Feed tests can save money

In extremely dry conditions, wet or failed seasons there is a shortage of feed supply and excess farmer demand for both traditional and alternative feeds from local sources. With limited supply, buyers are often under pressure to buy without negotiating for what's on offer and with a shrinking budget.

It is quite possible to empty a 30 tonne silo within a week when feeding 10,000 dry sheep equivalent (DSE) and at the same time reduce the farm account by $12,000.

Why get a feed test?

A feed test will allow more informed decisions to be made, and could save money and livestock. The alternative is potentially wasted feed, money and gradual loss of condition with your livestock. A feed test only costs about $60, and as it gives a better understanding of feed quality it enables more informed decision making and greater control over animal health and welfare.

Historical data shows feed quality in any year is highly variable. It's simply too hard to visually assess feed quality as anything more than good, average or poor feed. Managing a diet when you only have vague feed values is sure to result in a hit or miss answers, and the outcome for livestock is likely to be even more unpredictable.

Typical feed test results

Test term	Unit	Comment
Water content	%	The amount of water within the feed. Allow for this especially with high water content feeds.
Dry matter	% DM	Water removed. The nutritive component only. Used in other analyses.
Crude Protein	% CP	Calculated from total nitrogen content. Does not equal protein quality
NDF	% NDF	Neutral detergent fibre. Digestible fibre. Influences feed intake.
ADF	% ADF	Acid detergent fibre, the structural fibre, mostly indigestible.
WSC	% WSC	Water soluble carbohydrates. Rapidly digestible sugars.
Lignin	%	Indigestible fibre. Limits intake, reduces energy value.
Digestibility	%	Percentage of feed that is useable feed.
Ash	%	Indigestible portion and part of faecal loss
DE	MJ/kg DM	Digestible energy. Gross feed energy value minus faecal energy loss.
ME	MJ/kg DM	Metabolisable energy. Digestible energy minus urine and gas losses, and is the energy available for maintenance, growth, wool etc.
Visual faults		Presence of weeds, mould or other concerns.

Test laboratories offer a wide range of analysis and in some cases tailor the results for the class of livestock the feed is destined for. Similarly, as results can be presented in a number of formats it's important to familiarise yourself with the units used, and what they mean. For example, are the results on an "as fed" or "dry matter" basis?

If transport logistics are an issue, results may need to be used in conjunction with feed bulk density values. By-product feeds, such as grape marc, brewers grain etc. have generally had a significant portion of the energy removed during the first processing event and may have a high residual water content. Transportation costs per energy unit could be high making these feeds unfeasible options, even if they seem cheap. The primary advantage of these feed types is their higher protein levels. Feed test analysis will also indicate higher levels of other constituents including all fibre components. These types of feed supplements may need to be blended into a feed mix as some components may affect feed intake or be deleterious in large quantities.

Feed test results

While feed test results give important information on the nutritive value of the feed tested it also allows valuable comparisons to other feeds to ensure the feed value and cost is maximised.

	Dry matter (%DM)	ME (MJ/kg DM)	CP (%CP/kg DM)	Bulk Density (kg/cubic metre)
Oats	90	12	9	450-580
Wheat	90	13	12	760-820
Barley	90	13	11	620-630
Grape Marc	50	5.9	13	240-320
Palm Kernel Cake/Meal/Extract	88-95	10.5-11.5	12-20	570
Brewers Grain	20-25	9	22	96
Grass hay	80-85	9-10	8-9	130-225

For example, in extremely dry seasons the primary limitation for livestock is energy. Buying the feed with the highest energy content may not be the best or most efficient feeding strategy. In the table above, wheat and barley were the most energy dense (i.e. the most energy per kg DM). These two feeds do not make a complete ration and relying on cereal grain as the sole feed source has serious health risks.

Using feed values

	Cost ($/tonne)	Dry matter (%DM)	ME (MJ/kg DM	Bulk Density (kg/m^3)	Cost (¢/MJ)*	Cost (¢/MJ/m^3 transported)*
Oats	360	90	12	450-580	33	74-57
Wheat	400	90	13	760-820	34	45-42
Barley	400	90	13	620-630	34	55-54
Grape Marc	150	50	5.9	240-320	51	212-159
Palm Kernel Cake	350	88-95	10.5-11.5	570	38	66-56
Brewers Grain	75	20-25	9	96	42-33	434-347
Grass hay	250	80-85	9-10	130-225	33-31	253-138
Calculation	A	B	C	D	=100×A÷(B×C)	=1000×(D×A) ÷(B×C)

**the figures that give a range for feed cost (c/MJ and C/MJ/M3) have the number range going backwards. This is due to the dry matter. As the dry matter % gets higher the cost value gets better, in other words the cost goes down.*

In the example provided above, oats are the cheapest energy concentrate (¢/MJ), even though they are not as energy dense as other cereals. Grape marc is very cheap and provides the cheapest energy source from the feeds indicated, however the logistics of transporting 50% water means it is also the second-most expensive energy source to get on-site. Wheat is energy dense and with a high bulk density and low moisture content making it a cheap energy source that is efficient to transport. Palm kernel meal (or cake or extract) has a comparable energy cost to cereals though slightly more expensive, may need additional handling equipment, and has spoilage considerations. Brewers grain is highly palatable but has poor bulk density and dry matter content. It also has storage limitations to consider.

The final cost column in the table calculates the cost of feed energy per volume of feed. This allows a comparison of energy cost allowing for varying bulk density as well as dry matter. In this example no allowance has been added to the feed cost for transport, labour and incidentals such as specific feeding or handling equipment.

Feed test results can also be added to feed budgeting software to help predict potential livestock response to each supplement. Good software will advise on the safe levels to be mixed. Software should also indicate the expected level of feed intake for a specific outcome (i.e. liveweight maintenance, rate of weight change, or physiological status). If different classes of stock are being ration fed or supplemented it may be necessary to adjust the protein requirement in the diet for, as it may differ significantly.

For dry conditions, where feeding is generally for survival or maintaining liveweight, monitoring for weight change or condition score must be considered. Ideally livestock should neither lose liveweight nor condition score, as the energy cost to regain lost weight is approximately four times greater than the perceived energy saving. It is considerably cheaper under these conditions to feed adequately than to pay the penalty to regain weight.

Who provides a feed test service?

A number of providers offer feed testing services. Some test facilities are state government laboratories, others are commercial facilities.

A web search using 'feed test Australia' will show a range of providers, some with dedicated feed testing facilities, most provide a broad range of services including feed tests.

Most service providers have the necessary documentation as downloadable forms and with instructions on the sampling procedure for the type of material to be tested. Costs and turn-around times will vary according to the specific service requested. The test facility may request information on the type of livestock (sheep, cattle, horse, pig, poultry) receiving the feed, as well as factors such as age, pregnancy status etc so that any recommendations can be tailored for those specific animals.