Silage digestibility – its effects on concentrate requirement

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Introduction

Digestibility (DMD) is the most important factor influencing silage feed value and consequently the performance of beef cattle, lactating dairy cows, pregnant ewes and finishing lambs offered grass-silage based diets. Increasing the DMD of silage provides an opportunity to increase animal performance. Also, when concentrate price is high relative to product price (milk or meat) or relative to the cost of silage one of the potential benefits of increasing silage digestibility (thus feed value) is the opportunity to maintain animal performance whilst reducing concentrate input. This is known as the potential concentrate sparing effect.

My objective in this article, which is based on a review of research work on silage, is to summarise results of increasing silage DMD on maintaining animal performance whilst reducing concentrate input.

Dairy cows

When silage with a high DMD is available to offer to dairy cows one option is to increase animal performance. The mean daily milk yield response to increasing silage DMD by 5 percentage units is 1.65 kg/cow. A second option when high DMD silage is available is to maintain animal performance whilst at the same time reducing concentrate input. Research data clearly shows that each increase of 5 percentage points in silage DMD enables the yields of milk and of fat plus protein to be maintained when daily concentrate feed level is reduced by 2.7 and 3.3 kg/cow, respectively.

Beef cattle

The mean daily carcass gain response to increasing silage DMD by 5 percentage points is 0.12 kg. Producing high DMD silage for feeding to beef cattle provides the option of maintaining performance whilst at the same time reducing concentrate input. The magnitude of the reduction in concentrate feed level offered to finishing beef cattle made possible by an increase in silage DMD is influenced by silage DMD and the concentrate feed level (Table 1). For example, for beef cattle offered 71DMD silage and a daily concentrate feed level of 2 or 6 kg, a 5 unit increase in silage DMD reduces concentrate requirement by 2.0 and 1.4 kg, respectively , to maintain carcass gain; the corresponding reductions when a 75 DMD silage is offered are 2.4 and 2.1 kg, respectively.

Pregnant ewes

Increasing silage digestibility by 5 units increases ewe weight at lambing by 6.5 kg and lamb birth weight by 0.26 kg. Producing high DMD silage provides the option of maintaining animal performance whilst at the same time reducing concentrate input. The research data clearly show that each 5 unit increase in silage DMD enables lamb birth weight to be maintained whilst total concentrate input during late pregnancy is reduced by approximately 15 kg.

Finishing lambs

Increasing silage digestibility by 5 units increases daily carcass gain of finishing lambs by 47 g. Results from research studies show that each 5 unit increase in silage DMD enables lamb carcass gain be maintained whilst concentrate is reduced by 0.3 kg/day.

Conclusions

1) Silage digestibility (DMD) is the most important factor affecting the performance of beef cattle, lactating dairy cows, pregnant ewe and finishing lambs that are offered a grass-silage based diets.
2) Each increase of 5 units in silage DMD allows animal performance to be maintained while reducing concentrate feed level by:
    a) 3.3 kg per cow daily to maintain fat plus protein yield
    b) Between 1.4 and 2.8 kg/steer (depends on silage DMD and concentrate feed level –see Table 1) to maintain carcass gain

c) 15 kg per ewe in late lactation to maintain lamb birth weight

d) 0.3 kg/day per finishing lamb to maintain carcass gain

Table 1. Effects of a change of 5percentage points in silage DMD on the amount by which concentrate feed level can be reduced when offered to beef cattle receiving silages that differ in DMD and are supplemented with different levels of concentrate

	Concentrate (kg/day)		
Silage DMD (%)	2	4	6
71	2.0	1.7	1.4
75	2.4	2.3	2.1

Keady et al (2013)