Field pea can be included up to 30% in the fattening concentrate of lambs with minor effects on meat chemical composition

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Take home message The replacement of soya by field pea is advisable due to the minor changes produced in meat chemical composition

Introduction There is a growing interest to increase the use of field pea (*Pisum sativum*), which has a high content of starch (48%, Petit *et al*., 1997) and protein (19-26%, Soto-Navarro *et al*., 2012) in the diet of ruminants. It can be incorporated in lambs diets, the effects on meat quality being dependent on the breed (Colonna *et al*., 2014) or the rate of inclusion of field pea (Lestingi *et al*., 2016). The aim of the study was to evaluate if different proportions of field pea in the concentrate of fattening lambs affected meat chemical composition.

Materials & methods 54 weaned Rasa Aragonesa lambs (13.4 kg and 31 days of age) were randomly assigned to four treatments that differed in the inclusion of pea [0 (control), 10, 20 and 30%] in the fattening concentrate fed from weaning to slaughter (22-24 kg). The concentrates were formulated to be iso-energetic (1.18 MJ/kg FM) and iso-proteic (175 g CP/kg FM). After 24 h cooling, the *Longissimus thoracis et lumborum* muscle was excised and sliced to determine the chemical composition, cholesterol, lipid oxidation during oxygen exposure (0 to 9 days) and fatty acid profile (FA). The statistical analyses were performed using SAS v9.3. The chemical composition, FA and cholesterol were analysed with the GLM procedure with the inclusion of pea as the fixed effect. Lipid oxidation was analysed with a mixed model with pea, time and its interaction as fixed effects and the animal as random effect.

Results & discussion The inclusion of pea did not affect the chemical composition (Table 1), as reported with 24% inclusion (Scerra *et al*., 2011), but affected cholesterol content (Table 1), having the inclusion of 20% pea greater cholesterol content than the inclusion of 30% pea (P<0.05). The inclusion of pea affected only some individual saturated FA (C13:0, C15:0 and C17:0; data not shown) and consequently total saturated FA, the inclusion of 20% pea presenting greatest content (P<0.05). An inclusion of 24% pea modified saturated, monounsaturated and polyunsaturated FA (Scerra *et al*., 2011). Lipid oxidation was affected by the exposure time but not by the inclusion of pea (Figure 1).

Table 1 Effect of the inclusion of field pea on the chemical composition, cholesterol and FA profile.

	0%	10%	20%	30%	P-value
Dry matter, %	22.0	21.8	22.2	21.5	0.15
Crude protein, %FM	20.3	20.3	20.4	19.9	0.26
Ether extract, %FM	1.7	1.7	1.9	1.7	0.25
Cholesterol, mg/g	0.51^{ab}	0.51^{ab}	0.53^{a}	0.49^{b}	0.01
Saturated FA, %	44.98^{b}	44.97^{b}	46.67^{a}	45.16^{b}	0.01
Monounsaturated FA, %	40.19	40.15	40.11	40.47	0.98
Polyunsaturated FA, %	14.16	14.25	12.62	13.72	0.20
n-6, %	8.75	8.59	7.69	8.26	0.61
n-3, %	1.57	1.60	1.44	1.53	0.22

Means with different superscript differ at P<0.05

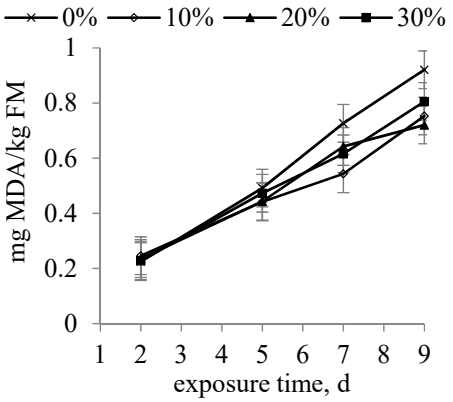

Figure 1 Effect of field pea inclusion on lipid oxidation during exposure.

Conclusion The inclusion of field pea had minor effects on the chemical composition and fatty acid profile. However, the inclusion of 20% of field pea increased the cholesterol and total SFA compared with the other concentrates.

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