KENPAL FARM PRODUCTS INC

# Dairy Briefs

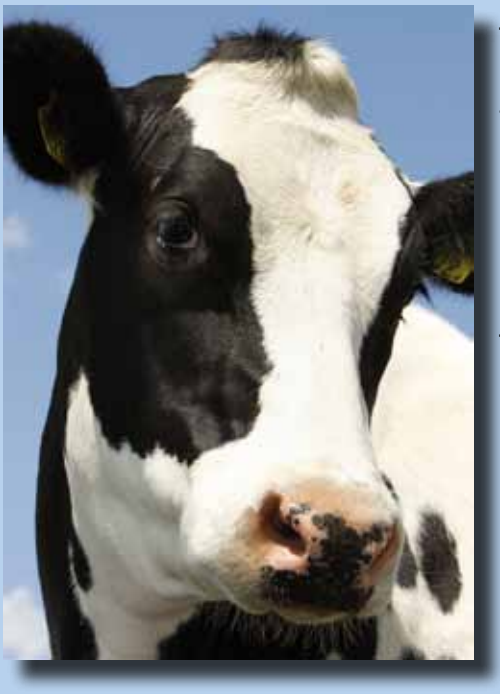
## The Latest Information on Dairy Cattle Nutrition

## Cutting Protein Cuts into Profits

**Laura Martin, M.Sc**

Protein costs are reaching all-time highs this year. Soybean meal is leading the pack and pulling other protein products along with it. With the cost of soybean meal approaching $700/tonne cutting back on the protein in the ration to save costs is a popular trend. Dairy cows need protein to produce milk and reducing protein levels too much can reduce milk yields and cut into profits.

High protein costs and nutrient management regulations have caused dairy producers to lower their dietary crude protein over the last decade. Over-feeding protein, when it was cheap, was often used to ensure the cows had enough protein to maximize milk production. A Wisconsin survey showed an average protein level of 19% in 1998, however very few dairy producers feed this high level today. In reducing protein costs and nitrogen emissions have we reached a point where we have gone too far?



To produce milk, especially the litres expected from Ontario dairy cows, feeding supplemental dietary protein is needed. Dietary crude protein for dairy cows has two main classifications. Rumen degradable protein (RDP) is protein that is available for the rumen microbes to break down into ammonia. The microbes then use this along with other nutrients in the rumen to form microbial protein. This microbial protein supplies an amino acid profile that is ideal for milk production and can supply over 60% of the total protein reaching the small intestine. However, if cows only use RDP, and therefore microbial protein, as their sole protein source, this can only support 12 L/d of milk production; anything over this production level requires rumen undegradable protein (RUP).

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Volume 7, Issue 7
June 2014

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RUP, or bypass protein, is not broken down by microbes in the rumen, but is instead broken down in the abomasum and intestine, and directly supplies the cow with amino acids. Early lactation cows especially require RUP as the microbes in the rumen cannot make enough microbial protein to meet the extra needs of the fresh cow. It is recommended that 35 - 40% of the crude protein in the diet be from RUP to maximize milk production.

Milk production isn't all about total crude protein; the protein profile itself can have a big impact on milk production. Cows receiving lush pasture, or rich alfalfa haylage, may not require much supplemental protein "on paper", however these cows will respond with an increase in milk production if supplemental RUP is supplied. Protein in forages is highly degradable and even if the haylage coming off the field is like rocket fuel, supplementing cows with RUP sources, like heat-treated SBM, distiller's grains, brewer's grains, and fish meal, can boost milk production.

Research from the University of Wisconsin showed quite clearly the effect of protein level and protein source on milk production. They fed diets with different levels of protein and different levels of bypass protein to cows in early lactation. They saw an increase in milk production with the increase in protein and also with the increase in RUP (Table 1), demonstrating that protein source is important as well as level of protein.

With the high price of protein though is this extra performance worth the extra supplementation cost? An Irish study, also looking at the effect of protein on milk production, had the same question. They looked at how 3 very different levels of protein affected early lactation performance (Table 2). Diets with the same level of protein as the trial were run through a Return over Feed Cost (ROFC) program with current commodity prices. Using the improvement in performance observed in the trial, even with the current high cost of protein supplementation there is still a significant return for feeding higher protein levels.

Since their research clearly showed that lower protein diets in the first 150 days of lactation didn't pay, the Irish researchers next looked at reducing protein later in lactation. They took half the animals on the high protein treatment and switched them to the medium protein level, while leaving the remaining half on the high protein diet. There was no negative effect from decreasing the protein on milk production for the remainder of the lactation. Nutrient requirements of cows decrease as lactation progresses and protein levels can be reduced if facilities allow for the feeding of two separate groups. This is where producers can save some money on the protein bill. The lower feed cost for the remainder of lactation can save over $100/cow.

With incentive days just around the corner try feeding a little bit more protein and see if the cows give more milk. Protein costs are high but extra litres of milk should offset these high prices. If you are looking to cut down on protein costs try feeding a low production group with less protein to save some money.



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**Table 1: Effect of Protein Level and Protein Source on Milk Production**

| Treatment | DM intake (kg/d) | Milk Yield (kg/d) |
|---|---|---|
| 17.0% Protein (high RUP) | 22.7 | 38.8 |
| 18.0% Protein (high RUP) | 24.4 | 40.6 |
| 17.6% Protein (high RUP) | 21.1 | 37.4 |
| 18.7% Protein (high RUP) | 23.6 | 38.6 |

Adapted from: Flis and Wattiaux. 2005. Effects of parity and supply of rumen-degraded and undegraded protein on production and nitrogen balance in Holsteins. J. Dairy Sci 88: 2096-2106.

**Table 2: Effects of Protein Level on Milk Production and Economics**

| Treatment | DMI (kg/d) | Milk Yield (kg/d) | ROFC |
|---|---|---|---|
| Low Protein (11.5%) | 16.5 | 24.7 | $14.43 |
| Medium Protein (14.5%) | 18.0 | 30.9 | $17.79 |
| High Protein (17.5%) | 18.6 | 34.4 | $19.73 |

Adapted from: Law, RA., Young, FJ., Patterson, DC., Kilpatrick, DJ., Wylie, ARG., and Mayne, CS. 2009. Effect of dietary protein content on animal production and blood metabolites of dairy cows during lactation. J. Dairy Sci. 92: 1001-1012.

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