



SELECTIVE DRY COW THERAPY

“use as much antibiotic as necessary, but as little as possible”

Introduction

The purpose of selective dry cow therapy (SDCT) is to reduce the use and expense of antibiotics on the farm and secondly to reduce the chance of developing antibiotic resistant strains of mastitis pathogens. Studies have shown that when applied properly, selective dry cow therapy can be an effective strategy for managing mastitis during the dry period, because not only does this help reduce antibiotic utilization, but it can also represent substantial cost savings.

Selective dry cow therapy is however not simple to implement and is not suitable for every dairy farm. Good records and a high level of management and veterinary involvement are essential for success. The method utilizes a targeted approach to dry cow treatment, where antibiotic treatment is reserved only for cows that are most likely to benefit from it. When applied, not every quarter of every cow should receive an antibiotic treatment.

Purpose of Dry Cow Therapy

Dry off is a transitional phase between lactation, during which the cow produces milk, and the actual dry period. For dairy cows, the dry period represents a time of rest in which the cow is not producing milk and is essential to the success of the upcoming lactation and further reproduction performances. A minimum of a 60-day dry cow rest period is recommended since, in practice, shorter periods have been found to have a negative effect on cow performance in the next lactation. This gives the cows time to recover and cure any possible infection before the next lactation (with treatment if necessary). At dry off, many cows, especially higher producing cows, may have a delay in teat end closure and a higher risk of developing mastitis. Up to half of all high yielding dairy cows may fail to develop a complete keratin plug in the dry period and without this barrier there is a greater risk of bacteria entering the udder.

The risk of infection during the dry period is up to seven times higher than during lactation. In some herds, over 60% of clinical mastitis cases can be traced to bacterial infections that occur in the dry period. This highlights the importance of drying off cows correctly. It can be argued that all cows, whether uninfected or infected (and then cured), are susceptible to new infection in the dry period, and because intramammary treatment is very effective in curing existing infections during the dry period, it makes sense to target the dry period for treatment.

Blanket Dry Cow Therapy

In the 1950's dairy farmers started to use blanket dry cow therapy (BDCT) at dry off to cure existing infections and prevent new intramammary infections (IMI). BDCT has over the years reduced the number of persistent bacterial mastitis organisms on most farms. As a result, there is a reduced need to treat all cows at dry off. Furthermore, because antibiotic resistance poses a global threat, livestock production is under increasing pressure to reduce antibiotic use.

Normally, antibiotics are only given to sick animals, but in BDCT it is given to all cows, including healthy ones, which increases the risk of resistance. Therefore, the use of antibiotics as a preventative treatment to treat healthy cows was banned in the EU in January 2022. Under the new regulations antibiotic dry cow therapy (aDCT) must be prescribed on an individual basis. This has led to the increased adoption of selective dry cow therapy.





Selective dry cow therapy

The aim of SDCT is to identify and treat only cows that need treatment at dry off. Research has shown that SDCT reduces the use of antimicrobials at dry off, without any detrimental effect on udder health or milk production during the 1st months of the subsequent lactation, provided it is combined with the use of teat canal sealants in all the cows at dry off (healthy and untreated cows included).

An advantage experienced by some farms that implemented SDCT is that their bulk tank somatic cell count (BTSCC) and mastitis cases showed a significant decrease over time. This is likely due to the system encouraging farmers to better identify and treat cows with high SCC. Cure rates of IMI will vary for several reasons. However, during the dry period, cure rates are significantly higher than during lactation so, arguably, tests used to identify IMI at drying off should be optimised for the detection of infected cows to avoid missing the opportunity for cure.

Veterinary input required

The veterinarian should be consulted to determine whether a particular herd is suitable for SDCT. In some cases, a herd may initially not fulfil the requirements to qualify for SDCT but could qualify at a later date with the help of the veterinarian.

Three basic approaches to SDCT

- A. Algorithm guided SDCT program – This uses a combination of bulk milk tank SCC, individual cow SCC, incidence of mastitis during the cow's lactation and prevalence of pathogens on the farm to determine which cows are at risk of developing mastitis during the dry period.
- B. Culture guided SDCT program – In this instance cultures are done on every cow in the last week before drying off and only cows that have bacterial growth are treated with intramammary antibiotics. Bacterial cultures can be done on each quarter individually or on a combined sample from all four quarters.
- C. Combined SDCT program – A combination of both the above programs.

Selection of farms for SDCT

The following criteria need to apply for a farm to be suitable for SDCT:

1. The average bulk SSC must be under 250,000 cells/ml for the past year.
2. The farm must perform and record individual cow SCC every month.
3. Good records of mastitis cases are a pre-requisite.
4. Clinical and subclinical mastitis cases must be cultured on a regular basis to identify causative organisms.
5. There must be no *Strep. agalactiae* in any quarters.
6. *Staph. aureus* must be non-existent or under control.
7. Attention to details, procedures and hygiene at sampling and dry cow treatment is essential.

Selection of cows for SDCT

A decision needs to be made for each individual cow as to whether she should be treated with antibiotics or not.

1. The cows that comply with all of the following criteria do not need to be treated with antibiotics:
 - a. SCC less than 200,000 cells/ml at dry off.
 - b. The cow must have had no clinical mastitis cases in the last 90 days.
 - c. She must have a **California Milk Test (CMT)** score of 2 or less at dry off (no gel formation).
 - d. If cultures are done on the milk during the last week before dry off, there must be no bacterial growth.
2. Cows that fall within the above criteria will receive teat sealants only and no antibiotic dry cow treatment.
3. Cows that fall outside the above criteria will be treated with intramammary antibiotics and teat sealants.



