet pastures, and changing weather conditions. Complete teat coverage is particularly important where spraying replaces dipping.

DairyNZ recommends appropriate emollient use, including glycerin or sorbitol, when teat condition deteriorates during wet and muddy periods. These ingredients help maintain skin condition during repeated wetting and drying, while the germicide provides antimicrobial protection. Correct dilution, drinking-quality mixing water, and properly maintained spraying equipment are equally important.

Matching formulations to environmental challenges

Environment	Main challenge	Formulation priorities
Freezing and windy	Chapping, cracking, frostbite	Validated germicide, effective conditioners such as lanolin or glycerin, winter-appropriate handling
Tropical and humid	Contamination, heat, storage stability	Proven antimicrobial activity, stable formulation, reliable dilution
Wet pasture systems	Mud, repeated wetting and drying	Effective germicide, suitable glycerin or sorbitol conditioning, complete coverage
Dry and dusty	Skin dryness, dust contamination	Skin-compatible disinfectant, appropriate conditioners, thorough cleaning
Resource-limited farms	Cost, availability, water quality	Affordable standardized products and consistent application

These are formulation priorities, not fixed prescriptions. Product selection should reflect the actual environment, pathogen challenge, and manufacturer's recommendations.

What about homemade teat dips?

Commercial disinfectants may be expensive or difficult to obtain in developing countries, encouraging interest in locally available alternatives such as aloe vera, neem oil, turmeric, and iodine preparations.

A small Indian study involving 25 crossbred dairy cows reported favorable somatic cell count responses with some plant-based treatments. However, only five cows received each treatment, and the study did not establish their effectiveness against bacteriologically confirmed new intramammary infections.

More recent research published in *Veterinary Sciences* (2025) evaluated standardized plant-extract antiseptics and reported promising reductions in teat microbial contamination. These findings support further investigation but do not establish that homemade mixtures are equivalent to validated commercial products.



The author on a USAID milk quality assignment in Honduras 20 years ago.

The distinction matters because antimicrobial concentrations, preparation methods, water quality, and storage conditions influence effectiveness. Incorrectly prepared iodine or chlorine solutions may irritate teat skin or provide inadequate protection. Household chemicals and untested mixtures should not be recommended without validated formulations.

For smallholder dairies, cooperative purchasing and locally manufactured, quality-controlled disinfectants may offer more reliable and economical alternatives. Affordability matters, but any savings must be weighed against the potential costs of mastitis.

One principle across every climate

The effectiveness of a teat-dipping program should be evaluated through clinical mastitis incidence, somatic cell counts, bacteriological results when available, and regular assessment of teat skin condition. Purchase price alone provides little information about the protection a product delivers. Freezing temperatures call for greater attention to skin conditioning and moisture management. Tropical humidity emphasizes contamination control and formulation stability, while pasture-based systems require reliable teat coverage and protection against repeated environmental exposure. These differences influence product selection and application, but they do not change the underlying objective.

From Wisconsin to Kenya to New Zealand, effective teat disinfection must accomplish two things: preserve healthy teat skin and prevent new intramammary infections. Climate determines how producers achieve that balance, but it never eliminates the need for either.

References

DairyNZ. 2013. *SmartSAMM Guideline 7: Use Post Milking Teat Disinfection on Every Teat after Every Milking*. https://www.dairynz.co.nz/media/ijxgtisv/smartsamm_guideline_07_use_post_milking_teat_disinfection_2013.pdf

Manzi, M. P., et al. 2012. "Relationship between Teat-End Condition, Udder Cleanliness and Bovine Subclinical Mastitis." *Research in Veterinary Science* 93 (1): 430–434. https://doi.org/10.1016/j.rvsc.2011.05.010

Morrill, K. M., et al. 2019. "Evaluation of Powdered 0.5% Chlorhexidine Acetate-Based Postmilking Teat Dip Compared with a Foamed 1% Iodine-Based Postmilking Teat Dip under Cold Weather Conditions in Northern New York." *Journal of Dairy Science* 102 (3): 2507–2514. https://doi.org/10.3168/jds.2018-15357

Nascimento, G. M., et al. 2025. "Antimicrobial Activity of Teat Antiseptic Formulations Based on Plant Extracts for Controlling Bovine Mastitis: In Vitro and In Vivo Evaluation." *Veterinary Sciences* 12 (4): 293. https://doi.org/10.3390/vetsci12040293

Vasquez, A. K., et al. 2026. "Invited Review: Evaluation of Teat Disinfectant Efficacy Studies from 2014 to 2026: A Systematic Review." *Journal of Dairy Science* 109 (10): 10124–10140. https://doi.org/10.3168/jds.2026-28644