

Table 1. Chemical composition and fatty acid profile of feedstuffs fed to beef heifers

Variable	Concentrate (n = 5)	Grass silage (n = 8)	Pasture (n = 29)
DM, g/kg	858 ± 1.5	178 ± 19.0	179 ± 2.3
CP, g/kg of DM	138 ± 16.5	177 ± 8.3	134 ± 10.9
Ash, g/kg of DM	79 ± 7.6	109 ± 4.9	104 ± 14.5
Oil, g/kg of DM	19 ± 1.4	34 ± 2.70	30 ± 2.99
DM digestibility, g/kg	—	620 ± 14.8	788 ± 40.3
Fatty acid composition, proportion × 100			
C16:0	21.77 ± 1.94	15.24 ± 1.30	14.22 ± 0.61
C18:0	3.87 ± 2.90	2.10 ± 0.31	4.20 ± 0.17
C18:1	14.48 ± 1.25	2.91 ± 0.79	2.22 ± 0.41
C18:2	47.92 ± 6.68	15.86 ± 0.85	11.16 ± 0.62
C18:3	5.76 ± 1.20	45.56 ± 4.00	47.50 ± 3.42
SFA ^a	27.04 ± 5.44	21.43 ± 2.28	21.68 ± 0.82
MUFA ^b	16.54 ± 0.33	4.40 ± 0.56	5.13 ± 0.39
PUFA ^c	53.79 ± 7.62	62.20 ± 3.81	59.41 ± 3.97

^aSum of all saturated fatty acids from C14:0 to C22:0.

^bSum of C14:1, C16:1, C18:1, C20:1.

^cSum of C18:2, C18:3, C20:2, C20:3, C20:4, C20:5, C22:4 and C22:6.

Consumo de grasa promedio:

- ✓ 0 d de pastoreo = 207 g/d
- ✓ 158 d de pastoreo = 224 g/d

Table 5. Effects of duration of grazing on fatty acid proportion of total lipids in fat from longissimus muscle of beef heifers

Fatty acids, proportion of total fatty acids × 100	Days at pasture				SEM	P ^a
	0	40	99	158		
C10:0	0.09	0.15	0.10	0.12	0.014	C
C12:0	0.05	0.05	0.05	0.05	0.004	NS
C13:0	0.02	0.02	0.02	0.02	0.004	NS
C14:0	2.08	2.53	2.31	2.09	0.100	Q
C14:1	0.34	0.38	0.37	0.30	0.020	Q
C15:0	0.43	0.49	0.49	0.48	0.016	Q
C16:0	24.13	23.44	24.07	21.71	0.258	C
C16:1	2.13	2.10	2.24	1.99	0.080	NS
C17:0	1.39	1.40	1.33	1.45	0.025	NS
C17:1	0.56	0.54	0.53	0.58	0.020	NS
C18:0	16.94	17.51	16.93	17.12	0.418	NS
C18:1cis-9	35.70	33.15	34.22	33.60	0.668	*
C18:1trans-9	0.38	0.35	0.43	0.39	0.024	C
C18:1cis-11	0.91	0.91	0.89	0.92	0.023	NS
C18:1trans-11	1.35	1.93	2.27	3.01	0.127	L
C18:2n6 cis	2.64	2.52	2.35	2.49	0.126	NS
C18:2n6 trans	0.13	0.14	0.16	0.18	0.008	L
CLA c9,t11	0.50	0.50	0.57	0.71	0.043	L
CLA t10,c12	0.03	0.04	0.07	0.07	0.006	L
C18:3n6	0.11	0.14	0.11	0.18	0.022	NS
C18:3n3	1.03	1.14	1.02	1.29	0.062	C
C20:0	0.14	0.15	0.13	0.14	0.006	C
C20:1	0.11	0.09	0.09	0.11	0.006	Q
C20:2n6	0.05	0.04	0.05	0.06	0.008	Q
C20:3n3	0.03	0.05	0.04	0.08	0.012	L
C20:3n6	0.11	0.11	0.10	0.11	0.009	NS
C20:4n6	0.52	0.52	0.40	0.47	0.039	NS
C20:5n3	0.22	0.28	0.25	0.30	0.026	NS
C22:0	0.04	0.06	0.03	0.02	0.005	L
C22:1n9	0.12	0.12	0.12	0.12	0.013	NS
C22:2n6	0.09	0.10	0.09	0.14	0.009	L
C22:5n3	0.38	0.43	0.43	0.54	0.031	L
C22:6n3	0.13	0.16	0.17	0.21	0.012	L
C24:0	0.07	0.03	0.02	0.02	0.023	NS
C24:1	0.02	0.03	0.02	0.05	0.007	L
Total SFA ^b	45.40	45.84	45.49	43.23	0.548	Q
Total MUFA ^c	41.64	39.60	41.19	41.06	0.700	NS
Total PUFA ^d	5.62	6.26	5.62	6.63	0.250	L
PUFA:SFA ratio	0.12	0.14	0.12	0.15	0.006	C
n-6 fatty acids ^e	3.50	3.80	3.06	3.46	0.213	NS
n-3 fatty acids ^f	1.59	1.90	1.88	2.37	0.111	C
n-6:n-3 ratio	2.21	1.99	1.63	1.46	0.054	L
Δ ⁵ -desaturase index ^g	0.470	0.450	0.458	0.466	0.070	NS
Total fatty acids, mg/100 g of muscle	2,461	2,329	2,754	2,515	177.5	NS

