Moderate Energy Diets and Forage Options for Dry Cows

by Noah Litherland, University of Minnesota

Take Home Messages

- Dairy producers must procure forages with dry cow nutrient requirements in mind.
- Optimal forage combinations should be moderate in energy density, avoid mineral imbalances, and be free of anti-nutritional factors.
- Moderate energy diets for dry cows may improve postpartum cow health.
- Feeding management of dry cow diets is critically important to the success of the dry cow program.

Introduction

Research focusing on dry cow nutrition and management has intensified over the past 10 years. It is generally accepted that nutritional management in the dry period affects metabolic status in the subsequent lactation. Feeding strategies that avoid excess consumption of energy during the dry period will likely optimize success in fresh cows.

Nutritionists are challenged with packaging diets that can be consumed at an ad libitum rate without greatly exceeding energy requirements. This challenge is further compounded by today's dairy cow's intense drive for feed intake. Moderate energy diets fed during the dry period show promise in reducing postpartum metabolic disorders such as ketosis, fatty liver and displaced abomasum. These moderate energy diets contain low energy forages, such as wheat straw, to dilute dietary energy density and prevent overconsumption of energy. Optimal forages for dry cows should be modest in energy density, high in quality, and have an appropriate mineral profile.

Forage options may include wheat, oat, or barley straw, corn silage, alfalfa, grass hay, corn stalks, and soybean stubble hay. Agronomic practices such as harvesting at a mature stage and varying fertilizer application rates are important aspects of production of dry cow forages. Adequate processing, inclusion into a TMR, and feeding strategy may be as important as the type of forage being fed.

Do bulky forages offer advantages in modifying feeding behavior? Bulky forages requiring greater eating and rumination time may help cows become accustomed to dedicating more time to feeding. This behavior, if maintained, may improve postpartum intake and be one less adaptation a cow must make. Rumen stretch and fill may also be advantageous in dry cows fed diets containing bulky forages throughout the dry period.

Importance of moderate potassium forages. Forage potassium concentration is dependent upon forage species, maturity, soil type, and fertilization. Most dairy producers recognize the importance of selecting forages that are low in potassium for dry cows to moderate dietary cation-anion difference (DCAD) and prevent milk fever. Milk fever, or hypocalcemia, is associated with reduced DMI and milk production and increased risk for displaced abomasum, delayed closing of the teat sphincter, compromised immune function, retained placenta, and metritis.

Potential Dry Cow Forage Options

Small grain straw. Wheat straw appears to be the gold standard to dilute the energy density of dry cow diets.

Advantages: Low energy density, slow rate of passage, excellent bulk, palatable, low potassium and calcium; may help reduce moisture in TMRs containing numerous wet ingredients; readily available in most areas; consistent nutrient profile; has received the most interest from researchers.

Disadvantages: Must be adequately processed to prevent sorting; oat and barley straw can work well to dilute dietary energy density, although both are less readily available and nutrient composition appears to be more variable; oat straw does not chop as readily as wheat straw, is higher in potassium, and has a slightly greater rate of in vitro digestibility; barley straw appears to be quite similar to wheat straw, but is less available in most areas.

Corn silage. Moderate starch corn silage works well in combination with wheat straw to form a moderate energy, moderate potassium, combination that is palatable. Varieties of corn silage that are modest in starch content and identified as less optimal varieties for lactating cows may serve well in dry cow diets.

Advantages: Low protein potassium and calcium; highly palatable; adds moisture to the TMR; low cost ingredient.

Disadvantages: May contribute excessive starch and energy; low bulk; sortable ingredient; poor fermentation; low quality corn silage is disruptive to rumen fermentation, total tract digestion, and may compromise immune function.

Cool season grass hay. Grass hay is readily available in most areas and has agronomic advantages for manure application. Cool season grasses including timothy, orchardgrass, reed canarygrass, smooth bromegrass, and tall fescue may work well in dry cow diets.

Advantages: Readily available in the Midwest; low cost; moderate protein and energy content; low calcium; high fill factor; palatable.

Disadvantages: Wide variability in nutrient composition depending on variety, maturity at harvest, and harvesting technique; tends to be higher in potassium; more difficult to process; higher energy and protein compared to straw; variability in mineral content may limit inclusion rates in diets; high levels of potassium are associated with higher dietary cation-anion difference placing periparturient cows at risk for milk fever.

Corn stalks. Corn stalks are one of the most readily available and perhaps underutilized forage sources in the Upper Midwest.

Advantages: Similar to wheat straw nutrient composition; low starch and sugar content; high fiber; low potassium and calcium; excellent bulk; palatable if finely processed.

Disadvantages: High ash content; difficult to process to appropriate particle size to prevent sorting; may contain mold depending upon harvest and storage conditions; moisture accumulation in bales with spring thaw and risk of mold growth may preclude use in dry cow diets in spring and summer months; tend to have high ash values which may reduce intake and digestibility.

Summary

Important components of a successful dry cow nutrition program include factors such as diet consistency and physical form (meeting but not greatly exceeding nutrient requirements – especially energy), avoiding mineral imbalance, and minimizing impact of anti-nutritional factors. Forage combinations that match dry cow nutrient requirements are becoming increasingly important on dairy farms focused on reducing fresh cow health challenges.