Winter 2012

Out of the Bag

COMPLETE FEED SOLUTIONS

Our News

It's been a particularly wet calving season as those of you in the dairy industry will be well aware. The cold, wet conditions in which most cows are calving will increase the susceptibility of calves to bacterial, viral and protozal infections. Under such conditions, it's even more important that calves receive sufficient amounts of good quality colostrum. The wet conditions favour the survival of coccidia, meaning increased risk for intensively housed calves and the inclusion of a coccidiostat in feed is essential.

Calf rearers in the South Island have been using Stalosan, a dry disinfectant, to help dry out damp calf sheds and improve the overall environment for calves, with good reports to date.

The rapidly increasing cost of protein sources, such as meat and bone meal and soya bean meal, are forcing home millers and feed millers alike to investigate alternative protein sources. In this issue, we look at the crude protein requirement of laying hens - is there an opportunity for you to reduce total dietary crude protein and potentially reduce overall diet cost?

I was recently sent a link to a YouTube clip produced by the University of Georgia, which features Professor Nick Dale and is a great summary of why animal production industries are so important. The clip deals with poultry production but the concepts discussed apply equally to pigs and to the dairy industry where increasing amounts of by-products are being used as feeds. Visit the General Articles section of our website to have a look at this video.

We are very lucky to have two internationally renowned ruminant experts, Prof. Mike Allan and Dr. Chad Mullins, in New Zealand in September, thanks to TCL Hunt. I, for one, am looking forward to hearing their presentations.

October is shaping up to be a busy month for us, starting with a layer seminar on the 1st of October at Wairakei Resort in Taupo. We are very lucky to have a comprehensive range of international speakers attending this seminar which has been designed specifically for the New Zealand layer producer. Attendance is by invitation only, but if you have not received an invitation as yet and would like to find out more, please don't hesitate to contact me.

I hope you find this edition of interest .

Natalie

In This Issue:

Effect of pellet size on calf performance

Recent research carried out at Harper Adams University College, in the United Kingdom, investigated the effect of early weaning calf feed pellet size on the performance of artificially reared bull calves.

Increasing pellet size from a 3 or 4 mm pellet to a 6 or 8mm pellet may have advantages for feed manufacturers where die changes are required to manufacturer the smaller calf feed pellets.

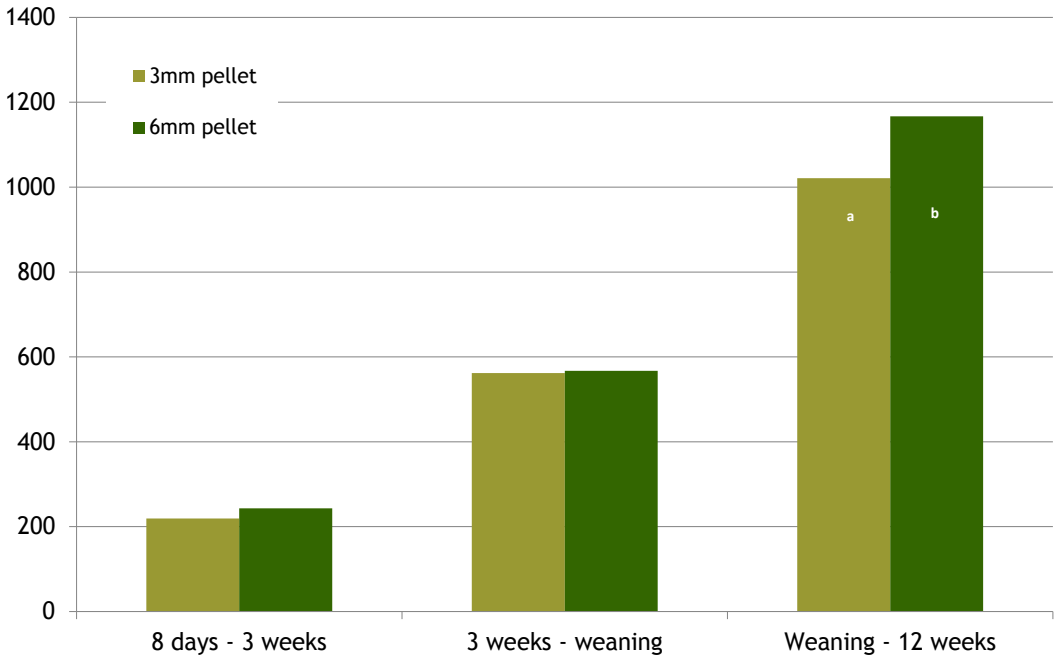
Using 40 bull calves, the researchers (Marsh and Lingham, 2011) compared daily live weight gain, feed intake and live weight at 12 weeks when calves were fed either a 3mm or 6mm pellet.

