J. Dairy Sci. 101:1–7
https://doi.org/10.3168/jds.2018-14742

Short communication: Drying-off practices and use of dry cow therapy in Finnish dairy herds

M. J. Vilar,[1] M. Hovinen, H. Simojoki, and P. J. Rajala-Schultz
Department of Production Animal Medicine, Faculty of Veterinary Medicine, University of Helsinki, Saarentaus 04920 Finland

ABSTRACT

The objective of this study was to survey drying-off practices and use of dry cow therapy (DCT) in Finland through an online questionnaire. The questionnaire was accessible to all dairy farmers of the Finnish dairy herd recording system in 2016 (approximately 5,400 farms). In total, 715 dairy producers across the country, representative of the Finnish dairy industry, participated in the survey. Cows were dried off gradually in most of the farms. Most farms (78%) reported using selective DCT, whereas 9% of farms did not use any DCT, and 13% of farms applied blanket DCT. A significant trend was observed with increasing herd size and proportion of farms using blanket DCT. Percentage of farms using blanket DCT was also higher in farms with automatic milking system. Farmer's own experience was the most commonly reported reason for choosing a particular approach to DCT. Microbiological testing of milk samples at dry-off was the preferred method of selecting cows for DCT; 82 and 64% of farms using selective and blanket DCT approach, respectively, reported testing milk samples before treatment. The second most common criteria for using antibiotic DCT were clinical mastitis history and high somatic cell count. A high number of farms using selective DCT reported treating only up to one-fourth of their cows at dry-off. Information acquired on drying-off practices in Finland allows for future monitoring of prudent antimicrobial usage at dry-off.

Key words: dry cow therapy, drying-off practices, selective dry cow therapy

Short Communication

Dry cow management is important for dairy cow health and welfare, milk production, and therefore for the profitability of dairy farms (Dingwell et al., 2003; Bradley and Green, 2004). The actual drying-off procedures, such as whether cows are dried off abruptly or gradually by reducing milking frequency or restricting feed intake (or both), differ between herds and countries. Antibiotic dry cow therapy (**DCT**), however, is an important part of most mastitis control programs worldwide. Dry cow therapy aims to reduce prevalence of IMI by eliminating existing IMI at dry-off and preventing new IMI from occurring during the dry period. The IMI during the dry period increases the risk of clinical mastitis in the first weeks of subsequent lactation (Pieper et al., 2013). The DCT can be either administered to all quarters of all cows (blanket DCT) or given to treat quarters or cows with a diagnosed or suspected IMI (selective DCT). In addition, internal teat sealants (**ITS**), which are used to mimic the protective effects of the keratin plug, can be used alone or in combination with antibiotic DCT at dry-off to prevent IMI and clinical mastitis (Cameron et al., 2014; Krömker et al., 2014). In some countries, blanket DCT has been recommended at dry-off for decades; however, recently preventive use of antimicrobials has been increasingly questioned and criticized. Development of antimicrobial resistance in bacteria is currently viewed as the most serious global public health threat (WHO, 2014), and prudent use of antimicrobials in human and veterinary medicine, as well as in agriculture, is emphasized (EMA/CVMP, 2015). Prophylactic use of antimicrobials should be restricted and susceptibility of pathogens ensured before treatment (European Commission, 2011; FAO, 2016). Also, recently, the European Commission Notice 299/04 recommended avoiding routine treatment of cows at dry-off (European Commission, 2015). The success of selective DCT and the effect on udder health depends on the accuracy [i.e., sensitivity and specificity of the selection procedure of the infected quarters/cows (Scherpenzeel et al., 2016)]. Identification of cows or quarters (or both) needing treatment at dry-off can be based on different criteria [e.g., individual cow SCC data and clinical mastitis history (Bradley et al., 2010; Rajala-Schultz et al., 2011), or on-farm milk culturing (Cameron et al., 2013)]. In recent years, in some countries, such as in the Netherlands and Germany, selective DCT (Scherpenzeel et al., 2016) and

Received March 14, 2018.
Accepted April 6, 2018.
[1] Corresponding author: maria.vilar@helsinki.fi

use of ITS (Krömker et al., 2014) have been promoted as an alternative to blanket DCT. However, a recent study reported that in Germany, 79.6% of commercial farms used blanket DCT, and 64.9% of all antibiotic DCT were carried out without previous bacteriological examination (Bertulat et al., 2015). Traditionally, the use of DCT in Nordic dairy farms has been limited to selective DCT (Ekman and Østerås, 2003). Nevertheless, knowledge and statistics about the current use of DCT and drying-off practices in general in Finland are missing. Therefore, the objectives of the present study were to (1) describe the drying-off practices and how common the use of DCT in Finnish dairy herds is, and (2) evaluate the associations between the drying-off practices and the farm characteristics and management practices.

We conducted a survey about farm characteristics and dry cow management practices. An online survey was accessible to all dairy farmers in the Finnish dairy herd recording system in 2016 (approximately 5,400 farms). The questionnaire was designed using close-ended questions, and when necessary open-ended questions were used for clarification purposes. Questions were grouped by topic: (1) general farm information, (2) drying-off practices, (3) antibiotic dry cow therapy, and (4) use of ITS. Type of DCT was the only obligatory question, and depending on the chosen answer, a new group of questions opened; therefore, if the responder selected blanket DCT as the option used in their farm, only a set of questions regarding the use of blanket DCT became available. The questionnaire was pre-tested with veterinarians and farmers. Pre-testing showed that the questionnaire took 10 to 20 min to complete and resulted in minor changes in the questionnaire format. The questionnaire was launched in collaboration with the main Finnish dairy processing company (a co-operative collecting milk from 85% of Finnish dairy farms) and the organization responsible for the official milk recording data system. It was accessible in both official languages, Finnish and Swedish. To encourage participation, the Dillman survey guidelines were followed (Dillman et al., 2014). Briefly, an introduction letter (both an electronic and a paper version), an invitation, and 2 follow-up reminders with the link to the web survey were sent to all dairy farmers. The online version of the questionnaire was open for participation between January and May 2017, and a paper version was also available per request during the same period of time. In addition, we organized a raffle among all respondents to increase the response rate. The online version of the questionnaire was designed in the E-lomake 3 browser (Eduix Oy, Tampere, Finland), which allows a direct transfer of data into a spreadsheet or statistics software. Thus, data collected from the online survey were exported to Excel (Microsoft Corp., Redmond, WA) for quality checks and cleaning. The software package IBM SPSS Statistics for Windows (version 24.0, IBM Corp., Armonk, NY) was used to explore possible associations between drying-off practices and different variables at farm level. The Pearson chi-squared test was used to investigate potential associations between categorical variables. The Cochran-Armitage trend test was performed to evaluate differences between the use of DCT and use of ITS across different herd sizes, rolling herd average milk production, and differences between use of DCT and use of ITS within milking systems.

In total, 715 dairy farmers (13.2% out of 5,400 farms) across the country participated in the survey; 714 farmers filled out the online questionnaire and 1 filled out the paper version. Based on their responses, 97.8% of the farms were conventional and 2.2% were organic farms. The proportion of farms with pipeline milking in tiestalls, parlor, and automatic milking system (**AMS**) was 54.5, 23.2, and 22.3%, respectively. The reported herd sizes were small, 34% of farms having less than 30 cows and 38.5% of farms with between 30 and 60 cows. Only 27.5% of the farms had more than 60 cows. Rolling herd average milk production was reported to be less than 8,000 kg per cow per year in 6.4% of responding farms, and more than 10,000 kg per cow per year in 37.5% of farms. Based on their responses, 66.1% of the farms had bulk tank milk SCC under 150,000 cell/mL. The reported farm characteristics indicate that the responding farms were representative of current Finnish dairy industry (LUKE, Natural Resource Institute Finland, 2017).

Cows were dried off gradually in 96.1% of the responding farms, and in 86.1% of the farms, cows were reported to produce 15 kg/d or less at dry-off. The ration was changed and feed intake restricted before the dry period in 87.2% of the farms. The length of the dry period was reported to be between 6 and 8 wk in 79% of the farms, and over 8 wk in 19.0% of the farms. However, the average length of a dry period registered in the Finnish dairy herd recording system is higher (67 d).

Selective DCT was the most common (78% farms, 558/715) practice when drying off cows, whereas 8.7% (62/715) of farms did not use antibiotic DCT at all and 13.3% (95/715) of farms applied blanket DCT. Table 1 shows the number (and percentage) of farms that reported using different approaches to DCT and farm characteristics and other management practices. In Nordic countries, application of selective DCT rather than blanket DCT has been recommended while emphasizing the importance of preventive measures to control IMI (Ekman and Østerås, 2003). For example, in Denmark, DCT is only recommended if contagious