

TECHNICAL NOTE

Feed Test Interpretation Guide

The following criteria have been compiled to facilitate the interpretation of this laboratory's feedstuff analysis. Because of the wide variety of circumstances associated with each feeding programme, the information given below should be regarded as a tentative guide only.

Dry Matter

The residual dry weight of forage after removal of moisture using standard drying conditions (expressed as g/100g of the fresh weight). The dry matter intake of a ruminant animal depends on many variables including liveweight, stage of lactation, level of milk production environmental conditions, feeding history, body condition and quality of feed.

Pasture Feeds

% DM	INTERPRETATION
Less than 18	Very wet. Poor silage with low intake. High effluent.
18-22	Average. Typical of direct cut silage. Intake still low. Effluent problems likely.
22-25	Slightly wilted or original grass rather mature. Generally improved intake.
25-30	Good wilt with better intake.
30-35	Optimal. Should give maximum intake and production.
greater than 35	Deterioration during storage is likely, unless stored in air-tight conditions.

Other feeds

%DM	INTERPRETATION
15-20	Fresh Pasture [spring (short) 15%, spring (rank) 18%, summer dry 25%, autumn/winter 13-18%]
30-40	Maize Forage/Silage
40-60	Baleage
85-90	Dry Grain Feeds
87-90	Hay

Crude Protein

The protein content of the feed is directly related to the nitrogen content*, which varies with growing conditions, plant species and maturity. The ideal level of crude protein in a feedstuff depends on the requirement of the livestock to which it is being fed. However, a tentative guide is shown below:

% CRUDE PROTEIN	INTERPRETATION	EXAMPLES
Less than 12	Low. Sub maintenance level	Maize silage
12-15	Medium. Maintenance level	Meadow hay Meadow silage
Greater than 15	High. Production level	Fresh pasture Clover hay or silage Lucerne hay or silage

*Note that Crude Protein includes non-protein nitrogen also

Acid Detergent Fibre (ADF) & Neutral Detergent Fibre (NDF) Content

ADF and NDF are measures of the less-readily digestible plant cell wall carbohydrates.

ADF consists of cellulose and lignin with small amounts of detergent-insoluble nitrogen and minerals (ash).

NDF includes the above fraction plus further cell wall carbohydrates (hemicelluloses).

Very high fibre levels slow the rate of digestion and limit dry matter intake but a certain amount is required to stimulate rumen activity (i.e. ADF <20% and NDF <28% can cause a series of metabolic disorders)

For silages, ADF>35% and NDF>50% indicate forage was harvested late in the growing season and usually gives silage of low digestibility and energy as well as low protein. Forage may be difficult to compact and so fermentation may also be poor.

Digestibility

Digestibility of forage is largely influenced by the maturity of the plant species. Digestibility reduces as the plant matures and this reduction is associated with:

- Increased levels of structural cell-wall carbohydrates (cellulose and hemicellulose) and lignin
- Decreased levels of protein.

DIGESTIBILITY (%)	INTERPRETATION
Less than 40	Very poor
40-50	Poor
50-60	Fair. Typical level for silage, hay and lucerne pasture.
60-70	Good, eg grass pasture
greater than 70	Excellent, eg grain feeds

Metabolisable Energy (ME)

ME is an estimate of the energy content of the diet potentially available for maintenance and production in ruminant animals. This is a derived value from other constituents rather than a directly measured value. It is that proportion of feed absorbed from the digestive tract and retained for metabolic purposes. ME is predicted from the digestibility of the feed.

ME (MJ/kgDM)	QUALITY
>11.0	Excellent
9.5-11.0	Good
8.0-9.5	Poor
<8.0	Inferior

Silage pH

pH	INTERPRETATION
3.8-4.2	Excellent fermentation & preservation (low losses)
4.2-4.5	Good fermentation & preservation
4.5-5.0	Fair fermentation
5.0-6.0	Poor fermentation

A moderate to poor fermentation suggests that full preservation of the silage stack has not taken place and decomposition of the stack continues with associated loss of nutrients. High DM silages (>40%) typically produce little acid and depend on good wrap to maintain stability. Very high levels of acidity (pH<3.8) will depress intake.

Silage Ammonia-N/Total N (%)

This ratio is valid over the complete dry matter range, and indicates the degree of protein breakdown that has occurred.

NH ₄ -N/TOTAL N (%)	INTERPRETATION
Less than 5	Excellent
5-10	Good
10-15	Fair
greater than 15	Poor

Silage Volatile Fatty Acids (VFA)

Generally it is recommended that Lactic Acid should comprise 65% of the total VFA content and that the lactic acid:acetic acid ratio should not be less than 3:1

High levels of acetic (>3-4%) and butyric (>0.5%) acid in any type of silage are indicators of unfavourable fermentation. N.B. Some inoculants may produce silage with elevated acetic acid with no negative effects.