

## **Drying off that high producing cow—what are the choices?**

*Paola Bacigalupo-Sanguesa*

*Ron Erskine*

The dry period impacts a cow's health and production in the following lactation. During the dry period, the udder "renews" milk-producing tissue and creates a "hostile environment" that favors the elimination of mastitis-causing bacteria. But what is the best way to dry off a cow? The latest USDA- NAHMS study (2016) reported that close to 74% of farms continue to abruptly stop milking cows as a dry-off method. But this approach may be a problem for cows who are producing 85 to 90 pounds of milk at dry-off. What about gradually increasing the milking interval (going from 3x to 2x to 1x)? Or reducing the intake or the content of the ration? What are the consequences of these approaches, as opposed to following the traditional plan, in terms of leaking milk and udder health?

Ideally, cows should have lower milk production at dry off in order to: 1) decrease the risk of leaking milk and pathogens entering the udder, 2) allow the "keratin plug" to seal the teat canal, 3) reduce udder swelling and discomfort, and 4) enhance a more rapid udder involution (rebuilding). A recent review concluded that a daily production of 33 pounds or less at dry-off is recommended to improve udder health (Vilar and Rajala-Schultz, 2020). This is unrealistic in for most dairy operations. Thirty years ago, peak milk production of 90 lb per day was thought to be top flight. Today, entire herds average 90 lb per day, or more. Thus, higher milk production brings new challenges at dry-off.

Some consistent conclusions across numerous trials of drying off cows have been reported. Higher producing cows are 1) less likely to form the 'keratin plug' in the teat canal, 2) more likely to leak milk, and 3) more likely to have new infections over the dry period. This impacts herd productivity because cows with high SCC (subclinical mastitis) at the start of lactation are more likely to have clinical mastitis and will lose an average of 1,600 pounds of milk by 305 days compared to cows that are not infected (Kirkpatrick and Olson, 2015). Thus, producers should have a plan for high producing cows at dry-off.

Animal welfare brings another perspective of drying off high-producing cows. When milking is stopped, the accumulation of milk in the udder causes discomfort and pain, and cows with higher milk production at dry-off may experience this with greater intensity.

Below is a brief review of the methods that may help to decrease milk production at dry-off:

**Nutritional changes:** Restricting or reducing energy of the ration reduces milk yield. However, this can lead to metabolic problems, including impacts on the immune system and hypocalcemia, and may cause hunger and stress in cows. Ration changes must be carefully assessed by the herd veterinarian and nutritionist and should only be short-term. In addition, it is impractical to apply this strategy to small numbers of “special needs” animals as bunk space and grouping is limited in many dairy herds.

**Changes in milking management:** Decreased milking frequency might be the easiest way to reduce milk yield, especially in late lactation cows. For example, decreasing milking frequency from twice to once per day for 5 to 7 days before dry-off will often decrease production. When compared to abruptly stopping milking, this strategy is more effective at reducing milk yield and preventing mastitis. This strategy requires the identification of the cows who are being “trained to dry off”. One solution may be to use Velcro® leg bands of one color, which can be exchanged for another color once dry cow treatment is given. This method could avoid the need for a separate milking group.

Newer technologies, such as milking robots and parlor management-added technologies, represent promising new methods to manage milking frequency. Robots can be programmed to limit the number of milkings per day for specific animals and to remove milking units earlier during milking, for example at a “wetter” setting with higher milk flow. Cow-specific early removal of milking units relative to milk yield has also been achieved in conventional parlors with newly developed software. The software monitors the targeted yields compared to previous yields, and triggers the automatic removal of units. A German study reported that cows that were milked by a “targeted reduced milk yield” had lower milk production at dry off than cows that were milked using the normal take-off settings for the herd (Martin et al., 2020).

Drugs (such as cabergoline) that lower milk production by blocking the production of prolactin, an essential hormone for milk production have also been studied as a way to attain lower milk production at dry off. Although these drugs have been successful at decreasing milk production, their commercialization has not been approved in the US and was stopped in the EU due to reports of severe secondary effects, including down cows and death.

Drying off cows is a critical part of the cow’s lactation cycle and dairy producers should reconsider their protocol for higher producing cows. The herd veterinarian and nutritionist should be consulted to evaluate current dry-off practices and take into account the production level at dry off, udder health in early lactation cows, future lactation performance and animal welfare. This needs to include a review of the dry cow treatment, internal teat sealant (and the proper use of infusion techniques) and the dry-cow environment protocols. Herds that have individual cow SCC are in a position to better know if changes in their dry period program are impacting udder health, particularly by tracking new subclinical mastitis over the dry period and the proportion of fresh cows with subclinical mastitis.

## References

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