

Reproductive success may be sweeter than you think

Sydney Moore for *Progressive Dairy*

AT A GLANCE

Sugar supplementation in the dry period can reduce the severity of negative energy balance after calving, thus improving a cow's ability to breed back.

The reproductive health of dairy cows is one of the most important factors influencing dairy herd efficiency. As we continue to genetically select our cows to produce higher quantities of milk, research has shown that we are inadvertently decreasing cow fertility as we prolong the calving interval to maintain this high production. Poor fertility and reproductive performance directly impact herd milk yield and can jeopardize future lactations. While there have been many advancements in the dairy industry in terms of sensory technology to detect and monitor estrous behaviours, we sometimes forget reproductive success can be influenced even before estrus begins. How we feed cows across their transition period has the potential to impact reproductive success. Therefore, investing in ways to support and improve reproductive health early

on is crucial for the success and longevity of your dairy herd.

Reproductive risks across the transition period

The risks on reproductive health begin in the dry period, as improper nutritional management can have severe negative consequences. When dry cows are overfed, or fed diets with higher energy levels, overconditioning may occur. Overconditioned dry cows (BCS greater than 3.5) are more likely to experience difficulties at calving, also known as dystocia. Dystocia not only impacts the health of the dam but the calf as well by increasing the risk of respiratory and digestive disorders. Additionally, research in 2011 from the faculty of veterinary medicine at the University of Montreal determined that of all the problems to occur in the dry period, dystocia has the greatest impact on future fertility

due to the increased risks of retained placentas and metritis.

Body condition during the dry period also has a major influence on postpartum metabolic health. While overconditioned dry cows are at risk for severe negative energy balance, due to the high amounts of body fat mobilized following the onset of lactation, underconditioned dry cows (less than 3.0) are at risk as well, as they may not have enough protein and energy reserves to support milk production. The length and severity of negative energy balance is associated with increased concentrations of growth hormones and decreased concentrations of insulin and insulin-like growth factor (IGF), directly impacting follicle development and capability. Severe negative energy balance is also known to impact and delay cyclicity, reduce estrous expression, increase incidence of ovarian cysts and reduce the odds of pregnancy at the first artificial insemination. All these factors not only impact the current lactation but the success of future lactations as well. The consequences of negative energy balance and ketosis on reproductive health are detrimental. While negative energy balance

is inevitable, we can implement nutritional strategies to control the severity and duration of negative energy balance cows will experience by stimulating the highest dry matter intake (DMI) possible while creating a positive rumen environment.

Nutritional management to optimize reproductive health

The investment for better, sustainable reproductive health begins in the dry period, with strategic dry cow nutritional management. Copious studies have proven the benefits of feeding a controlled energy dry diet on maintaining body condition score (BCS), avoiding overconditioning and improving metabolic health in the fresh period. These diets are designed to feed the cow with enough energy to maintain her bodyweight and meet the nutritional demands to support both the cow and her growing fetus.

Studies from the University of Guelph have gone further to demonstrate the importance of smaller chop length and a liquid molasses blend dry cow product (Promix Dry Cow) in controlled



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energy dry cow diets. That research found that a 1-inch chop length and supplementation of the liquid molasses blend product encouraged DMI, reduced feed sorting behaviours and improved rumen and metabolic health across the transition period. While reproductive performance was not directly evaluated in these studies, the positive results found with respect to metabolic health indirectly suggest positive benefits for reproductive health as well.

The impact of sugar supplementation on reproductive health has been further investigated by multiple research facilities. Research from the University of Missouri concluded that optimizing nutrition in the dry period was the most effective way to maintain adequate glucose supply and support postpartum reproductive health. Glucose is a simple sugar, obtained through dietary sources like liquid molasses, and is also synthesized in the liver through gluconeogenesis. Glucose controls circulating levels of insulin and sequentially non-esterified fatty acids (NEFA) and beta-hydroxybutyrate (BHB), directly impacting metabolic health. Researchers from the University of Missouri found that by increasing circulating blood glucose across the transition period, through external sugar supplementation, immune function improved and less time was required to first ovulation.

Additionally, research from the University of Florida found that feeding diets to encourage higher energy intake in early lactation had positive effects on reproductive health, including enhanced luteal function and improved fertility. Studies from the University of Alberta focused on the benefits of sugar supplementation to dairy



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cattle and determined that sugar is an excellent, rapidly available source of energy, with reduced risks of subacute ruminal acidosis, compared to feeding high-starch feeds/grains.

Researchers from the University of Guelph investigated the effect of liquid molasses supplementation to fresh cows, as opposed to increased concentrate allowance in automated milking systems. Those researchers found that additional energy supplementation from the liquid molasses blend product (Robolick) allowed cows to maintain BCS across early lactation and reduced the reoccurrence of metabolic illnesses. Thus, sugar supplementation in early lactation could be extremely beneficial to reduce the severity of negative energy balance and bridge the inevitable energy gap seen during this period.

Sugar supplementation is beneficial for metabolic health and, subsequently, reproductive health as well. Therefore, investing in sugar supplementation for your dry cows and fresh cows may be the key to maintaining DMI and BCS, and supporting immune and metabolic health, increasing your herd's odds at reproductive success early on. ↗

Sydney Moore is a Ph.D. student at the University of British Columbia. She provided the article on behalf of Liquid Feeds Inc.

References omitted but are available upon request.



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TAKE-HOME MESSAGES

- 1** Reproductive health issues are one of the biggest threats to your herd's success and longevity.
- 2** Reproductive success starts in the dry period with good nutritional management.
- 3** Supplementing sugar encourages dry matter intake (DMI), improves immune and metabolic functions and supports energy demands needed for milk production safely and effectively.
- 4** Feeding liquid molasses blends to your dry and fresh cows can increase their chance of a successful current and future lactation.