Linseed oil and natural or synthetic vitamin E in ewe diets: milk performance and fatty acid profile

Gallardo, B.[1], Manca, M.G.[2], Mantecón, A.R.[3], Nudda, A.[2], Manso. T.[1]

[1] E.T.S. Ingenierías Agrarias. Universidad de Valladolid. 34004 Palencia (Spain). Email: tmanso@agro.uva.es.
[2] Dpto. Science Zootechnique. Univeristà delgi Studi di Sassari, 07100 Sassari (Italy).
[3] Instituto de Ganadería de Montaña (CSIC-ULE). 24346 Grulleros. León (Spain).

Introduction

• In recent years, there has been a growing interest in enhancing the concentration of healthy fatty acids in ewe milk, being dietary inclusion of PUFA-rich lipids the most commonly nutritional strategy.

• Dietary PUFA intake appear to affect the rumen environment and thus the biohidrogenation pathway of α-linolenic acid.

• Studies have indicated a possible role of high doses of vitamin E in preventing shifts in PUFA biohidrogenation pathways.

Objetive

The objective of this study was to evaluate the effects of dietary linseed oil and vitamin E, synthetic or natural, on milk performance and fatty acid (FA) profile in early lactating ewes.

Material and Methods

• Two days after lambing, forty-eight Churra ewes were selected and assigned to one of the four dietary treatments (12 ewes per treatment).

• The experimental diets consisted of a total mixed ration (TMR) that varied according to the inclusion of linseed oil (LO) and the type of vitamin E, synthetic (LO+Syn E) or natural (LO+Nat E).

• Milk production was recorded once a week during the firs month of lactation by the oxitocine technique.

• Milk chemical composition was analysed by MilkoScan-400 analyser and fatty acid profile of milk fat was determined by Gas Cromatography.

• Milk yield and composition were analysed by repeated measurements analyses and fatty acid profile of milk fat by general linear model of SAS.

	CONTROL	LO	LO+Syn E[1]	LO+Nat E[2]
Ingredients, % as fed				
Deshydrated alfalfa	39.18	38.02	38.02	38.02
Soybean meal	17.13	16.72	16.72	16.72
Corn grain	11.77	11.42	11.42	11.42
Oat grain	10.33	10.02	10.02	10.02
Barley grain	7.82	7.58	7.58	7.58
Beet pulp	7.82	7.58	7.58	7.58
Molasses	4.99	4.85	4.85	4.85
Linseed oil	-	2.87	2.87	2.87
Vitamin mineral premix	0.97	0.94	0.94	0.94

[1] Diet supplemented with 400 mg/kg of syntetic vitamin E

[2] