

# Abstract Submission Form

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**Preferred presentation**

Oral

**Preferred session**

Session 1: WG Animal Data Exchange – Decision Support Tools of the Future – Promoting Sustainability Farm Management

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**Title of your paper**

Dry-off treatment of dairy-cows – Methods to guide targeted antimicrobial use

## Insert ABSTRACT text

One of the most common indications for the use of antimicrobials in dairy cattle is the administration of long-acting antibiotic products for drying off. Antibiotic dry cow therapy (aDCT) has proven itself over decades to be an efficient tool to cure existing udder infections and to reduce the number of new infections in the following lactation. However, from a One Health perspective, the routine use of antibiotics is controversial. As the use of antibiotics increases the risk of selecting antimicrobial resistant bacteria, the administration of antibiotic dry cow tubes should be restricted to cows with a proven infection with known mastitis pathogens or those at an increased risk of a new infection during the dry period. As part of the D4Dairy research project, a cohort study was carried out to investigate whether the selective use of aDCT could lead to a reduction in the total antimicrobial use, without negatively influencing the

udder health of the dairy herd. To determine the frequency of udder infections prior to dry-off, as well as the frequency of new infections, bacteriological milk cultures were carried out on all cows before dry-off and at the beginning of the subsequent lactation.

The diagnosis of udder infections prior to dry-off by bacteriological milk culture provides greater diagnostic certainty than indirect selection methods, but is associated with significantly higher levels of labour, time, materials, and overall costs than the selection of cows for aDCT based on individual somatic cell counts (SCC).

The data collated during the D4Dairy field study were combined with the data collected via the national milk monitoring scheme and the Austrian health monitoring programme and were used for the statistical modelling of the results of the bacteriological milk culture at the time of dry-off. The aim of the study was to develop a practical and cost effective model for a herd-specific decision-making tool for selective aDCT. The results of two statistical modelling methods (GEE (Generalized Estimating Equations), Random Forest) were compared with the selective aDCT recommendations carried out on farm in the D4Dairy field study. The selection according to herd, cow and lactation-specific SCC thresholds led to more frequent recommendations to use antibiotics than was actually necessary. The relationship between udder infections, the results of milk monitoring programmes, the lactational age of the cow and the udder health parameters of a herd are complex and could not be sufficiently explained with the first GEE model. The best predictive performance was obtained using the Random Forest model. However, the test set was rather small. To assess whether a statistical prediction model could make a more accurate selection of cows for antimicrobial dry-off and to further reduce the overall antimicrobial use, a larger amount of data from routine recordings was used to train and test the Random Forest model.

Based on the results of the statistical modelling, the feasibility, as well as the strengths and weaknesses, of the different selection methods for antimicrobial dry cow therapy will be presented.

#### **Enter keywords**

targeted dry-off treatment, antibiotic use, decision support, random forest, statistical modelling