

Defining grass silage quality requirements for dairy herds

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Summary

- Most pasture-based dairy farms will feed at least 40% of the annual silage budget to milking cows and youngstock; this ratio increases with stocking rate
- Target 68-70 DMD silage for dry cows and 74+ DMD for milking cows and youngstock.

Introduction

While the focus for pasture-based dairy farms must be on maximising the proportion of grazed grass in the milking cow diet, there are inevitably times of the year where silage constitutes part or all of the daily forage fed to the herd. Having an adequate rolling stock of appropriate quality silage is therefore centrally important to resilient pasture-based systems. Silage strategy for the farm should take into account the varying nutritional needs of milking cows, dry cows and young-stock.

Defining annual demand for quality silage on dairy farms

During the milk quota era, grass silage for dairy herds became widely viewed and managed as a maintenance-type dry cow feed, due in part to short lactation lengths, and also to low milking platform stocking rates. However, dry cow silage demand is typically fixed at 0.75- 0.85 t dry matter (DM)/cow annually (65-75 days at 11-12 kg DM/day), which is only a proportion of the annual silage budget. All remaining silage will by definition be consumed by stock with a requirement for quality feed i.e. milking cows and growing heifers. The relative proportion of high quality in the silage budget varies across farms and years (Table 1). The volume and proportion of high quality silage needed per cow increases in scenarios where the milking platform is less self-sufficient for forage (i.e. higher stocking rate and/or lower annual grass dry matter production).

Table 1. Effect of grazing stocking rate and annual grass growth on silage demand

Annual Grass t DM per ha	12	12	15	15
Milking Platform Stocking Rate	2.5	3.2	2.5	3.2
Silage t DM to milking cows	0.58	0.94	0.45	0.62
Silage t DM to dry cows	0.75	0.75	0.75	0.75
Total annual silage fed t DM per cow	1.33	1.69	1.2	1.37
Quality silage* (%)	44%	56%	38%	45%
Silage from external land (non-platform ground) (%)	52	75	0	43

*Add another 0.40 t DM per cow as high quality silage reserve

Contingency silage stocks (for drought, poor spring weather etc.), should also be of high quality; this will reduce concentrate inputs and simplify feeding plans during grass deficits. Even in scenarios where the milking platform has a balanced forage supply and demand, approximately 38-40% of annual silage is fed to milking stock. When allowance for drought reserves and young-stock are included, a significant proportion of spring-calving dairy farms will require over 50% of their silage as high quality. The parameters used to define silage quality are summarised in Table 2.

Defining silage quality characteristics for different dairy stock types

All silage fed should be well-preserved, palatable, and free from anti-nutritional factors (e.g. mould/toxins, excessive soil contamination). It is recommended to test for these factors where animal health and performance on silage diets is suboptimal. The target preservation

metrics of pH, ammonia, lactic acid and ash content are consistent across silages of different feed value (Table 2). The key factor differentiating optimal feed value for dry or milking cows is dry matter digestibility (DMD). This determines the total nutrient intake from forage through a combined effect on dry matter intake and energy (UFL) density. Feeding high DMD silage to dry cows, increases risk of excess body condition gain and metabolic problems at calving. Feeding low DMD silage to milking cows results in poor milk solids output and higher rates of concentrate supplementation during times of grass deficit.

Table 2. Key parameters for assessing quality of grass silage

Measure	Dry cows	Milking cows and youngstock	Comment
Feed value metrics			
DMD %	68 to 70	74+	Key determinant of overall feed value
UFL (energy) per kg	0.72 to 0.75	0.83 to 0.88	Higher UFL means more feed energy for milk solids and weight gain
Crude protein % (CP)	12	14+	Lower DMD and/or N application reduce CP.
PDIE g/kg (protein)	75+	80+	Determined by UFL and CP levels in silage
Intake value g/kg LW0.75	90 to 95	>105	Higher values indicate better intake potential
Potassium (K) content	<2.2% for dry cows	>2.4% no issue for milking cows	High K silage fed from 2wk pre-calving creates milk fever risk.
Preservation metrics		Comment	
Dry matter %	24-28%	Silage should be costed on a DM basis	
pH	4.0 to 4.2 (4.4 for drier crops)	Too high pH indicates poor preservation, too low may affect intake	
Ammonia	Less than 8% of N	High ammonia indicates poor preservation and reduces intake.	
Lactic acid	8-10% of DM	Higher values indicate a stable, palatable silage.	
Ash	<8% of DM	High ash indicates soil contamination.	

Conclusion

Herd feeding decisions are simplified by having an adequate supply of the appropriate quality silage for each type of stock on the farm. Silage making should be managed accordingly, with specific targets set out based on projected annual demand.