Feed lab testing – understanding the results

Feed lab testing is useful to confirm whether a particular feed source is worth buying, or compare the nutritional value of alternative feeds.
It's essential when using lab results to understand the reasons why results vary.

Understanding variation in feed lab results

So, you've received a report from the feed lab on a sample of hay you are looking to buy. The report says the ME is 10.2 MJ and the crude protein is 9.4%. How accurate are these results?

It's important to understand that there is always a certain degree of variation that you need to allow for around the measured result.

Key tips

- Feed testing is useful to confirm or compare feeds for nutritional value.
- There is always a certain degree of variation in feed lab results.
- The greatest source of variation is due to sampling method.

Table 1: The three sources of variation in feed lab results

The feed itself	Sampling variation	Testing variation
Feeds naturally vary in their nutritional values depending on: • Growing conditions (soil fertility, rainfall, frost etc.). • Harvesting time and method. • Conservation method (hay/silages). • Manufacturing process and level of quality assurance (manufactured stockfeed and co-products). Pastures, hays, silages and co-products vary more than grains/concentrates (see Fact Sheet 5)	Of the three sources of variation in feed lab results, sampling method has by far the greatest potential impact. Any testing carried out on a feed sample submitted for analysis can only measure the composition of that particular sample. It's important therefore to take the time required to collect a truly representative sample and not take short cuts. It's much harder to get a representative sample of some feeds (especially hays) than others such as grains, so pay particular attention to the sampling methods suggested in Fact Sheet 6.	All lab tests have varying levels of precision (often called the measurement of uncertainty). This depends on: • Analytical method and equipment used. • Nutritive value tested. • Operator technique. • Type of feed The variation in the level of precision of a lab feed result is unavoidable, but should be well managed in reputable laboratories by internal quality assurance programs and regular participation in inter-lab testing. Your feed lab should be able to give you a good idea of the level of measurement uncertainty for a particular analysis.

Garry says: "My adviser says that while the variation in the feeds I use and in the lab results are unavoidable, I do have control over the biggest source of variation – feed sampling."

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'As is' versus dry matter – be sure you are comparing apples with apples

There can be a big difference between so many kilograms or tonnes of feed on a *dry matter* basis versus on an *as-fed* basis. For example, here's 5 kg of silage on a *dry matter* basis and an *as-fed* basis.

5 kg silage

***Dry matter* basis**

***As-fed* (wet) basis**

Even with a 'dry' feed, talking on a *dry matter* versus an *as fed* basis makes a difference, as demonstrated by 1 kg of grain on a *dry matter* basis versus an *as fed* basis.

1 kg grain

Dry matter basis

As-fed (wet) basis

So we need to be sure we know on which basis we are quantifying feed – *dry matter* or *as-fed* – and be consistent when formulating diets and feeding out. It's the same when reading your feed lab report. To avoid any misuse of results on a feed test report, it is important to check the units the lab is using to express each result.

It makes a difference, even with 'dry' feeds like hay and grain. For example, if a feed contains 16% Crude Protein (CP) on an *as-fed* basis, with a DM content of 85%, (i.e. 15% moisture content), the protein content in the DM = (16 X 100 divided by 85) or 18.8% in the DM.

Similarly, if the feed's Metabolisable Energy (ME) is reported as 10 MJ/kg DM, with a DM of 85%, the ME on an *as-fed* basis is 8.5 MJ/kg. (10 X 85 divided by 100). This would lead you to interpret the quality of this feed quite differently than if it were 8.5 MJ/kg on a DM basis!

My feeds were analysed using NIR – is that okay?

Near Infrared Reflectance (NIR) is a method commonly used by feed laboratories in preference to specific chemical assays. It enables them to reduce the cost per sample and provide results more quickly.

It's important to understand that NIR testing requires the establishment of calibrations based on results from standard analytical reference methods ('wet chemistry'). The NIR scan data is plotted against the 'wet chemistry' data for the same samples to establish their calibration curves. These curves are then used to predict the respective nutritive value. For this reason, the result predicted by the NIR can never be more accurate than the reference methods upon which it is based.

Expect results from feed analysis by NIR to vary more than that when 'wet chemistry' methods are used. Exactly how much it varies will depend on the robustness of the calibration, that is, how many number of samples have been used to establish the NIR calibration.

If unsure of a result obtained by NIR analysis, contact your feed lab.

For more information go to www.dairyaustralia.com.au

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