*P < 0.05.

^aNS = not significant; L, Q, and C are significant linear, quadratic, and cubic effects, respectively, of days at grass, P < 0.05.

^bSum of all even chain FA from C10:0 to C24:0 + C13:0, C15:0, and C17:0.

^cSum of C14:1, C16:1, C17:1, all C18:1, C20:1, C22:1, and C24:1.

^dSum of total n-6, total n-3, CLA c9,t11, and CLA t10,c12.

^eTotal n-6 = sum of C18:2, C18:3n-6, C20:2, C20:3n-6, C20:4, and C22:2.

^fTotal n-3 PUFA = sum of C18:3n-3, C20:3n-3, C20:5, C22:5, and C22:6.

^gCalculated as (C14:1+C16:1+C18:1)/(C14:0+C16:0+C18:0+C14:1+C16:1+C18:1).

PREGUNTAS

- ✓ Le parecen lógicos los resultados con respecto a contenido de:
 - CLA, relación PUFA:SFA, relación n-6:n-3
- Fundamente su respuesta*
- ✓ Cual es el efecto del consumo de pastura en la calidad de la carne?
- ✓ Cual es el origen AG de cadena impar?

Table 1. Ingredient composition (% wt/wt) of the control and experimental diets*

Component	Diet A (control)	Diet B	Diet C
Barley	36.0	36.0	36.0
Wheat	30.0	30.0	30.0
High-protein soybean meal	26.0	26.0	26.0
Fish meal	2.5	2.5	2.5
Mineral/vitamin supplement ^b	2.5	2.5	2.5
Tallow-soybean oil (4:1, wt/wt)	3.0	—	—
Rapeseed oil ^c	—	2.0	2.0
Fish oil ^d	—	1.0	1.0
All- <i>rac</i> - α -tocopheryl acetate, mg/kg diet	100	100	250

*Proximate composition of Diets A, B, and C, respectively (as analyzed): 16.8, 16.7, 16.9 MJ DE/kg DM; 24.2, 24.9, 23.7% CP; 9.9, 10.6, 9.7% NDF; 4.4, 4.4, 3.8% crude fiber; 6.3, 6.7, 6.2% ash; 5.5, 6.0, 5.8% acid hydrolyzed ether extract.

^bSupplied per kg of diet: 109 mg Cu, 27 mg Se, 9.1 g Ca, 4.8 g P, and 1.5 g Na.

^cRefined and deodorized; supplied by The White Sea and Baltic Company Ltd. (Leeds, U.K.); declared analysis: free fatty acid: .1% maximum, iodine value: 110, peroxide value: 1.0 mEq/kg maximum.

^dRefined; supplied by Seven Seas Ltd. (Hull, U.K.); declared analysis: free fatty acid: .08%, iodine value: 204, peroxide value: .98 mEq/kg.

