

## The effects of a high grass input feeding system compared to high concentrate input feeding system offered to spring calving dairy cows in early lactation

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**Introduction** Grazed grass is the cheapest feed available on Irish dairy farms. The inclusion of grass in the diet of the spring-calving dairy cow in early lactation is recommended. Previous studies focused on introducing grazed herbage into the cow's diet in early spring in conjunction with grass silage and concentrate, and compared this to cows fed indoors. The objective of this study was to compare the milk production and feed budget of two contrasting early lactation feeding regimes. One regime was based on a high herbage inclusion with a low concentrate level (HG), while the other was based on a high concentrate inclusion with grass silage (HC).

**Materials and methods** Sixty-four spring calving dairy cows, (mean calving date - 2 Feb.) were randomised on lactation number, milk yield and composition, days in milk, bodyweight and body condition score. They were assigned to one of two feeding regimes. Each regime (n=32) consisted of 16 primiparous and 16 multiparous animals. The HC herd remained indoors and was offered a total mixed ration (TMR) consisting of grass silage in combination with a high concentrate level. Mean feed allowance was 19.6kg DM/cow per day. The HG animals were offered a high daily herbage allowance (DHA) of 15.1kg DM/cow (s.d. 3.7) above a height of 4cm with a mean concentrate allowance of 3.0kg DM/cow per day (s.d. 1.0). The study began in mid Feb. and finished in early April, lasting seven weeks. The stocking rate for the HG herd was 2.4 cows/ha. A fresh TMR mix was offered daily to the HC herd, refused feed was weighed and removed before each feeding. Both fresh and refused feed was sampled at each feeding. Pre- and post-grazing sward heights were measured daily while herbage mass and sward density were measured twice weekly. Milk yield was recorded daily and milk composition was determined weekly from samples collected over two consecutive morning and evening milkings. Cow dry matter intake (DMI) was measured once during the study using the n-alkane technique. Live weight was recorded weekly and body condition score was measured every three weeks. Milk production carryover effects of each of the feeding regimes were measured in a subsequent grazing study.

**Results** The TMR offered to the HC herd had a concentrate inclusion of 11.1kg DM/cow per day (s.d. 2.3) or 0.56 of the diet; grass silage constituted the remaining 0.44 of the diet, or 8.5kg DM/cow per day (s.d. 1.6). Table 1 summarises the effect of feeding regime on milk production: there was no significant effect of feeding regime on milk yield. The HG herd produced milk with significantly ( $P<0.001$ ) higher protein concentration than the HC herd, however milk from the HC herd had a significantly ( $P<0.001$ ) higher fat concentration. There was no significant difference in total DMI between treatments, the HC herd had a DMI of 15.3 kg DM/cow compared to an intake of 15.7 kg DM/cow for the HG herd. The HC herd had a higher live weight ( $P<0.006$ ) than the HG herd, even though the HG herd had a numerically higher live weight gain. The HG herd maintained a significant difference ( $P<0.01$ ) in milk protein concentration for the 12-week carryover period, there was no significant difference in any other production parameter.

**Table 1** Effect of feeding regime on milk yield, milk composition, bodyweight and body condition score

	HC	HG	SED	Sig
Milk yield (kg/day)	27.3	28.3	0.72	NS
Fat (g/kg)	41.6	38.6	0.86	***
Protein (g/kg)	30.7	33.6	0.35	***
Lactose (g/kg)	48.7	49.0	0.28	NS
SCM yield	25.9	26.6	0.73	NS
Live weight (kg)	517.2	498.9	4.78	***
Live weight gain (kg/day)	+0.03	+0.20	+0.12	NS
BCS	2.92	2.87	0.035	NS

SCM=Solids Corrected Milk yield. NS=Non-significant, \*\*\*= $P\leq 0.001$ .

**Conclusion** Increased milk production performance can be achieved by offering a high DHA to spring-calving dairy cows in early lactation. Economic benefits are achieved by the production of milk with a high value combined with the efficient utilisation of a low-cost feed. The results of this study question the role of grass silage in the cow's diet in early lactation.