

Thermodurics: tips to minimize thermoduric bacteria in bulk-tank milk

David Gleeson, Bernadette O'Brien and Lizandra Paludetti

Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork

Summary

- Target to minimize transfer of thermoduric bacteria into milk at farm — difficult to remove at processing stage.
- The risk of Thermoduric bacteria entering milk via the cow is higher during periods of very dry or wet weather.
- Focus on good hygiene of the cow and her environment.
- Focus on hygiene of the milking plant by following a recommended wash routine.

Introduction

Thermoduric bacteria (i.e spore-former *Bacillus Cereus*) can have serious implications for the quality of milk and subsequent dairy products. They can result in processing problems during product manufacture and quality issues in the final dairy product. Due to their ability to withstand pasteurisation, thermoduric bacteria can limit the shelf life of pasteurised milk. Additionally, some thermodurics are considered as food borne pathogens, thus their numbers in dairy products must be minimised. Ideally, thermoduric counts in bulk-tank milk should be non-detected or less than 200 cfu/ml and counts of 500 cfu/ml or greater are generally at the penalty threshold.

Thermoduric bacteria exist in the dairy cow's environment on-farm, e.g. in soil, bedding and faeces. These bacteria enter milk produced on-farm largely via the cow teats, during milking, in the first instance. Poor milking machine and bulk-tank cleaning can result in multiplication of these bacteria and can further exacerbate the problem. Therefore, the critical control points for minimizing thermoduric bacteria in farm milk are:

- A clean cow and cow environment.
- A totally effective cleaning regime for the milking machine.
- A totally effective cleaning regime for the bulk milk tank.

The presence of thermoduric bacteria is indicative of ineffective cleaning somewhere in the milk production process (cow, environment, milking plant). Detailed protocols for achieving clean cows and environment, clean milking machine and clean bulk milk tank are outlined below.

Cow and milking hygiene

Ensure that teats are clean and dry before milking. If the milk sock is soiled after milking, then teat preparation is inadequate. Where teats are washed pre-milking, they should be dried before cluster attachment.

- Maintain cows in a clean environment — if the udders and teats look dirty, then there is a problem. Collecting yards and approach roads should be scraped regularly.
- Clip cow tails and udder hair — minimum three times/year.
- Keep hands/gloves clean throughout milking.
- Keep milking clusters clean during milking and if they fall on the floor, flush out completely.

- Do not wash down clusters while still attached to a cow.
- Do not wash down the platform while cows are present.
- Cover meal bins in the parlour (some feed ingredients may contain thermophilic bacteria).

Milking plant hygiene

- Follow a recommended milking machine wash routine <https://www.teagasc.ie/animals/dairy/milk-quality/cleaning-guidelines-for-milking-equipment/>.
- Ensure sufficient volume of detergent/water solution so that all surfaces will be in contact with the detergent solution (9 litres/unit)
- Maintain adequate turbulence (air injection for large plants) and vacuum level during the wash cycle.
- Hot water usage is critical (70/80°C) — low wash water temperature can be associated with more variability in farm milk bacterial levels.
- Milk stone remover should be used once weekly at a minimum, and more often if water hardness is an issue, or install a water softener.
- After each (twice daily) wash cycle, the milking plant could be disinfected with Peracetic acid in an additional rinse.
- Thermophilic bacteria survive in perished rubber-ware - replace milk liners twice yearly and milk tubes every second year.
- Debris can build-up in the plate cooler - use clean filter sock during washing and get milking machine technician to clean plates.

Bulk milk tank hygiene

- Disinfect the bulk milk tank outlet regularly.
- Avoid having the milk supply pipe immersed in milk during milk transfer.
- Keep the bulk-tank lid closed at all times, especially during milking.
- Ensure sufficient volume of detergent wash solution for the size of the bulk-tank- insufficient volume will result in poor surface contact with detergent.
- Blocked suck-up detergent tubes will result in insufficient detergent usage, replace these tubes annually.
- Spray balls that are clogged or spinners not moving freely or missing will impact on effective tank cleaning.
- Cool milk to 3/4°C within 30 min of the completion of milking with the aid of a plate cooler, as some thermophilic bacteria will multiply at temperatures above 4°C.

Conclusions

Critical control points for minimizing thermophilic bacteria in farm milk include a clean cow and clean cow environment with an effective milking equipment cleaning regime.