

Quarter-selective dry cow therapy to reduce the antibiotic use in dairy farming

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- One approach to reduce the use of antibiotics is the quarter-selective dry cow therapy, where only quarters infected with major pathogens are treated with antibiotics at dry-off.
- The project MinimA investigated this pathogen-based approach on commercial dairy farms, resulting in a substantial reduction in the use of antibiotics at dry-off.
- To achieve a sustainable reduction in antibiotic use, the focus must be on preventing new intra-mammary infections during the dry period.

Background and Objectives

Considering that any use of antibiotics can contribute to the development of resistance, the targeted and prudent use of antibiotics is becoming increasingly important. In dairy farming, the dry period is of particular importance as a high amount of antibiotics is used for dry cow therapy. Thus, there is considerable antibiotic saving potential for dairy farmers. A growing number of farmers have come to recognize this and established selective dry cow strategies in their herds. Moreover, this has been a legal requirement since 2022 (Regulation (EU) 2019/6). However, in many farms, the decision to administer antibiotic treatment at drying off is mostly based on the results of the last milk recording(s) or the history of udder diseases of the cow. But can the use be more targeted and further reduced when antibiotic treatment is limited to infected quarters only? This approach was tested in the model and demonstration project „MinimA – Sustainable minimization of antibiotic drug use due to quarter-selective dry-off in dairy cows“.

The aim of this project was to transfer a quarter-level approach that has been successfully tested on experimental farms into commercial dairy farms. Furthermore, the objectives were to determine the reduction of antibiotic use when using a pathogen-based approach and to evaluate its influence on bacteriological cure rate and new intramammary infection rate.

Approach

A total of 16 German dairy farms tested the quarter-selective approach over two years in their herds. Therefore, bacteriological analysis was performed on quarter milk samples collected two weeks before the scheduled dry-off date. The strategy: Only quarters infected with major pathogens were treated with antibiotics at dry-off. For quarters either not infected or infected with minor pathogens (Non-*aureus* staphylococci (NAS) and *Corynebacterium* spp.), no antibiotic treatment was applied. To prevent new intramammary infections, all quarters received an internal teat sealant. A

second sample was taken three to five days after calving to determine the cure rate and new intramammary infection rate (Figure 1). The final analyses should include at least 75 dry periods per farm.

Farmers were trained in the correct sampling (Figure 2) and application of udder injectors using [leaflets and videos](#) (in German language). Where sampling quality was poor or deteriorated during project, sources of contaminations were identified together with the farm and herd managers.

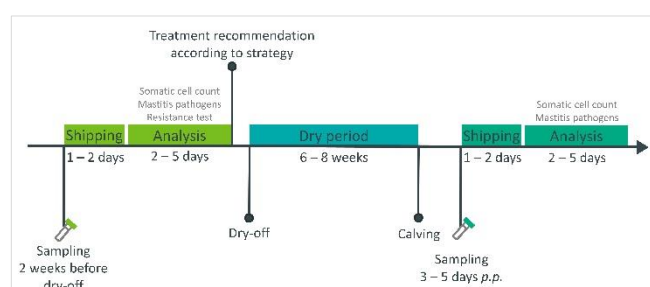


Figure 1: Sampling procedure (p.p. = post partum) - (Source: Alexandra Beckmann).

To share knowledge between dairy farmers and scientists, feedback talks were conducted to discuss bacteriological results and project experiences. Furthermore, „stable schools“

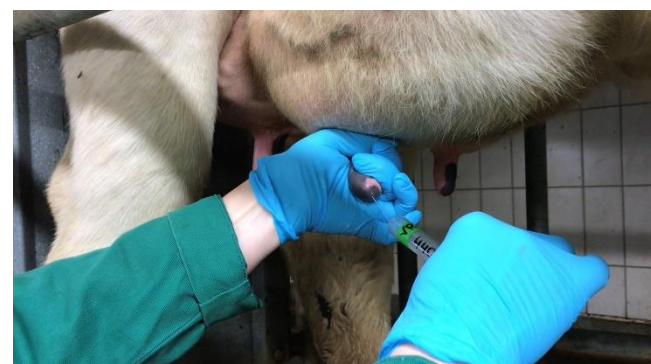


Figure 2: A clean and correct sampling is essential in order to obtain reliable bacteriological results from the laboratory (Source: Alexandra Beckmann).

(Figure 3) provided an opportunity for all project farms to discuss and determine the best practical implementation of the quarter-selective dry cow strategy.

Results

A total of 4,530 udder quarters from 1,155 dry periods were included in the analyses. Depending on the farm, the dry periods ranged from 60 to 83 cows. On average, cows were in the third lactation and had a mean dry period length of more than seven weeks. Before dry-off, no mastitis pathogens were detected in 71.2% of all quarters. Minor pathogens were responsible for 13.1% of all infections, whereas major pathogens were found in 6.9% of all quarters before dry-off. Most frequently detected pathogen groups before dry-off and after calving were minor pathogens like *NAS* and *Corynebacterium* spp.

A substantial amount of antibiotics was saved: 91.9% of all udder quarters were dried off without antibiotics. However, antibiotic use differed between the farms: Depending on the herd's infection status, between 71.2% and 97.4% of the quarters were dried off without antibiotics. In contrast to the selective dry cow strategies on cow-level that were previously practiced on all farms, antibiotic use was further reduced by 80.8%. The feedback from farmers has also been consistently positive. One of the farmers said: *"It is remarkable how few antibiotic udder injectors I now need just for the drying off procedure."*

The targeted antibiotic treatment of infections with major pathogens resulted in an average cure rate of 97.1% and was higher than expected. However, the cure rates varied depending on the pathogen: The lowest cure rate of 86.2% was observed for quarters infected with *Staphylococcus aureus*. Quarters infected with *Streptococcus uberis*, esculin-positive streptococci and Gram-negative bacteria showed cure rates above 95%. Infections with *Streptococcus dysgalactiae* were completely cured. Self-cure rates above 80% for minor pathogen infections indicated no need for antibiotic treatment at dry-off.

Of all the quarters that were not infected prior to dry-off, 84% remained not infected. Of all major pathogen infections detected after calving, over 90% were due to new intramammary infections. Consequently, half of the farms had at least as many quarters new infected after calving as were cured by antibiotic treatment during dry period. Therefore, the focus must be on preventing new intramammary infections during the dry period to achieve a sustainable reduction in antibiotic use.

Based on the results and experiences a [German practical guide](#) was created to support other interested dairy farmers with the implementation of this pathogen-based quarter level approach.



Figure 3: "Stable Schools" facilitated knowledge and experiences among the project farms, enabling them to connect and learn from each other (Source: Alexandra Beckmann).

Conclusion

We recommend the following measures:

- Important for the implementation of quarter-selective dry cow therapy are the coordination with the consulting veterinarians, a good level of management as well as the correct and clean collection of quarter milk samples.
- We recommend to sample all cows two weeks prior to the scheduled dry-off date, and preferably at the beginning of the week. The establishment of a specific day of the week for sampling and drying off and accompanied these tasks to only a few people can prove beneficial. Sampling after calving is only recommended in exceptional cases (e.g., detection of contagious pathogens before dry-off).
- Following the targeted use of antibiotics, we recommend to treat only those quarters with antibiotics at dry-off that are infected with major pathogens. For quarters either not infected or infected with minor pathogens, no antibiotics are needed. To prevent new intramammary infections during dry period, it is recommended to use an internal teat sealant for all udder quarters (except in the case of yeast detection). It is essential to ensure clean and correct application.

Further information

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