Nutrition and Milk Protein %

Technical Note N08

Feeding for higher milk protein %

Improvements in diet composition offer the quickest and sometimes the largest potential for lifting milk protein %. Milk protein % is a particularly important issue in Australia's subtropical and tropical regions, where milk protein tends to decline in the spring and summer months. Refer to the Protein Plu$ checkbook for more details. Important nutritional factors to consider are:

Feed intake

Refer to Technical Note N03: Feed intake and Technical Note N04: Factors affecting feed intake

Maximising daily feed intake has a major impact on milk protein %, allowing more energy and protein to be available for milk yield and components.

Aim for a daily dry matter (DM) intake of at least 3% of body weight. High-producing cows can eat more than 4% of their body weight. Refer to Technical Note N03: Feed intake for ways to calculate/estimate feed intake.

Neutral detergent fibre (NDF) content of the diet is a major limitation to DM intake.

Cows that are not leaving any feed in troughs or paddocks are hungry, and are not eating to their potential intake.

Insufficient energy intake is the most common dietary factor causing low milk protein % and yield.

Energy is required to produce rumen microbial protein, which in turn becomes an important source of protein for milk protein production.

Most energy for the rumen microbes is sourced from starch, sugar and fibre in the cow's diet.

Starch

Refer to Technical Note N05: Important nutrients and Technical Note N06: Balancing the diet

Increasing starch content of the diet is an effective way to increase milk protein %.

Aim for 22–25% starch in the diet.

Starch sources are degraded by rumen microbes at varying rates (15–80% per hour). Rapidly degraded starch can quickly provide readily available energy; however, starch overloading can cause the rapid production of lactic acid in the rumen leading to ruminal acidosis.

Starch sources include cereal grains; pulses (chickpeas and mung beans); cereal silage (including corn, barley, sorghum and wheat silage); vegetable waste (including potatoes, peas and beans); bread and bakery waste.

Processing changes the speed and extent of starch digestion by rumen microbes. The more highly processed the grain, the faster starch is broken down. Steam flaking and hammer milling increase rumen degradability of starch, more than dry rolling and cracking of grain.

Sugar

Both an excess of sugar (e.g. high levels of molasses) and low levels of sugar in the diet can lead to low milk protein %. Too much sugar can cause rumen pH to drop (acidosis).

Aim for 3–6% sugars in diet (up to 10% is OK on mature tropical grass/molasses diets).

Temperate and lush tropical grasses are a good source of sugars; their sugar reserves increase throughout the day and peak in the late afternoon. Other sources include molasses (photo below), citrus pulp and other fruit byproducts.

Sugar is rapidly digested (within ¼ to ½ an hour) by rumen microbes.

Sugar has proved less effective than starches at increasing milk protein %.

Dietary protein

Generally, dietary protein is not the main limiting factor for milk protein %. Potential situations where dietary protein could limit milk protein % include diets of mature, low-protein tropical grasses fed with energy but no protein supplements, or on silage/hay diets where forage is grown in nitrogen-deficient soils.

A good indicator of low dietary crude protein is where a cow's body condition increases, often accompanied by lower milk yield, milk protein % and milk protein yield.

Aim for 13–16% crude protein (CP) in the diet, depending on production and stage of lactation.

For optimal microbial production, available protein in the rumen must balance available energy. Rapidly available protein sources include lush pasture, legume grains, protein meals and urea.

For high-production cows (greater than 30 L/cow/day), diets should also be balanced for amino acids particularly lysine and methionine for optimum milk protein %. Good quality protein meals, such as soybean and canola meal, also offer some bypass protein which are required in these diets.

Dietary fat

High levels of fat in the diet (>5–6%) can affect rumen health and potentially reduce milk protein %.

Fat sources from feeds such as whole cottonseed have less impact on rumen health as they are slowly broken down in the rumen.

For average feed composition of major feed types, refer to feed tables in the Protein Plu$ checkbook or to the Feed Plu$ feed analysis database available from www.dairyinfo.biz

Further information

Contact the DAFF Customer Service Centre by
Phone 13 25 23, or
Email callweb@daff.qld.gov.au

More technical notes can be found at:
www.dairyinfo.biz

Protein Plu$ checkbook (Published 2006 by DPI&F Qld)

Feed Plu$ CD v4.0 (Published 2008 by DPI&F Qld)

Condition magician booklet (Published 2003 by DPI Vic)

The project is funded and supported by the Department of Agriculture, Fisheries and Forestry and Dairy Australia.

Dairy IN ACTION | Nutrition PLUS | Subtropical Dairy | Dairy Australia Your Levy at Work | Queensland Government