

## Quality Components of Feeds

### 1. Organic Matter / Ash (%DM)

The organic matter component of a feed is what disappears on combustion at 500°C. The remaining material can be termed the mineral or ash content. A high ash content (>12%) is a sign that there is soil contamination or effects of bacterial damage on the feed cell structure. Elements should be in the following concentrations. Lower values can limit animal production.

Na	0.12	Ca	0.44
K	0.58*	P	0.32
Mg	0.19	S	0.18

K concentrations > 5% would reduce Mg availability.

### 2. Crude Protein (%DM)

Proteins are a group of compounds which contain nitrogen. If you know the nitrogen content of a feed, then you can easily determine crude protein, because on average, the mean nitrogen content of crude protein is 16%. A minimum of 15% protein is required to maintain milk production in lactating dairy cows. Levels of protein in a pasture (ryegrass, white clover) are typically 18%-25% and this is more than sufficient for grazing animals. Forages such as cereal and maize silages are typically in the range of 8%-10%, and should be used as feed in conjunction with a high protein source i.e., pasture.

### 3. Digestibility (%DM)

Dry matter digestibility (DMD) or organic matter digestibility (OMD) is a measurement of the feed's capacity to be digested by the animal. Laboratory testing is known as *in vitro* digestibility. A prediction of the metabolisable energy (ME) can be made from the digestibility figure. Low digestibility = <55%. High digestibility = >70%.

### 4. Fibre (%DM)

Acid Detergent (ADF) and Neutral Detergent (NDF) fibres are both measures of the difficult to digest plant cell wall carbohydrates. Generally the lower the fibre, the better, but this should not drop below 20% ADF or 30% NDCF, because some fibre is needed to stimulate rumen activity.

	ADF	NDF
Good Quality	20-35	30-45
Poor Quality	>50	>70

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## 5. Metabolisable Energy (ME: MJ/kgDM)

ME is a measure of the energy that is available to the animal for maintenance, growth or production.

Poor quality	<8
Good quality	10-12
Excellent quality	>12

## 6. Soluble Sugars and Starch (SSS - %DM)

SSS supplies rumen microbes with energy. The normal range in pasture is 10%-15%. If SSS is less than 10%, rumen microbial fermentation can be reduced with negative effects on digestion. Maize silage should be 30%-40% SSS and pasture silage is typically 2%-7% SSS.

## 7. Fat (%DM)

The normal range in pasture diets is 2.5-4.5%. Too much fat (>7%) can interfere with fibre digestion and cause diarrhoea.

### Silages (additional quality indicators)

## 8. pH

This is a measure of acidity. It is normally measured for silage and baleage. Well preserved and wetter silages normally have a lower pH, meaning more acid has been produced during the fermentation process. Drier silages require less acid to achieve stable conditions.

Typical pasture silage should be pH < 4.5. Silages with a pH of less than 3.8 can cause decreases in feed intake and possible animal health problems due to disruption to rumen micro-organisms.

## 9. Ammonia Nitrogen (NH<sub>3</sub>-N, % total N)

Ammonia is an indicator of protein degradation in silage, i.e. high values are associated with poor quality fermentation. NH<sub>3</sub>-N should be <5% for maize silage and <10% for pasture silage. Values higher than this indicate excessive wastage and quality loss.

## 10. Lactic Acid (%DM)

A high lactic acid content is desirable: > 6-8% for wet silage (<35% dry matter) and > 3%-4% for wilted silage (>45% dry matter).

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