Effects of supplementary concentrate level and separate or mixed feeding of grass silage and concentrates on carcass tissue composition in steers

J. Caplis[1], M.G. Keane[1] and F.P. O'Mara[2]
[1]*Teagasc, Grange Research Centre, Dunsany, Co. Meath, Ireland, Email: gkeane@grange.teagasc.ie,*
[2]*Department of Animal Science and Production, University College, Belfield, Dublin 4, Ireland*

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Introduction Supplementary concentrate level may affect carcass composition in steers. Feeder wagons facilitate feeding and management. The objectives were to determine the effects of (1) supplementary concentrate level with grass silage, and (2) separate or mixed feeding of silage and concentrates, on ribs joint composition.

Materials and methods The experiment had 6 feeding treatments of 14 animals per treatment:

1. Silage only (SO)
2. Silage + 3kg concentrate dry matter (DM) per day fed separately (LS)
3. Silage + 3kg concentrate DM per day fed mixed by feeder wagon (LM)
4. Silage + 6kg concentrate DM per day fed separately (HS)
5. Silage + 6kg concentrate DM per day fed mixed by feeder wagon (HM)
6. Concentrates *ad libitum* + 1kg silage DM per day (AL)

The animals were individually fed for a mean period of 132 days. The concentrate allowance was fed once daily to the separate groups. After slaughter the 6-10th ribs joint was separated into its component tissues of fat, bone and muscle. In the statistical analysis the 5 degrees of freedom for treatment were partitioned into 5 orthogonal contrasts, one for the effect of mixing, one for the concentrate level x mixing interaction, and one each for the linear, quadratic and cubic effects of concentrate level.

Results Growth and slaughter data were reported previously (Caplis *et al.*, 2003). Carcass weight increased with increasing concentrate level with both the linear and quadratic components significant (Table 1). Subcutaneous fat, intermuscular fat and total fat proportions increased with increasing concentrate level with both the linear and quadratic components significant. *M. longissimus,* other muscle and total muscle proportions were unaffected by concentrate level. Bone proportion decreased with increasing concentrate level with both the linear and quadratic components significant. There were no significant effects of mixing and no significant concentrate level x mixing interactions.

Table 1 Effects of concentrate level and separate or mixed feeding on ribs-joint composition

	Treatment							Significance	
	SO	LS	LM	HS	HM	AL	s.e.	L[1]	Q[2]
Carcass weight (kg)	308	352	351	369	364	382	5.4	***	**
Ribs joint (g/kg)									
Subcutaneous fat	33	57	58	55	53	53	4.3	**	***
Intermuscular fat	115	142	154	151	140	142	9.3	P<0.06	*
Total fat	148	199	211	206	194	195	12.2	*	**
M. longissimus	225	215	208	217	219	224	7.0	NS	NS
Other muscle	416	399	397	403	408	403	9.0	NS	NS
Total muscle	640	614	604	620	627	627	11.7	NS	NS
Total bone	211	187	188	175	180	178	4.4	***	**

[1]Linear effect of concentrate level; [2]Quadratic effect of concentrate level
There was no significant effect of mixing and no significant concentrate level by mixing interactions.

Conclusions Carcass weight and total fat proportion were lowest and total muscle and bone proportions were highest on the silage only diet. The first concentrate increment resulted in big increases in carcass weight and fat proportion and big reductions in muscle and bone proportions. Above the low concentrate level further increases in concentrates increased carcass weight but did not increase fat or decrease muscle proportions. There was no effect of mixing or no concentrate level by mixing interaction for any variable.

References

Caplis, J., M.G. Keane & F.P. O'Mara (2003). Comparison of separate and mixed feeding of silage and concentrates for finishing cattle. In: *Proceedings of the Agricultural Research Forum* (2003) p38, ISBN 184174016.