

## Effect of the inclusion of field pea on the degradability of the dry matter of the concentrate and the volatile fatty acids in fattening lambs

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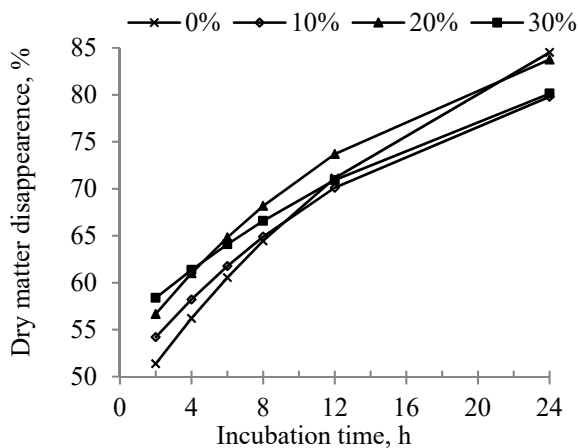
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**Take home message** The effect of the inclusion of field pea in the fattening concentrate of lambs on the degradability of dry matter and proportions of volatile fatty acids is dose-dependent.

**Introduction** The partial substitution of soya by field pea (*Pisum sativum*), a local source of protein, in the fattening diets of lambs has been encouraged to reduce the dependency of Europe on soya imports. The field pea has a high content of starch, with lower ruminal degradability than barley (Walhain *et al.*, 1992). Moreover, the ruminal solubility of the protein of field pea is greater than that of soya in cattle (Vander Pol *et al.*, 2009), but there are no studies in lambs. The aim of the study was to evaluate the effect of different proportions of field pea in the concentrate of fattening lambs on *in sacco* digestibility.

**Materials & methods** Four rumen-fistulated Rasa Aragonesa wethers (55 kg LW) were randomly assigned to four treatments that differed in the inclusion of field pea (0, 10, 20 and 30%) in the fattening concentrate during 4 periods. The concentrates were formulated to be iso-energetic (1.18 MJ/kg FM) and iso-proteic (175 g CP/kg FM). Every 15 days, 2 nylon bags (50 µm) per sample (3 g) were introduced through the fistula and incubated in the rumen for 2, 4, 6, 8, 12 and 24 hours. Ruminal content was extracted to determine pH, ammonia and volatile fatty acids (VFA). The disappearance of dry matter (DM) was studied during incubation and fitted to the equation  $y=a+b(1-e^{-ct})$  and N disappearance was studied after 24 h of incubation. Data were analysed using SAS v.9.3. The disappearance of DM was studied with NLIN procedure and the VFA, ammonia and N disappearance with proc GLM with the inclusion of field pea as fixed effect.

**Results & discussion** Rumen pH was not affected by the inclusion of field pea in the concentrate. The disappearance of DM is reported in Figure 1. The rapidly degradable and soluble fraction (a) was affected by the inclusion of field pea (P<0.05) being greater in 30% than in 0% field pea, presenting 10% and 20% intermediate values. The rate of degradation (c) and the slowly degradable fraction (b) were not affected by the inclusion of field pea. The inclusion of field pea did not affect total VFA production but affected the proportions of VFA (Table 1). The percentage of acetic acid was greater in 30% field pea (P<0.05). Propionic acid percentage was greatest in 20%, intermediate in 30% and 10% field pea and lowest in 0% field pea (P<0.001). Butyric acid percentage was greater in 0 and 10% than in 20 and 30% field pea (P<0.001). The inclusion of field pea tended to affect ammonia concentration (P<0.10) but did not affect the disappearance of N (P>0.05)



**Table 1** Effect of the inclusion of field pea on total and percentages of volatile fatty acids (VFA), ammonia and nitrogen (N) disappearance.

	0%	10%	20%	30%	P-value
VFA, mmol/l	104	101	103	99	0.36
acetic acid, %	69.9b	69.9b	69.8b	70.6a	0.04
propionic acid, %	13.6d	14.4c	15.6a	14.9b	0.001
butyric acid, %	12.5a	12.2a	11.4b	11.7b	0.001
isobutyric acid, %	1.06a	0.97b	0.91c	0.92c	0.001
valeric acid, %	1.00a	0.92bc	0.93b	0.87c	0.001
isovaleric acid, %	1.96a	1.58b	1.36c	1.11d	0.001
Ammonia, mg/l	105a	83ab	90ab	70b	0.06
N disappearance, %	48.0	29.4	37.3	48.0	0.66

Within a line, means with different letter differ at P<0.05

**Figure 1** Effect of the inclusion of field pea on dry matter disappearance during incubation.

**Conclusion** The inclusion of field pea affected the dry matter disappearance through the rapidly degradable and soluble fraction (a) and the proportions of VFA.

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### References

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