

# TECHNOTE

# 16

## *Dry off abruptly taking steps to reduce yield*

The method used to dry off cows can influence how many udder infections establish during the dry period.

The aim is to shut down milk secretion and seal the teat canal as rapidly as possible; this usually takes about two weeks. Most new infections occur in quarters where the teat canal has not sealed.

### 16.1

#### *Dry off cows as soon as their production reaches 5 L or less per day.*

Cows producing less than 5 L/day (or less than 0.4 kg MS/day) may significantly increase bulk milk SCC even when they do not have mastitis. This is because the same numbers of cells become more concentrated within a reduced volume of milk, and the rate of involution of the udder tissues accelerates as milk volumes drop.

In a study of 94 uninfected identical twin cows approaching dry off (Lacy-Hulbert *et al* 1995), over 60% of animals had a sharp increase in SCC (>50,000 cells/mL per week) during the last month of lactation. Of these animals, over 60% were producing less than 5 L/day during this period.

Furthermore, the quality of milk from low-producing cows at the end of the season can cause processing problems for some dairy products due to changes in milk composition (especially serum protein).

To avoid adverse effects on milk quality, SmartSamm recommends that cows be dried-off if milk yields fall to below 5 L/day (0.4 kg MS/day). This practice may also reduce the likelihood of mastitis infections at the following calving (Natzke *et al* 1975).

Technote 14 describes closure of the teat canal during the dry period.

#### Confidence – High

The consequences of milking cows with low milk yield on milk quality and udder health are well documented.

#### Research priority – Low

# 16.2

## Reduce milk production during dry off.

Dairy advisers need to emphasise the importance of planning for dry off so that farmers can:

1. Implement management changes for high producing cows at least one week before the dry off date, and
2. Organise their grazing rotation such that all cows go to clean paddocks immediately after dry off.

Cows that are producing between 5 and 10 L per day (0.4 to 0.9 kg MS/day) near dry off should tolerate the drying off process, so long as management changes are introduced after the last milking that encourage involution.

Cows producing more than 10 L of milk near dry off will require more active management of their plane of nutrition to reduce milk volumes before dry off. Reducing the plane of nutrition is a more effective tool than switching to once daily milking, for reducing milk volumes and accelerating involution (Holmes *et al* 1996, Lacy-Hulbert *et al* 1999, Tucker *et al* 2009).

Reductions in milk yields by up to 30% can be achieved within a short period.

A study of the behaviour of dairy cattle during dry off (Tucker *et al* 2009) indicated that dry matter intakes (DMI) of 8 kg DM/d, imposed for the last week of lactation and first 14 d of the dry period, reduced milk volumes from 9.3 L/d to between 4 and 6 L/d by dry off, compared with cows eating 16 kg DM/d. This also reduced udder firmness and udder leakage after dry off, and reduced the likelihood of mastitis. However cows on the low DMI were clearly hungrier than their higher DMI herd mates, with 2-3 times more bellowing, both before and after dry off.

Although DMI of 10-12 kg DM/d during the drying off process would result in less hunger, it is not known if it would achieve the same rapid udder involution and reduced risk of mastitis. In this study, cows were not protected with antibiotic DCT; it is likely that treating cows with some form of intramammary protection at dry off will greatly reduce the mastitis risk.

**SmartSAMM recommends** that the dry matter allowance for high-producing cows (producing more than 1.0 kg MS/day) is reduced by 30-50% during the last 1-2 weeks before dry off, to assist the drying off process. These recommendations are consistent with those of NMC in the United States, where it is recommended that supplementary feed, especially concentrates, ceases at least one week before dry off. This requires a balance in the ration to achieve the reduction in milk yield while maintaining sufficient energy for a cow that is 6-8 months pregnant.

As a guide, a 500 kg cow requires about 59 MJ/day of metabolisable energy for maintenance, excluding the energy demands of pregnancy and activity. Her energy requirements increase dramatically in the last two months of pregnancy. The table provides a guide to energy requirements and DMI in the transition from end of lactation through to calving.

To comply with animal welfare codes, water must not be restricted.

Confidence – Moderate

There is widespread field experience with drying off high producing herds in New Zealand, Australia and overseas.

