AHDB BEEF & LAMB

Project Report

September 2017

Better Returns Programme

Making better conserved forage campaign

Think about testing silage

Now is a good time to get silage sampled, as long as it has been stored for at least six weeks to allow for the fermentation process to complete. The results can be used to understand the supplementation requirement during the winter and to get orders in early. Analysing silage is a crucial factor in this process, as it is likely to be the most variable component of the diet. It is important to get a representative sample from the silage, whether in a clamp or bales.

Clamp silage sampling

Clamps are relatively easy to analyse as you can take a cored sample in a diagonal line across the top of the silage clamp. Be sure to core as far into the silage clamp as possible and to take at least four cores from each clamp.

Bale silage sampling

The best approach is to sample as many as possible. However, while it is not possible to sample every bale, it is advisable to take samples from bales made at different times over the season and from areas of the farm that you know produce different quality forage. This approach will enable bales with different compositions to be identified and so fed to the stock where they will best meet their dietary requirements.

One problem with bales is the variation in dry matter (DM) from the top to the bottom of the bale. As the DM content increases, this becomes less of an issue, but silage with less than 25% DM will have a significant DM graduation through the bale. Therefore, it is important to sample all the way through the bale.

There are two possible approaches to do this. One is to core the bale from the top to the bottom, ideally in three places across the bale, and mix the samples well before sending for analysis. The second is during feed-out, but only if the bale is being processed through a chopper as this will mean the sample is well mixed.

Once all samples from a given clamp or set of bales have been taken, mix them well and pack into a plastic bag, remove all the air from the bag before sealing and send immediately to the laboratory. It is advisable to send samples for analysis during the first part of the week to avoid the risk of them ‘sitting around’ at the lab over a weekend, when the nutrient content could be changing.

The silage analysis can be split predominantly into three parts:

Firstly, those parameters associated with the initial forage such as metabolisable energy (ME), crude protein (CP), ash, neutral detergent fibre (NDF) and acid detergent fibre (ADF), will be similar irrespective of ensiling method and reflected by the quality of the forage at harvest.

Secondly, there are those that are associated with fermentation, such as pH, lactic acid, total volatile fatty acids (VFAs) (sometimes split into acetic, propionic and butyric acids) and ammonia-N. These parameters will indicate how well the preservation process has been controlled.

Finally, there are two parameters that reflect both crop quality at harvest and fermentation, these are dry matter and water soluble carbohydrate (WSC) or sugars. If there has been an inefficient fermentation process, some of the dry matter in the original forage will be converted to water and carbon dioxide. So the DM content of the silage will be less than that of the ensiled forage. The WSC concentration is not only a reflection of the level of WSC in the ensiled forage but also a gauge of the efficiency of fermentation, with a higher level being associated with a more efficient fermentation. There are also some differences in fermentation between bales and clamps. In general, the fermentation in a bale is more restricted than a clamp resulting in baled silages having a higher pH and WSC concentration but a lower level of both total fermentable and lactic acids. See Table 1 for target values.

Table 1: Silage analyses parameters with target value and ranges for grass silages

Analysis	Abbrev	Units	Range	Target value
Dry matter	DM	g/kg	150-500	270-350
D value	'D'	%	55-75	>68
Metabolisable energy	ME	MJ/kgDM	8.8-12.0	>11
Neutral detergent fibre	NDF	g/kgDM	500-650	500-550
Acid detergent fibre	ADF	g/kgDM	230-350	300
Ash		g/kgDM	60-200	<80
Crude protein	CP	g/kgDM	100-200	150-175
pH			3.5-5.5	Depends on DM
Ammonia N	NH3N	g/kg N	20-300	<80
Total fermentable acids	TFA	g/kgDM	20-200	<100 (depends on DM)
Volatile fatty acids	VFA	g/kgDM	10-90	%TFA 25% (as low as possible)
Lactic acid		g/kgDM	20-200	80-120
Acetic acid		g/kgDM	20-80	<25
Butyric acid		g/kgDM	0-20	<5
Residual sugars		g/kgDM	0-150	100 (as high as possible)

* For well fermented silage lactic acid as the proportion total acids should be >75%

More information can be found in the BRP manual, Making Grass Silage for Better Returns.

This article was supplied by Dave Davies of Silage Solutions Ltd. The final results of his recent silage project will be available in late autumn.