Table 2. The fatty acid composition (% wt/wt of total fatty acids) of the control and experimental diets*

Fatty acid ^{ab}	Diet A (control)	Diets B and C ^c
SAT	15.4	1.19
16:1(n-7)	19.3	17.4
(n-7)	1.78	1.23
	.46	ND
(n-7)	.28	ND
	8.55	2.12
(n-9)	24.4	31.0
(n-7)	2.48	2.52
(n-6)	31.9	27.0
(n-3)	3.56	5.42
	.16	ND
(n-3)	.19	.43
(n-9)	.82	2.48
(n-3)	.52	1.19
(n-9)	.64	2.58
(n-3)	.74	1.67
MUFA	30	21
MUFA	30	40
PUFA	37	36
P:S ratio	1.2	1.7
18:2(n-6)/18:3(n-3)	9.0	5.0
Total (n-6)/total (n-3)	6.4	3.1

*The fatty acid X:Y(n-Z) represents a fatty acid with X carbon atoms and Y double bonds with the position of the first double bond being Z carbon atoms from the methyl end (n) of the molecule.

^bSAT = total weight percentage of 14:0, 16:0, 17:0, 18:0, and 20:0; MUFA = total weight percentage of 16:1(n-7), 17:1(n-7), 18:1(n-9), 18:1(n-7), 20:1(n-9), and 22:1(n-9); PUFA = total weight percentage of 18:2(n-6), 18:3(n-3), 18:4(n-3), 20:5(n-3), and 22:6(n-3); P:S ratio = ratio of PUFA:SAT.

Table 5. The fatty acid composition (% wt/wt of total fatty acids) of the total lipid extractable from the longissimus muscle in the pigs fed the control and experimental diets (n = 16 per diet)

Fatty acid ^a	Diet A (control)	Diet B	Diet C	SED ^b	Significance ^c
14:0	.95	1.04	1.06	.090	NS
16:0	21.3	21.9	21.5	.591	NS
16:1(n-7)	2.82	2.81	2.75	.193	NS
17:0	.41	.35	.34	.030	*
18:0	12.5	12.3	12.1	.25	NS
18:1(n-9)	29.4	32.1	32.6	1.53	†
18:1(n-7)	4.32	4.37	4.29	.108	NS
18:2(n-6)	18.2	15.4	15.5	1.35	†
18:3(n-3)	.78	1.00	1.13	.053	***
20:0	.17	.11	.14	.015	**
20:1(n-9)	.67	.98	1.01	.042	***
20:3(n-6)	.69	.56	.55	.078	NS
20:4(n-6)	4.54	3.28	3.21	.557	*
20:5(n-3)	.68	1.13	1.18	.125	***
22:1(n-9)	.01	.09	.12	.013	***
22:5(n-3)	1.09	1.16	1.04	.158	NS
22:6(n-3)	.77	.99	1.00	.097	*
SAT	35	36	35	.8	NS
MUFA	37	40	41	1.8	NS
PUFA	27	24	24	2.4	NS
P:S ratio	.8	.7	.7	.08	NS
18:2(n-6)/18:3(n-3)	23.6	15.5	13.9	1.29	***
Total (n-6)/total (n-3)	7.3	4.6	4.5	.17	***

^aSAT = total weight percentage of 14:0, 16:0, 17:0, 18:0, and 20:0; MUFA = total weight percentage of 16:1(n-7), 17:1(n-7), 18:1(n-9), 18:1(n-7), 20:1(n-9), and 22:1(n-9); PUFA = total weight percentage of 18:2(n-6), 18:3(n-6), 18:3(n-3), 18:4(n-3), 20:3(n-6), 20:4(n-6), 20:5(n-3), 22:4(n-6), 22:5(n-3), and 22:6(n-3); P:S ratio = ratio of PUFA:SAT. Not all fatty acids are presented.

^bSED = standard error of the difference between any two means.

^cNS: $P > .10$; † $P < .10$; * $P < .05$; ** $P < .01$; *** $P < .001$.

PREGUNTAS

✓ Le parecen lógicos los resultados con respecto a contenido de:

○ relación n-6:n-3

Fundamente su respuesta

✓ Que diferencias encuentra entre la carne de cerdos y rumiantes en relación a la relación PUFA:SFA? A que se debe esta diferencia?