The following apply for SDCT

1. Teat sealants need to be used with extreme caution. Strict aseptic technique is required when inserting a teat sealant, otherwise bacteria may be introduced into the udder and sealed inside. **Do not use teat sealants unless it is done by very well-trained trustworthy employees.**
2. All cows need to receive a tube of teat sealant in all four quarters at dry off regardless of whether or not they receive dry cow antibiotic treatment.
3. All cows that fall outside the criteria listed above, must receive antibiotic dry cow therapy AND a teat sealant. It's best to err on the side of caution – if not sure whether a cow should have teat seal alone, or teat seal and antibiotic, both should be given.
4. Strict hygiene at dry off is crucial to the success of SDCT.
5. Gloves must be used.
6. The teat ends must be disinfected properly with a cotton ball soaked in spirits before the antibiotic treatment and/or teat sealant is inserted.
7. The correct order of teat disinfection and order of teat sealant insertion must be followed. The teats furthest from the operator must be disinfected first and then the ones closest to the operator. Treatment must be inserted in the teats closest to the operator first and then into the teats furthest away from the operator. This prevents contamination from the handler's arms or sleeves accidentally touching the teat ends.
8. It must be ensured that the teats' skin is smooth and healthy.
9. The dry cow therapy must be administered in a clean environment since preventative antibiotics are not administered to all the cows, so cleanliness is key. A good dry off routine is critical to ensure pathogens are not introduced into the teat canal during the process.
10. Staff must be properly trained in the procedures to be followed and strict compliance must be adhered to. It is best to only select one or two trained and trustworthy staff members to perform all dry cow treatments.

Alternative approaches to SDCT selection

Other approaches to selecting which cows should not receive antibiotic dry cow therapy are:

1. Some farmers opt to not use teat sealants on the cows that are not treated with antibiotics.
2. To only select cows whose SCC has been below 200,000 cells/ml and no more than two cases of mastitis for the entire lactation. Some farmers even stipulate no mastitis during the whole lactation.
3. Another approach is to culture each quarter individually in the week before dry off and only those quarters with bacterial growth receive antibiotic dry cow treatment.
4. A lower SCC threshold for first lactation cows, such as 150,000 cells/mL is sometimes used, and a higher SCC of 250,000 cells/ml is used for primiparous cows.
5. Although a "one size fits all" SCC threshold (e.g. 200,000 cells/ml for all herds) might seem a simple solution, this approach will put many herds, particularly those with a low bulk tank SCC, at risk of treating too many uninfected cows with aDCT, while in herds struggling with a higher bulk tank SCC a golden opportunity to cure many unidentified infected cows during the dry period may be missed, with a resultant increase in bulk tank SCC over time. Indeed, since the bulk tank SCC and pathogen profile of a herd is likely to change over time, there is a need to continually refresh and re-evaluate the thresholds needed to apply targeted aDCT.
6. It is important to note that the lower the cow SCC threshold is set, the more cows will be included for antibiotic treatment. It is better to set the cow SCC selection level low at first until the bulk tank SCC and mastitis improves and then adjust it upwards in consultation with the herd veterinarian.



Other factors to consider.

1. Dry off is an important task that requires care and attention to detail and should be treated as such. Time should be taken to dry off cows and the procedures should not be performed during normal milking time.
2. The dry cow environment can have a significant effect on the infection risk during the dry period. Therefore, attention should be paid to the hygiene in paddocks/areas where the dry cows are kept.
3. First lactation heifers are a good indicator of dry period infection when they calve, since they have no previous mastitis history and have not received any prior dry cow therapy that could influence mastitis or SCC rate after calving. A high incidence of heifers calving with mastitis or a high SCC at first milk recording after calving may point towards poor cleanliness of the dry cow environment.
4. Heifers have different challenges compared to cows over the transition period and they likely experience more stress with moving from the in-calf heifer group to the dry cow group and their introduction to the milking parlour. Stress will suppress the immune system and increase the risk of infection.
5. The criteria to justify aDCT should be a bespoke personalised plan for each dairy farm and should be expected to change over time. Farmers should work closely with their veterinarians to choose which dry cow therapy is most appropriate to their farms and they should regularly review performance and selection criteria based on bulk tank SCC, individual cow SCC, clinical mastitis data and bacterial cultures to identify the main mastitis causing organisms and effective antibiotics on their farms.

Measure it to manage it

It is important to measure some production parameters to assess the success or failure of a SDCT program:

1. Producers using selective dry-cow therapy should closely monitor SCC, particularly during early lactation. They should also assess development of mastitis immediately after dry off and throughout the dry period. As a rule, the number of cows that develop high SCC or mastitis within the first month of lactation must be compared to previous years' figures to determine the success of SDCT.
2. Dry period infection is defined as a SCC under 200,000 at drying off, increasing to over 200,000 at first recording in the next lactation.
3. The target for dry period protection is >90% - defined as a SCC under 200,000 at drying off and still under 200,000 at first recording in the next lactation.
4. The target for dry period cure rate is >80% - defined as a SCC over 200,000 at drying off, decreasing to under 200,000 at first recording in the next lactation.



TABLE 1: An example of how a sliding scale of thresholds for making decisions to use targeted antimicrobial dry cow therapy (aDCT) might be applied

SCC threshold x 1000 cells/ml		
Bulk Tank SCC	Multiparous Cows SCC	First Calf Heifer SCC
<100	250	200
100 - 150	200	150
150 - 200	150	100
200 - 250	100	50
>250	A low threshold could be used (eg, 50) otherwise selective/targeted aDCT may not be appropriate until the bulk tank SCC is reduced	

© Antibiotic dry cow therapy: where next? Andrew Biggs et al, Veterinary Record, 2016 178: pg 93-94