Inclusion of maize silage in beef fattening diets: Effects on performance and meat quality

Casasús I., Ripoll G., Revilla R.*, Albertí P.
*CITA *CTA, Gobierno de Aragón. Zaragoza, Spain*

OBJECTIVE

Conventional feeding in Spanish beef fattening enterprises is based on *ad libitum* concentrates + straw.

In order to reduce feeding costs, the effects of using alternative diets with maize silage on performance and carcass and meat quality were tested.

Materials and Methods

32 Pirenaica and Blonde d'Aquitaine female calves placed on two diets from weaning (5.5 mo) to slaughter at 450 kg

Treatments (diets offered *ad libitum*)

- **Conventional diet (CONV)**:
  concentrates (13.2%CP, 4.3% CF) and barley straw
- **Total mixed ration (TMR)**:
  80% maize silage (7.7%CP, 22.1% CF)
  20% high-protein concentrate (14.8% CP, 17.4% CF)

Measurements

- Monthly weights
- Daily feed intake (per group) & feeding costs
- Carcass characteristics and income perceived
- Meat quality: colour and instrumental texture

Results

Performance

- Similar growth rate and time to reach target slaughter weight
- DM intake and feed : gain slightly higher in TMR animals
- Feeding costs per kg gain 13% lower in TMR

Diet	TMR	CONV	
Initial age, d	174	175	NS
Final age, d	448	425	NS
Length fattening period, d	274	250	NS
Initial weight, kg	152	165	NS
Final weight, kg	434	442	NS
Global ADG, kg/d	1.053	1.134	NS
Intake fresh matter (FM), kg/d	15.80	6.83	
Intake dry matter (DM), kg/d	6.53	6.00	
DM Feed : Gain, kg/kg	5.83	5.08	
Feed costs : Gain, €/kg	1.14	1.62	

Meat quality

No differences between treatments

- Similar tenderness after 0, 7 or 14 d ageing
- Similar meat colour at slaughter or through 13 d in either conventional or modified atmosphere packaging

Carcass quality

- Similar carcass characteristics

Diet	TMR	CONV	
Carcass weight, kg	251	261	NS
Dressing percentage, %	58.0	59.0	NS
Conformation score (1-18)	10.8	10.9	NS
Fat score (1-15)	4.8	5.9	*
€ perceived / carcass	1049	1096	NS

- Carcass fat: colour slightly more vivid in TMR

Diet	TMR	CONV	
L*	67.1	66.7	NS
Hue	69.6	74.3	NS
Chroma	12.1	9.3	**

CONCLUSIONS

The inclusion of maize silage in beef fattening diets reduced feeding costs while economic revenue and carcass and meat quality did not differ, providing an interesting alternative to fattening on concentrates.

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icasasus@aragon.es

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Casasús, I.[1], Ripoll, G.[1], Revilla, R.[2] and Albertí, P.[1], [1]CITA, Avda. Montañana, 930, 50059 Zaragoza, Spain, [2]CTA, Avda. Movera, 50194 Zaragoza, Spain; icasasus@aragon.es

In order to reduce feeding costs in Spanish beef fattening enterprises, an alternative to conventional feeding on concentrates and straw was tested. Thirty-two female calves received in a feedlot either of two fattening diets ad libitum from weaning to slaughter at 450 kg. One group received concentrates (13.2%CP, 4.3% CF) and barley straw (CONV), and the other was fed a total mixed ration (80% maize silage : 20% high-protein concentrate, 14.8% CP, 17.4% CF) (TMR). Animals were weighed monthly and feed intake was registered daily per group. At slaughter, carcass characteristics were assessed and samples of Longissimus thoracis were taken for the determination of meat quality (colour determined with a spectrophotometer, instrumental texture as Warner-Bratzler shear force). Animals from both treatments had similar growth rates (ADG 1.119 vs. 1.181 kg/d in TMR and CONV, respectively, NS), and therefore took a similar period to reach target slaughter weight (273 vs. 258 d, NS). Dry matter intake was slightly higher in TMR animals (6.53 vs. 6.0 kg DM/d, not statistically tested) and so was feed conversion ratio (5.83 vs. 5.08 kg/kg). Carcass characteristics were similar between both groups (271 vs. 275 kg in TMR and CONV, respectively, NS; 59.2 vs. 59.9% dressing percentage, NS; 10.5 vs. 10.6 points conformation score (U), NS; 5.3 vs. 5.5 points fat cover, NS), and therefore income perceived per carcass was similar (1122 vs. 1160 €, NS). There were no statistical differences in subcutaneous fat colour (although TMR animals tended to have higher a* and b* values in, indicating a higher pigment content) or meat tenderness (with a trend towers more tender meat in TMR animals). Meat colour was similar at slaughter or after 13 d in either conventional or modified atmosphere packaging. These results show that, with similar economic revenue per carcass, feeding costs per kg gain were 13% lower in TMR animals, while other costs were kept constant and carcass and meat quality did not differ.