Table 2. Composition of the TMR based either on Megalac (MEG), whole flaxseed (FLA), whole sunflower seed (SUN), or no fat supplement (CON).

Ingredient, % of DM	MEG	FLA	SUN	CON
Grass silage	33.2	33.2	33.5	31.5
Corn silage	23.2	20.1	21.1	20.2
Protein supplement ¹	10.7	4.4	6.3	7.8
Ground barley	26.1	30.8	27.7	28.7
Whole flaxseed	0	9.7	0	0
Whole sunflower seed	0	0	9.6	0
Megalac ²	4.6	0	0	0
Premix ²	1.5	1.5	1.5	1.5
Calcium carbonate	0	0.3	0.3	0.3
Ammonium phosphate	0.7	0	0	0

¹Contained (as fed basis): 10% soybean meal, 25.3% corn gluten meal, 20.5% distillers' wheat, and 44.2% Soyplus.

²Church and Dwight, Princeton, NJ.

³Premix contained (DM basis): 400,000 IU of vitamin A/kg, 70,671 IU of vitamin D₃/kg, 245 IU of vitamin E/kg, 6.8% Ca, 6.7% P, 2000 mg/kg of Mn, 1865 mg/kg of Zn, 463 mg/kg of Cu, 2900 mg/kg of Fe, 58 mg/kg of I, 24 mg/kg of Co, and 18 mg/kg of Se.

Table 3. Chemical composition of the 4 total mixed diets based either on Megalac (MEG), untreated whole flaxseed (FLA), untreated whole sunflower seed (SUN), or no fat supplement (CON).¹

Item	MEG	FLA	SUN	CON	SE
DM, %	45	45.6	46.7	47.4	0.5
OM, % of DM	92.4	92.7	92.7	93.1	0.1
ADF, % of DM	22.3	22.7	22.4	22.1	0.1
NDF, % of DM	33.7	35.2	34.7	34.8	0.3
CP, % of DM	16.7 ^a	15.9 ^b	16.1 ^b	15.9 ^b	0.1
Ether extract, % of DM	6.2 ^b	6.6 ^b	6.7 ^b	3.6 ^a	0.7
Fatty acids, % of total FA ²					
C14:0	1.5	ND	ND	0.9	0.3
C14:1	ND	ND	ND	ND	ND
C16:0	34.7	11.7	11	21.4	5.5
C16:1	0.2	ND	ND	0.6	0.2
C18:0	3.8	3.3	3.3	2.7	0.2
C18:1n3cis	25.9	18.3	18.5	15.3	2.2
C18:1cis11	0.7	ND	ND	0.7	0.02
C18:2n6cis	25.2	28.3	60.6	43.6	8.1
C18:3n3	7.2	28.4	6.6	14.8	7.8

^{a,b}Means within a row with no common superscript differ ($P < 0.05$).

¹Mean of 5-wk composite samples that were prepared from one weekly sample collected during each of 4 experimental periods.

²Mean of weekly composite samples that was prepared from 7 daily samples collected on the digestibility week during each of 4 experimental periods.

ND = Not detected.

Table 5. Milk fatty acid composition of Holstein cows fed a total mixed diet based either on Megalac (MEG), untreated whole flaxseed (FLA), untreated whole sunflower seed (SUN) or no fat supplement (CON).¹

