Prime Scholars Library

Advances in Animal Science, Theriogenology, Genetics and Breeding

Editorial

Vol. 9 (4), pp.03-04, December, 2021

Available online at
https://primescholarslibrary.org/

Dietary intake of nutrients in dairy farming

Randy Barrientos*

Department of Agriculture and Environment, Harper Adams University, Shropshire, TF10 8NB, United Kingdom.

BACKGROUND

Almost all practical livestock conditions, dairy cows and growing dairy heifers are bred. Therefore, voluntary feed intake is the greatest limitation of dairy cows' nutritional supply. Feed intake is commonly referred to as Dry Matter Intake (DMI) to compare feeds with different water concentrations. DMI is affected by both animal and feed factors. Body size, milk yield, lactation or pregnancies are the most important animal factors. At peak DMI, the daily DMI of high-performance cattle is 5% of body weight, which can be even higher in very high-performance cattle. More common peak DMI values range from 3.5% to 4% of body weight. In adult cows, DMI as a percentage of body weight is lowest during non-lactation or dry lactation.

In most cows, DMI drops to a minimum in the last 2-3 weeks of gestation. Food intake during this period has important implications for postpartum health. This is due to the low DMI and negative prenatal energy balance, which increases the risk of postpartum illness. After the calf, DMI increases with increasing milk yield. However, the rate of increase in feed consumption is such that energy intake lags behind energy requirements in the first few weeks of lactation. Milk yield and associated energy requirements usually peak 6-10 weeks after the start of lactation, while DMI usually does not peak until 12-14 weeks after the start of lactation. This delay in DMI with respect to energy demand leads to a period of negative energy balance in the early stages of lactation. Cows during this period are at higher risk of metabolic disease than at other times during lactation. Management and nutrition strategies should be designed to maximize DMI in late pregnancy and early lactation.

The energy requirements of lactating cows are mainly covered by the carbohydrate fraction in the diet. These are composed of fibrous and non-fibrous carbohydrates. Fibrous carbohydrate content is commonly measured as NDF and expressed as a percentage of dry matter. The percentage of fiber-free carbohydrates (NFC) is calculated by subtracting the percentage of NDF, crude protein, fat, and ash (as dry matter) from 100%. Dietary fiber-free carbohydrates are mainly composed of sugar and fructans, starch, organic acids and pectin. In fermented feeds, fermentation acids also contribute to the NFC fraction. The sum of sugars and starch is referred to as Non Structural Carbohydrate (NSC), which should not be confused with NFC. Balancing fiber and NFC fractions to optimize energy intake and rumen health is a challenging aspect of dairy nutrition.

In general, dietary fiber supports lumen health. Lumen fiber, especially fiber from dietary fiber that is not finely chopped or crushed, maintains the swelling of the rumen and stimulates motility, rumination, and salivation. These effects have beneficial effects on the lumen environment by stimulating the endogenous production of saliva buffer and the movement of high fluids through the lumen. Saliva buffer keeps the lumen pH in the desired range, and high liquid flow increases microbial energy efficiency and protein yield. However, dietary fiber provides less dietary energy than NFC. Dietary fiber is generally less fermentable in lumens than NFC, and rumen fermentation is the main mechanism by which energy is supplied to both animals and rumen microorganisms. Therefore, a diet high in NDF promotes lumen health, but has relatively less energy than a diet high in NFC. Macrominerals required for a dairy cow's diet include sodium, potassium, chloride, magnesium and sulphur. Of these, sodium usually needs to be supplemented as sodium chloride or table salt.

Inadequate dietary sodium leads to reduced feed intake, which in turn reduces animal performance. Signs of severe salt deficiency include licking and chewing fences and other surroundings, drinking urine, and generally inadequate frugality. Milk production decreases within 1-2 weeks after removing excess salt from the lactating cow's feed. It is not a good practice to completely refrain from salt from bovine dry feed to prevent calf edema. The maintenance sodium requirement for non-lactating cows is estimated to be 1.5 g/100 kg body weight/day, and the pregnancy requirement is estimated to be an additional 1.4 g / day after 190 days of gestation. For large dog dairy cows, this requires 9-10 g/day of sodium. Unsupplemented dry cow feed rarely provides more than 3 g of sodium per day. Therefore, it is important to supplement dry cattle feed daily with at least 6-7 g of sodium (15-16 g of salt) per day. Heat stress requires additional salt. Dry cows need to be added in the required amount of salt, but excessive salt is not required and can contribute to calf edema.