

Evaluation of how chlorine-free cleaning protocols for milking equipment are applied on farms

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Summary

- A survey was undertaken to evaluate the degree to which chlorine-free cleaning protocols are applied correctly to milking equipment on farms.
- Numerous faults in the application of cleaning protocols were observed, particularly with regard to the use of detergents.
- The specific steps and elements/features of the cleaning protocols on-farm must be corrected if bacterial quality is to be maintained in the long term.

Introduction

A requirement for chlorine-free cleaning of milking equipment on-farm has been adopted by milk processors since January 2021. To address this scenario (and to compensate for the removal of chlorine), five new milking machine cleaning protocols have been developed and evaluated at Moorepark. The new cleaning protocols (compared to traditional protocols) require more frequent hot washes to be conducted at higher temperatures. In addition, the new chlorine-free (CF) sodium hydroxide based detergents have a higher viscosity than previous products and therefore recalibration of automated cleaning equipment is vital; otherwise, the new CF detergent take-up rate may be less than that of the previous product. As Irish dairy farmers approach the end of their second season producing milk using these new CF cleaning detergents, some farmers/advisors continue to report issues with milking equipment hygiene and an increase in bacterial counts. To establish potential reasons for this observation, Teagasc undertook a survey focusing on milk quality management on commercial dairy farms.

Farms visited

One hundred and five farms were visited in co-operation with 11 milk processors between July and October 2022. The number of farms chosen from each processor was based on the total supplier numbers of each processor; between five and 20 farms were selected per processor; with half of the farmers surveyed having a consistently high (>25k) or low (<15K) total bacteria count (TBC). Participating farmers did not receive specific advice on TBC management in the two months previous to the Teagasc visit. Each farmer was interviewed using a set number of questions and detergent usage rates, water temperatures and water volumes were measured.

Results

Many deficiencies in the application of the cleaning protocols were highlighted, in particular the frequency of hot washes, detergent circulation time, temperatures and chemical usage rates; particularly where liquid products were used with automatic cleaning. A summary of the main faults associated with the use of liquid detergents is presented in Table 1. Higher usage rates (1% solution) of CF liquid detergent are required when detergents are used with cold water, to compensate for the lack of heat, whilst a usage rate of 0.5% is sufficient where hot water is employed. Ninety seven percent of farmers surveyed were not observing this requirement. In addition, 38% of farmers were not using sufficient amounts of detergent when using hot water. Many farmers indicated that they had not recalibrated the auto-washer to facilitate the use of the new CF products. To properly recalibrate an

auto-washer, it is necessary to read the recommendations on the drum, for both hot and cold-washing, ascertain the volume of water being used (measure the trough), calculate how much detergent should be used and recalibrate as necessary.

The frequency of hot washing for the milking plant depends on the wash routine employed; a minimum requirement of seven hot washes per week are necessary when liquid detergents are used. A target starting wash temperature of 75-80°C is necessary for effective hot washing. A minimum of nine litres of hot water per unit is required for effective cleaning and this increases to 12 litres per unit with larger plants that have axillary equipment, e.g. milk meters/dump lines. Fourteen percent of farmers used less than seven litres per unit. It is recommended to conduct an acid wash on a least two occasions per week and more frequently if the water used is considered 'hard' (> 300ppm CaCO₃). Acid containers are generally identified as being red in colour and should match with the red take-up tubes to avoid incorrect product being used. Eight percent of farms had these tubes placed incorrectly. Twenty two percent of farms had an organic matter residue build-up on the inside of claw-pieces-indicating that a poor milking equipment-cleaning protocol is employed on those farms (Figure 1).

Table 1. Summary of main faults associated with the use of liquid detergents

Main faults	% farms
Shortage of detergent for cold wash	97%
Shortage of detergent for hot wash	38%
Inadequate hot washing	70%
Insufficient water temperature	62%
Inadequate acid washing	18%
Inadequate water volume	14%



Figure 1. Residue build-up on a claw bowl

Conclusions

The results of this survey indicate that there are many faults in the application of cleaning protocols on farms. If these management faults are not addressed, the success of CF cleaning at farm level will be limited and bacterial counts in milk may increase over time.

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