Soaring energy prices, unreliable power supply and larger economies of scale all contribute towards a drive for increased mechanisation. However, higher degrees of mechanisation increase the capital requirement of dairy businesses, intensifying the emphasis on performance. Consequently, the dry period should be re-evaluated to establish whether objectives in terms of milk and component yields, the incidence of metabolic disorders, reproduction, culling rate, etc are being achieved.
The dry period

The dry period is a time of drastic nutritional, metabolic and mammary change, all of which profoundly affect the cow’s health and productivity in the following lactation. Dairymen try to achieve dry-off of lactating cows in the ideal condition, limit mammary gland infections, improve the condition of thin cows and prevent fattening. In addition, they want these animals to be in the best possible position in the transition period so that they can handle the challenges of a negative energy balance and still maximise milk yield in the subsequent lactation.

Cows have two transition phases within every dry period. First, the rumen microbial population must migrate from an energy-dense lactation diet to a low-density, high-fibre, far-off diet. This requires 14 to 21 days and usually ends when the rumen microbes must adapt once again to an intermediate-energy, pre-partum diet at approximately three weeks prior to calving.

At the same time, the udder undergoes drastic changes, including the cessation of milk production, which results in the regression of milk secretory tissue, which lasts approximately 25 days. During this period, the udder is highly susceptible to infection, as intramammary pressure builds up in a full udder that is not being evacuated. This causes leakage from quarters allowing bacteria to penetrate the teat canal and cause infections such as mastitis.

Cessation of milk production is followed almost immediately by a period of rapid differentiation of the secretory tissue in preparation of the impending lactation as calving approaches, associated with intense growth and accumulation of fat, protein and colostrum. In addition, more than 60% of foetal growth takes place in the last 60 days prior to calving. Foetal requirements take precedence over the cow’s own requirements for tissue maintenance, highlighting the importance of drying off cows in the required body condition. It is financially sensible to build condition in cows while still lactating, when foetal growth is not that rapid and costs can be offset against milk income.

Historically, a dry period of 60 days was adopted as standard practice and believed to yield the best results in terms of milk production in the following lactation. Today, many cows still produce a considerable amount of milk 60 days prior to calving, representing a real challenge for the dairy producer to transition these cows from relatively high levels of milk production to completely dry within a couple of days, or in some cases even in one sudden action. Increased intramammary pressure and the consequent higher risk of infections resulting in an increased incidence of mastitis in the following lactation is a real threat under these conditions. In this context, a shorter dry period has been proposed as a possible strategy to facilitate easier dry-off by reducing milk yield prior to drying off the cows.
Effects of a reduced dry period on:

1. Milk and component yield
   Conflicting effects of a reduced dry period on milk yield in the subsequent lactation are reported in literature. The consensus appears to be that a reduced dry period does not significantly affect milk yield of multiparous cows, but does limit milk production in the subsequent lactation of first-lactation heifers. When energy-corrected milk yields were compared, differences in the milk production of heifers were negligible. An additional 25 to 30 lactating days represents a substantial additional volume of milk. Generally, butterfat and protein concentrations in late lactation milk are higher, increasing the milk component yield for cows subjected to shorter dry periods. For producers whose milk prices are determined by milk components, implementing a shorter dry period may be very useful. Literature suggests that reduced dry periods have no effect on milk fat concentration, but may increase milk protein concentration in the lactation following the shorter dry period. The ideal dry period should be the one that yields maximum milk and components in consecutive lactations, without affecting cow health, reproduction, calf mortality and production.

2. Mammary gland health
   A dry period is essential to renew damaged mammary epithelial cells. This process is completed after approximately 25 days. High intramammary pressure in the first few days after dry-off considerably increases the risk of mammary gland infections, especially for high-production cows. Research indicates a significantly increased risk for intramammary infections at calving for every 5 kg increase in milk yield above 12.5 kg at dry-off. Shorter dry periods can reduce milk production at dry-off as the cow is kept in milk for some 30 additional days.

3. Health
   Metabolic adaptation following a diet change can take several weeks. A shorter dry period does not allow sufficient time for the renewal of damaged mammary epithelial cells. The duration of the dry period that delivers the highest energy-corrected milk production.

“"For those producers whose milk prices are determined by milk components, implementing a shorter dry period may be very useful.""
use of a far-off dry diet, resulting in cows only receiving the close-up, moderate-energy diet. Some researchers argue that fewer ration changes will result in improved nutrient utilisation. Although not consistent throughout all the studies, this hypothesis was supported by reports of improved feed intake during the dry period, as well as in early lactation when cows received only one diet during the dry period.

4. Reproduction
Results of a reduced dry period on reproductive performance are inconclusive, but significant positive results have been observed. In a study involving 781 cows, shortening the dry period from 56 to 34 days decreased the number of days to first ovulation by eight days, the cows not ovulating by 70 days in milk by 50%, and the number of days open for multiparous cows by 20 days. It must also be acknowledged that other studies have found non-significant or no effect on cow reproduction.

5. Longevity
Information on the effect of dry-period length on cow culling rate and longevity appears to be limited. However, the anticipated positive effects of a shorter, well-managed dry period on energy balance can be expected to reduce culling rate, especially for older cows that are at greater risk of metabolic disorders associated with a negative energy balance. Indeed, multiparous cows subjected to a 35-day dry period instead of a 60-day dry period had a culling rate of 31.6% vs 42.6%.

6. Calves and colostrum
Good-quality colostrum is defined as sufficient volumes of colostrum containing high enough concentrations of immunoglobulins (IgG) to ensure proper transfer of immunity to the calf. Few studies have looked at the effect of a reduced dry period on colostrum yield, but one study indicated a reduced colostrum production at first milking from 8.9 to 6.8 kg. Based on recommendations by the NRC (2001), the lower colostrum yield was still sufficient for proper immunity transfer to the calf. The quality of colostrum measured by IgG concentration was not affected by dry-period length when a minimal dry period was maintained. However, when the dry period was completely omitted, IgG concentrations decreased by as much as 40%. This strategy is not recommended!

CONCLUSION
Getting dry-period management just right is indeed a challenge. In a study involving 850 cows, a dry period of less than 28 days affected energy-corrected milk production in the following lactation and was associated with higher culling and mortality rates. Dry periods of more than 29 days, but less than 43 days yielded the highest energy-corrected milk production. Internationally, several high-production dairy herds have implemented reduced dry periods with great success. This should serve as justification to investigate a shorter dry period in many elite dairy herds in South Africa where cows are dried off when milk production is still reasonably high.

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