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Bypass Protein for the Dry and Transition Periods

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Introduction

The benefits of feeding a diet containing a digestible undegraded protein (DUP), such as SoyPass during the lactation period of a ruminant are well proven and documented. The greatest increase in milk yield of the cow occurs postpartum (after calving) tailing off towards the end of lactation. This as expected coincides with where the greatest benefit from feeding a bypass protein can be achieved. However,

dairy farms are a business and the profitability of the farm depends on the management of the cow's nutrition towards the end of lactation and prior to the next parturition (calving) in order to maximise milk production during the following lactation, this period is termed the 'dry' and 'transition' period. The main aim of dry cow feeding is to maintain body condition by ensuring a sufficient energy intake of 9-10 MJ ME/Kg DM.

Definition

The dry period is divided into the 'far-off dry period' 60 to 14 days, prior to parturition and the 'close-up dry period' or 'Transition period' of 14 days prior to parturition, although some state that the transition period is 21 days prior to parturition and 21 days after parturition and the far-off dry period from 60 to 21 days prior to parturition. Fresh cow period is considered to be 14 days after parturition.

Far-off Dry Period

The far-off dry period for a cow is a critical phase of the lactation cycle where it is normal to focus on dry matter intake and providing a high fibre diet. During this critical period good nutritional management can increase milk yield in the following lactation and minimise metabolic problems around calving such as Ketosis (acetoaemia/fatty liver), or Hypocalcaemia (Milk Fever).

The feeding program for dry cows is different from that of lactating cows and therefore it is advisable to group dry cows in order that they may receive the appropriate ration. This ration will be formulated to meet the specific requirements of body maintenance, fetal growth, rejuvenation of the rumen wall, provision of needed minerals and vitamins as well as replacing body weight lost during mid to late lactation.

Dry matter intake is expected to be in the order of 2% of their body weight. The NRC (2001) estimates metabolizable protein (MP) requirements based on days pregnant and calf birth weight. The NCR (2001) predicts that a 730 kg cow at 240 days pregnant will consume 14.4 kg of dry matter per day and require 871 grams

of MP per day. This equates to 6% MP in the diet or 9.9% crude protein (CP) if the diet is perfectly balanced for the protein fractions. It is noted that NRC (2001) recommends that a 12% CP diet may be required to meet the needs of the cow due to protein wastage.

Underfeeding protein during the dry period may deplete the cow's protein reserves lowering the body condition score. This may reduce the cow's milk production, reproductive performance, and healthiness during the next lactation. In one study, increasing dietary CP from 9 to 13% in heifer diets from 70 to 0 days before calving, increased first-lactation milk yield from 10,807 kg to 11,720 kg. Many farmers not realizing the importance of good nutrition during this period provide a poor quality high fibre diet or poor pasture and do not supplement any protein, so the total dietary CP ends up at around 8-10%. The use of digestible undegraded protein to supplement the feed during this period should not be necessary. However a benefit can be derived where cows are losing a significant level of body condition. Ideally a body condition score of between 2.5 and 3 should be maintained throughout the pregnancy.



Transition Period

It is important during this 14/21 day period prior to parturition, also known as the close-up dry period, to gradually adapt the dry cow to the ration which is to be fed during the most productive milking period of the cow and to minimise health and fertility problems. This is achieved by a gradual change in the diet until parturition when the milking diet is introduced. The provision of good DUP sources such as SoyPass during the transition period ensures amino acid supply for calf growth, the production of colostrums and the required supply of protein for the major physiological changes taking place in the cow during the transition period. The addition of high quality DUP prior to parturition has also been shown to boost milk yield and milk protein as well as bringing forward fertility cycling.

During this critical period attention should be drawn to various aspects of the diet to ensure good rumen function. For the purpose of this article the focus is on the protein requirements of the diet. The use of bypass protein in the dry period is contentious; nevertheless, in an article by Mary Beth de Ondarza – ‘Dry cow and transition cow nutrition’ we are informed that Cornell researchers have experimented by increasing the protein content of first-calf heifer transition diets from 12 to 15% using a bypass protein such as SoyPass. Their goal was to meet the DIP needs of the rumen microbes and maximize microbial protein production and then to supply extra bypass amino acids to meet the rest of the cow’s needs. The resultant effect was to increase milk protein percentage postpartum and a tendency to decrease services per conception. Another benefit from

the experiment was to reduce the loss of body condition following parturition, which may indicate a lesser incidence of ketosis.

Pregnancy is a stressful time for the cow with protein required for calf muscle growth as well as to be burned by the cow for energy. Without adequate dietary protein before parturition, the cow may have less protein reserves to use postpartum, which may negatively impact milk protein production. The NRC (2001) recommends only 12% CP in the transition diet. However, the Mary Beth de Ondarza article informs us that researchers disagree on whether or not that is adequate. Some of the research trials showing no response to extra protein fed relatively high levels of degradable protein rather than undegradable protein. Degradable protein may have been wasted and the extra nitrogen load may have adversely affected these cows. A Cornell field trial indicated that feeding more than 12% CP during the transition period decreased the risk of retained placenta and

ketosis. It would appear that experience with many commercial herds also supports the feeding of higher levels of protein. As a result of the Cornell study previously discussed and experience from commercial farms, many nutritionists recommend that the transition diet contain 14-15% CP with about 30% of that protein being in the form of soluble protein, 60% in the form of degradable protein, and 40% as undegradable protein. The inclusion of some processed soya protein products such as SoyPass is recommended to improve the amino acid quality of the undegradable protein, the extra protein being especially important for first-calf heifers.

The use of an undegraded protein such as SoyPass is also supported in the article 'Managing the transition cow' by Mike Hutjens, Extension Dairy Specialist who informs of the Illinois Livestock Trail by the UNIVERSITY OF ILLINOIS EXTENSION, in which they recommend increasing crude protein in the transition phase to 15-16% using undegraded intake protein (UIP) sources.

Recommended Feeding

It is recommended that the use of rumen bypass proteins such as SoyPass and AmiPro during the dry and transition periods should not exceed 0.75 Kg/cow/day.

References

Varga G. A. 2003. Do We Need Two Close Up Dry Cow Groups? Advances in Dairy Technology (2003) Volume 15, page 331

National Research Council. 2001. Nutrient Requirements of Dairy Cattle: Seventh Revised Edition, 2001. Washington, DC: The National Academies Press.

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