

Dried, sealed, delivered



With more scrutiny than ever on the use of antimicrobials, especially in animals, **TEAGASC** researchers looked at methods to reduce their use and maintain low levels of mastitis in dairy herds.

Mastitis is a costly disease that impacts on animal welfare, milk quality and farm profit. Not alone is mastitis associated with reduced milk yield, but additional costs related to diagnostic and treatment expenses and extra labour inputs also accrue. In addition to reducing farm income, mastitis can also negatively impact on the image of the dairy sector, due to animal welfare and milk quality issues. Furthermore, there are public health concerns due to the increased risk of residues through 'improper' use of antimicrobials. Mastitis is a disease that can threaten udder health in both heifers and adult cows. Herds are considered to have problems with heifer mastitis if >15% of the heifers have intra-mammary infections around the time of calving. Owners of such herds should instigate investigations and implement heifer mastitis prevention and control measures. As heifer mastitis is a multifactorial disease, a multifaceted approach to prevention and control is required. Commonly recommended interventions include housing heifers in a clean environment, minimising stress and optimising general farm udder health to minimise infection pressure from older cows to younger heifers. While some studies have investigated the use of pre-partum antibiotic treatment in heifers, this is not considered prudent use of antimicrobials.

Another area of concern regarding antimicrobial use is blanket dry cow therapy (BDCT). BDCT involves the administration of long-acting antimicrobials into all quarters of all cows at drying off. Due to the success of mastitis control programmes involving BDCT, regular milking machine maintenance and improved udder hygiene, many animals are now uninfected at drying off. As a result of these favourable trends, and the growing fears over antimicrobial resistance, it has been suggested that BDCT is no longer required. As the majority of antimicrobials used in dairy cattle are administered via the intra-mammary route, trials have been conducted at Teagasc Moorepark to examine the potential for reduced use of antimicrobials and also non antimicrobial-based mastitis control programmes.

Selective dry cow therapy

Unlike BDCT, where all cows receive antibiotics, selective dry cow therapy (SDCT) involves targeted use of antibiotic treatment only in those cows that have an intra-mammary infection at drying off. In quarters uninfected at drying off, teat seal (TS) is administered instead, which can prevent new infections during the dry period. The seal forms a physical barrier in the teat canal, preventing the entry of bacteria capable of causing mastitis.

In herds with somatic cell counts (SCC) of <200,000 cells/ml, <2% clinical case rate in the last three months, and where individual cow milk recording data is available, SDCT may be worth considering. When administering TS, strict hygiene is essential (**Figure 1**). Our aim was to investigate SDCT and the administration of TS to heifers in an Irish setting.

SDCT study

The experiment was run in the Clonakilty research herd across 2015 and 2016, and was repeated in the Clonakilty, Moorepark and Curtins research farm herds in 2017 (the study is currently ongoing). At drying off, cows were deemed eligible for inclusion if their SCC had not exceeded 200,000 cells/ml and they had not presented with a clinical case of mastitis throughout the previous lactation. In total, 364 cow lactations were recruited to the study across the three years. Eligible cows were randomly assigned to treatment 1 (TS only; n=184) or treatment 2 (TS plus antibiotic (cefalonium); n=180). To determine SCC and bacteria present, quarter sampling was conducted at drying off (pre treatment) and at three time points post calving: (1) immediately post calving; (2) two weeks post calving; and, (3) mid lactation. Weekly post-calving milk recording data provided additional SCC measurements.

Results

Initial results indicate that the SCC of TS-only cows was statistically greater than those cows that received both antibiotic and TS



FIGURE 1: Strict hygiene is essential when infusing teat seal.

(unadjusted SCC 70,374 vs 46,673: first 120 days in lactation). The proportion of cows in each treatment group that had an SCC recording of >200,000 cells/ml during the first 120 days post calving is illustrated in **Figure 2**. The majority of cows in both treatments (>80%) maintained an SCC of <200,000 cells/ml, but cows administered TS only were 2.9 times more likely to have an SCC reading >200,000 cells/ml within the first 120 days of lactation. Initial results indicate that a more stringent selection criteria at drying off would not change the conclusion from this study (e.g., only choosing cows with an SCC of <100,000 or <150,000 cells/ml at drying off).

On a positive note, herds maintained a bulk tank SCC of <200,000 cells/ml (with the exception of one herd in one month recording an SCC = 243,000 cells/ml). This indicates that using TS only on a proportion of cows did not have a major adverse effect at the herd level, and suggests that reduced antimicrobial use is possible in Irish herds. The study will continue until the end of the current lactation.

Heifer teat seal trial

A separate study to determine the association between TS administration to heifers pre calving and infection levels in the subsequent lactation was undertaken on four separate research farms in 2015.

Four to six weeks pre calving, all heifer teats were disinfected and TS was infused in two quarters, while the remaining quarters acted as controls. Quarter level sampling was conducted at similar time points to the SDCT trial.

Teats not administered TS were between 1.99 (P<0.05: mid lactation) and 3.85 (P<0.001: first milking) times more likely to have bacteria present than those administered TS.

In approximately 6% of teats, it was impossible to administer seal. Although they were excluded from the trial, this knowledge provides important farmer information. In such a situation, it is important not to cause teat end damage.

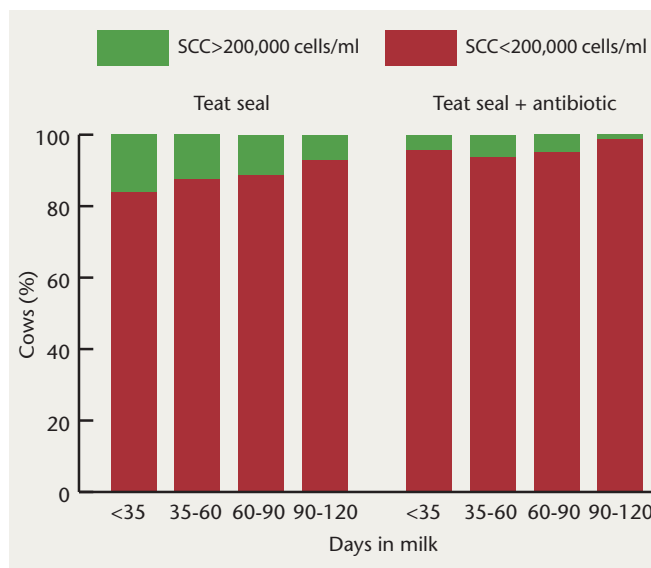


FIGURE 2: Proportion of cows in each treatment group that had an SCC recording of >200,000 cells/ml at different time points post calving.

Conclusion

Results from these studies provide a generally positive indicator that reduced antimicrobial use is possible in Irish mastitis control programmes. Further research is required to determine the appropriate balance between maintaining a high standard of udder health, and also promoting responsible antimicrobial use.

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