Item	MEG	FLA	SUN	CON	SE
C10:0	3.4 ^c	4.6 ^b	3.3 ^c	5.0 ^a	0.2
C12:0	3.5 ^c	4.7 ^b	3.4 ^c	5.8 ^a	0.3
C14:0	11.2 ^c	14.0 ^b	11.1 ^c	15.4 ^a	0.5
C14:1	0.9 ^c	1.1 ^b	1.0 ^b	1.3 ^a	0.1
C16:0	38.0 ^a	31.2 ^b	24.2 ^c	38.1 ^a	1.6
C16:1	1.6	1.5	1.6	1.9	0.4
C18:0	10.2 ^c	13.7 ^b	15.7 ^a	8.4 ^d	0.8
C18:1n3trans	1.5 ^b	1.4 ^b	3.9 ^a	1.0 ^b	0.3
C18:1n6cis	24.8 ^b	23.1 ^b	29.8 ^a	17.9 ^c	1.2
C18:1cis11	0.53 ^b	0.55 ^b	0.70 ^a	0.68 ^a	0.04
C18:2n6cis	3.1 ^{ab}	2.4 ^b	3.8 ^a	3.2 ^a	0.2
C18:2n6trans	0.27 ^b	0.32 ^b	0.58 ^a	0.30 ^b	0.04
C18:3n3	0.6 ^b	1.1 ^a	0.5 ^b	0.6 ^b	0.1
C20:3n6	0.17	0.13	0.13	0.18	0.01
C20:4n6	0.18	0.19	0.19	0.23	0.01
Saturated ²	66.3 ^c	68.1 ^b	57.8 ^d	71.3 ^a	1.4
Unsaturated	33.7 ^b	31.9 ^b	42.1 ^a	28.7 ^c	1.4
PUPA	4.3 ^b	4.2 ^b	5.2 ^a	4.5 ^b	0.2
n-6/n-3	6.8 ^b	2.8 ^c	9.9 ^a	6.5 ^b	0.8
n-3	0.55 ^b	1.12 ^a	0.50 ^c	0.58 ^b	0.06
n-6	3.75 ^b	3.10 ^b	4.74 ^a	3.87 ^b	0.22

^{a,b,c,d}Means within a row with no common superscript differ ($P < 0.05$).

¹Least square means with pooled SE.

²Saturated = 10:0 + 12:0 + 14:0 + 16:0 + 18:0, unsaturated = 14:1 + 16:1 + 18:1n3trans + 18:1n6cis + 18:1cis11 + 18:2n6cis + 18:2n6trans + 18:3n3 + 20:3n6 + 20:4n6, and PUPA (polyunsaturated) = 18:2n6cis + 18:2n6trans + 18:3n3 + 20:3n6 + 20:4n6.

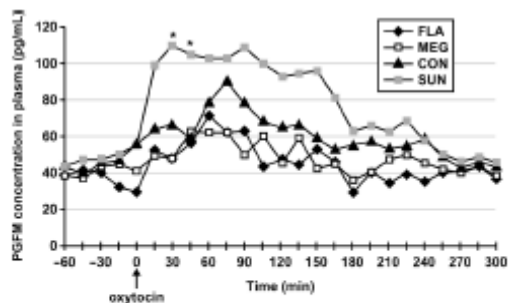


Figure 1. Mean plasma 13,14-dihydro-15-keto-PGF_{2α} (PGFM) concentrations following an oxytocin challenge on d 15 of a synchronized estrus cycle for lactating Holstein cows fed a total mixed diet based on Megalac (MEG), whole flaxseed (FLA), whole sunflower seed (SUN), or no fat supplement (CON). The PGFM response was higher in cows fed whole sunflower seed 30 and 45 min after injection of oxytocin (*, $P < 0.05$). SEM = 8.1 and n = 4.

Item	MEG	FLA	SUN	CON	SE
PGFM in plasma, ng/mL ²					
Mean ²	55.1 ^b	85.5 ^b	102.7 ^a	71.4 ^{ab}	10.7
Area under the curve ⁴	1744 ^b	2260 ^b	5734 ^a	2753 ^{ab}	788
Peak	72	82	128	92	16

PREGUNTAS

- ✓ Cual es el origen de los AG en la leche?
- ✓ Le parecen lógicos los resultados con respecto a la concentración de:
 - AG de cadena corta (<16C)
 - C18:2, C18:3
 - SFA, PUFA
 - relación n-6:n-3

Fundamente su respuesta

- ✓ Cual de los suplementos presenta una mayor biohidrogenación de los AG en el rumen?

Fundamente su respuesta

- ✓ PGFM es el metabolito originado en la degradación de la PGF_{2α}. Le parece lógico el resultado obtenido? Fundamente su respuesta

- ✓ En cuales animales esperaría un mayor porcentaje de luteólisis? Cual podría ser el efecto sobre la preñez?