Figure 1: Pellet size.

Calves were housed individually on straw and were offered *ad lib* water and straw. Initially, calves were fed 4l of milk replacer per day mixed at 125g of powder per litre. Milk replacer was increased to 5l at 8 days. Calves were gradually weaned at 42 days of age and moved into group pens.

From 8 days of age, identical

Figure 2: Effect of pellet size on average daily gain in calves (from Marsh and Lingham, 2011).



"Calves fed a 6mm pellet showed higher daily gains post-weaning and were 6.5kg heavier at 12 weeks of age"

diets with a crude protein of 204g/kg DM were offered *ad lib* as either a 3mm or 6mm pellet.

Increased live weight

Overall performance was good, (as shown in Table 1) with calves fed the 3mm pellet attaining a weight of 110.9kg at 12 weeks.

Calves on the 6mm pellet reached a weight of 117.4kg at 12 weeks, exceeding the UK Meat and Livestock target of 115kg for rearing calves to 12 weeks of age.

Higher average daily gains

The higher live weight at 12 weeks reported for calves fed the 6mm pellet was a consequence of the significantly higher weight gain in these calves from weaning to 12 weeks (Figure 2).

Better rumen development

It is generally accepted that early intake of concentrate feed is a key factor in encouraging rumen development and the authors suggested that improved intake on a 6mm pellet compared to a 3mm pellet would minimise growth checks at weaning and enhance rumen development.

Last rib girth measurement is considered to be an indicator or rumen growth and development. In this trial, calves fed the 6mm pellet showed a higher (but non-significant) last rib girth measurement at 12 weeks suggesting improved rumen development in these animals.

Higher feed intakes

As calves are typically weaned when they are consuming 1kg of hard feed per day, increasing feed intake preweaning could help to reduce age at weaning and overall rearing costs.

In this trial calves were weaned gradually at 42 days and consequently milk replacer cost per calf were the same. However, if earlier weaning were possible, this would reduce the amount of milk or milk replacer fed and could lead to cost savings.

Table 1: Effect of pellet size on live weight, feed intake and feed conversion efficiency (Marsh and Lingham, 2011).

	3mm pellet	6mm pellet
Live Weight (kg)		
Start weight	51.6	51.4
Weaning weight	68.0	68.4
12 week weight	110.9	117.4
Feed Intake (kg/head)		
8 days - weaning	22.3	31.2
Weaning - 12 weeks	125	138
Milk replacer	21.4	21.4
Feed Conversion		
FCR (kg feed: kg gain)	2.84	2.89

How Important is Crude Protein in Layer Feeds?

What is crude protein

The term "crude protein" is really important to understand before one gets into the merits of its levels in poultry feed, or any feed for that matter. Normal, (wet chemistry) analysis of feed measures the nitrogen content of the feed and then, based on protein containing "on average" 16 % nitrogen, the value analysed is multiplied by 6.25 to arrive at a crude protein value. The assumption that all crude protein contains 16% nitrogen and that all the nitrogen found in feed, or feed ingredients, is actually protein really does result in a crude measure of the true protein in feed and hence the term used to describe it. However, crude protein still has its value as a quick and relatively cheap measure to assess whether theoretical feed formulation and actual feed analysis are comparable.

Essential amino acids

The nutritionist will also use the crude protein value of individual feed ingredients to calculate the amino acid content of these ingredients by using established regression equations. It is the amino acid content itself of feed and the birds' ability to digest these amino acids that is really far more important than simply the crude protein of the feed. The amino acids are the building blocks of protein and there are 22 of these of which 10 are deemed "essential". Examples of essential amino acids include lysine, methionine, threonine and tryptophan.

All of the 22 amino acids are used to make up the protein used to produce an egg (or muscle, feathers and skin) but the animal is unable to produce the 10 that are deemed essential through normal metabolism and therefore these must be supplied in sufficient amounts in the diet.

There are many ways to manipulate the crude protein of a feed or feed ingredient using a non protein nitrogen source such as urea or melamine and although this "adulteration" still occurs, it is less frequently found than in previous years due to improved analytical methods available.

