Supplementation Under Intensive Grazing, Silage- Or Grain-Based Diets for Beef Production on Steer Performance and Meat Fatty Acid Composition

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Introduction Alfalfa (*Medicago sativa L.*) is the main cultivated pasture in Argentina. In beef production enhanced productivity and profit depend on high stocking rates and pasture utilisation, with grain supplementation necessary to maintain high individual live weight gains (LWG) and to increase production per ha (Ustarroz, 1999). Substitution of grazed grass by concentrate can affect meat fatty acid (FA) composition (French *et al*., 2000). The objective of this study was to evaluate the effects of intensifying an alfalfa-based grazing system and two confinement dietary regimens for beef steer finishing on animal performance and meat FA composition.

Materials and methods The study had 7 treatments (T) with 2 replicates in a complete randomised design. Experimental units (pens or paddocks) had 5 Angus steers (7-8 months and 165.9±7.0kgLW). Grazing T comprised 2 forage allowances (A, g/kg LW: low (LA=15) or medium (MA=30) combined with 2 supplementation levels (S, g/kg LW: low (LS=7.5) or high (HS=15). The last grazing T received solely a high A (HA=40-60). Supplement consisted of maize (0.7) and rye (0.3) grains. Steers grazed first rye (winter) and then alfalfa (spring-autumn). Confined T were corn grain (CG, 73:14:12:1% CG: alfalfa hay: soybean meal: urea) or sorghum silage-based (SS, 65:17:11:6:1% whole plant BMR SS: corn grain: soybean meal: rye grain: urea) diets offered *ad libitum*. Steers were slaughtered at 10mm of back fat (BF). *Longissimus* muscle (11^{st}-13^{rd}rib) FA composition was analysed by gas chromatography.

Results Forage consumption was higher for HA ($p<0.01$). Total intake (pasture + grain or confined diets) was lower ($p<0.05$) while pasture utilisation was higher in LA-LS ($p<0.01$). CG reached target BF earlier due to higher LWG ($p<0.01$, Table 1). Carcass weight, BF and *longissimus* muscle area were consistently higher for MA-HS ($p<0.1$). Secondary production (kg LWG/ha) was higher in SS and LA-HS ($p<0.01$). HA had higher $_{c9,t11}$CLA, SFA and *n*3-PUFA, and lower MUFA and *n*6/*n*3 ratio, while the opposite occurred in confined T (Table 1).

Table 1 Weight gain (g/d) and meat fatty acid composition (g/100gFAME) from steers on different diets

	CG	SS	LA-HS	LA-LS	MA-HS	MA-LS	HA	s.e.m.
LWG (g/d)	1148 ^{a}	967 ^{b}	805 ^{bcd}	704 ^{d}	863 ^{bc}	755 ^{cd}	858 ^{bc}	39
$_{c9, t11}$CLA	0.44 ^{bc}	0.34 ^{c}	0.70 ^{a}	0.70 ^{a}	0.62 ^{ab}	0.69 ^{a}	0.77 ^{a}	0.043
SFA	41.0 ^{c}	43.2 ^{bc}	42.8 ^{bc}	43.4 ^{bc}	43.9 ^{b}	44.5 ^{b}	48.1 ^{a}	0.607
MUFA	47.3 ^{a}	47.2 ^{a}	45.1 ^{ab}	41.1 ^{c}	43.5 ^{bc}	41.6 ^{c}	40.3 ^{c}	0.800
PUFA	10.4 ^{cd}	9.6 ^{d}	12.1 ^{bc}	15.5 ^{a}	12.5 ^{bc}	13.9 ^{ab}	11.6 ^{bcd}	0.556
*n*3-PUFA	1.17 ^{d}	1.24 ^{d}	3.28 ^{c}	4.83 ^{ab}	4.15 ^{bc}	4.47 ^{ab}	5.33 ^{a}	0.441
PUFA/SFA	0.25 ^{cd}	0.22 ^{d}	0.29 ^{bc}	0.36 ^{a}	0.29 ^{bc}	0.31 ^{ab}	0.24 ^{cd}	0.013
*n*6/*n*3	7.98 ^{a}	6.67 ^{b}	2.46 ^{c}	2.11 ^{cd}	1.91 ^{d}	1.99 ^{cd}	1.04 ^{e}	0.697

Different superscripts indicate differences between treatments, LSD (α=0.05).

Conclusions Confinement and grazing dietary regimens affect beef production and produce meat with a different fat profile. Under intensive grazing systems grain supplementation can affect not only animal performance but also meat fatty acid composition and as a consequence meat quality.

References

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