Research priority – Low

**Daily metabolisable energy requirements and recommended daily dry matter intake for a 500 kg cow between dry off and calving. Values derived from DairyNZ Facts and Figures (DairyNZ, 2012a).**

	Days before and after dry off		Weeks before calving	
	7 days before	7 to 14 days after <sup>3</sup>	8	4
<i>Energy Requirements (MJ/day) for:</i>				
Maintenance	59	59	59	59
Pregnancy	13	18	32	54
Milk (0.4 kgMS/day)	40	-	-	-
<b>Total Energy Requirements (MJ/day) =</b>	<b>112</b>	<b>77</b>	<b>91</b>	<b>113</b>
<i>Dry Matter Intake (kg DM/day) for:</i>				
Holding condition <sup>1</sup>	10	8	8.5	10
Adding condition (0.5 score/30 days):				
On Pasture			3.5	
On Supplement <sup>2</sup>			2.5	
<b>Total Dry Matter Eaten (kg DM/day) =</b>	<b>10</b>	<b>8</b>	<b>11 to 12</b>	<b>10</b>

<sup>1</sup> where DM is supplied at 11 MJ/kg DM of feed.

<sup>2</sup> from DairyNZ body condition scoring (DairyNZ, 2012b).

<sup>3</sup> note that the feed restriction after dry off can be lifted after 7 days, once gross swelling of the udders subsides.

## 16.3

### **Dry off abruptly; do not skip days or milkings.**

It is advisable to maintain the same milking frequency up until dry off. Reducing the frequency of milking will increase the bulk milk SCC, particularly for cows with a higher SCC (Holmes *et al* 1996).

Intermittent milking (i.e. milking every other day) should be avoided as this can significantly increase the risk of mastitis (Zecconi *et al* 1995; Lacy-Hulbert and Woolford, 1999).

Confidence – High

It is clear that milking must occur every day prior to dry off to minimize infection.

Research priority – Low

Milking 'once-a-day' has not shown significant impacts, or benefits, on the risk of mastitis after drying off.

## 16.4

### **Put cows in clean areas after giving DCT or ITS.**

It is important to minimise the number of bacteria on teats by thorough manual teat spraying after the last milking, and not allowing cows to lie down on bare ground or areas that are soiled with manure in the two hours immediately after antibiotic dry cow treatment (DCT) or internal teat seal (ITS) is given.

Cows should be put in dry, clean paddocks (not heavily soiled with manure, little bare ground, no exposure to dairy effluent) for 7-14 days after dry off. This is because the numbers of coliform and streptococci bacteria in the environment are important predictors of new infection rates. Outbreaks of

Confidence – High

Experimental results confirm the importance of the defence mechanisms of the teat canal at dry off, and findings are consistent with field observations.

Research priority – Low

infection by *Pseudomonas* bacteria have been recorded in situations where cows lie in wet conditions in the first few days immediately after dry off. These bacteria are usually associated with contaminated water supplies; infections can be severe, often fatal, and virtually impossible to treat.

Although the keratin plug makes the teat canal more resistant to penetration for the first three weeks of the dry period (as measured by water pressure needed to open the canal), O'Brien (1989) reported that the canal is not well closed until four days after dry off and that cows are particularly susceptible to infection during this time. Full closure of teat canals, measured using a manual stripping technique, can take up to 40 days after dry off (Williamson *et al* 1995), despite administration of antibiotic DCT at dry off.

Rapid closure of the teat canal will help prevent new infections (Capuco *et al* 1992, Williamson *et al* 1995). Keeping cows in a clean paddock well away from the milking herd and milking area reduces the possibility of triggering milk ejection and therefore assists plug formation. An additional benefit of keeping cows out of the farm dairy is that there is less chance that cups can be mistakenly attached.

## 16.5

### **Feed 'maintenance' diet for the first 7-14 days after dry off.**

Restricting feeding after dry off helps accelerate the udder involution process. Most cows in modest body condition are only likely to require 'maintenance' diet for up to 7 days before gross involution of the udder occurs, and feed intakes can be increased.

Cows that were producing high milk yields before dry off i.e. over 10 L/day may require a longer period (up to 14 days) on 'maintenance' diet before signs of udder involution become evident i.e. udder swelling subsides.

For cows that have been treated with antibiotic DCT and/or ITS, the requirement to restrict feed to 'maintenance' levels is less essential than for cows receiving no protection. It is possible that such cows can be fed above 'maintenance' during this 7-14 day period.

Confidence – High

Rapid involution of the gland is assisted by a restriction in feed intake.

Research priority – Medium

The optimum feed restriction after dry off for cows that are fully protected with antibiotic DCT and/or ITS has not been confirmed in field studies.

Section 16.3 discusses maintenance requirements and diet changes after dry off.

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## Key papers

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