Digestibility is important

Two common raw materials we use such as soya meal and meat and bone meal are often exactly the same in crude protein value but the amino acid profiles are actually very different. For example, if both these ingredients are at 48 % crude protein, the essential amino acid, lysine would be 3.05% in the soya and 2.60% in the meat and bone meal. The digestibility of the lysine is 88% for the soya and only 74% for the meat and bone so only 2.68% lysine is actually available from the soya and 1.92% from the meat and bone meal. Despite equivalent crude protein values, meat and bone has a 30% lower available lysine value compared to soya.

Recent research

Excellent recent research published by Pérez-Bonilla *et al.* (2012) on brown egg laying hens from 22 to 50 weeks of age concluded that irrespective of initial body weight of laying hens, the crude protein requirement for maximum egg production did not need to exceed 16.5%. However, these authors emphasise that *this is only possible if the diet meets the requirements for key indispensable amino acids*.

The trial was conducted with 3 levels of crude protein in the test feeds (16.5, 17.5 and 18.5%). All feeds had the same energy content of 11.5MJ/kg.

Diets were fed to either low body weight (1 592g) or high body weight (1 860g) hens for the duration of the trial over 28 weeks. The key point is that the 8 critical essential amino acids in all feeds met the digestible levels as recommended by the brown-egg layer supplier.

Effect on performance

These authors found highly significant differences between heavy and light body weight birds for average daily feed intake (120.6 vs. 113.9g), egg production (92.5 vs. 89.8%) and egg weight (64.9 vs. 62.4g) respectively.

The lighter birds gained body weight quicker than the heavier

"Crude protein requirement for maximum egg production does not need to exceed 16.5% if all essential amino acid requirements are met"

birds and their feed conversion per dozen eggs was significantly better (1.52 vs. 1.57). None of the egg quality variables measured was affected by dietary treatment.

Earlier work by Burley *et al.* (2009) found similar results when they fed diets that contained the same amino acid balance but differed in dietary crude protein by 0.75 and 1.5% respectively.

Cost savings

The use of appropriate amino acid ratios (such as those published by Evonik) combined with formulating on the basis of digestible amino acids can help to reduce the overall cost of poultry diets by making the best possible use of the protein component of the diet.

Biological limitations

Although it is possible to reduce dietary crude protein levels for layers, there are obviously biological limits to the amount of dietary protein that can be replaced with synthetic amino acids. There is a "tipping" point at which the levels of non-essential amino acids are too low to support maximum egg production and both egg weight and egg numbers will decline.

Talk to us if you have any questions or if you would like to investigate opportunities to reduce the cost of your feeds, while still maintaining performance.

How to Attach Meaning to Figures

I am constantly amazed at the poor quality of data presented by many people trying to sell feed additives. Whilst it isn't expected that every farmer should be a statistician, there are a few things one should keep an eye out for when presented with research data. To begin with, the source of the data is really important. Recognised Journals such as *British Poultry Science* are checked by other academics prior to publication and these are commonly referred to as "peer reviewed". Peer reviewed publications carry a lot more weight than popular press articles or glossy presentations of "in house" research. Even large reputable companies are guilty of selective reporting if they are able to sell their products this way.

One of the cleverest tricks I see every day is where data is only reported as a percent improvement. For example, a simple comparison of the effects of a product on laying percentage in hens may report that product X improves the eggs per hen housed by 10% (which is a lot if production is already good). Problem here is that if one doesn't know the base levels, there is no way that a figure such as this can be verified or checked against your current data.

The other common trick is to quote averages without statistics. An average of a set of data tells one absolutely nothing about the quality (or spread) of the data. If there are two treatments looking at body weight of birds and the "average" weight is 1 850g per bird. Group A may have a range of birds from 1 750 to 1 950g (200g range) while group B ranges from 1 650 to 2 050g (400g range). Group B is clearly more uneven and the next measure required is called standard deviation. All this measures is the average of the difference from the mean. Using our 2 examples of A and B above and assuming there are equivalent numbers (and weights) either side of the mean (i.e. a "normal distribution") then the standard deviation or SD of A would be 50g and B would be double A at 100g. The coefficient of variation (or CV) is then simply a measure of SD expressed as a percentage of the mean. So A would have a CV of 2.7% and B would be 5.4%. Once we have a measure of variation, we are then able to analyse the data in a meaningful way to see if differences are real or simply part of the normal variation.

I will add more "statistics" to future issues of Out of the Bag but some simple explanations of statistics can be found at the following website:

www.mathsisfun.com/data/index.html#stats

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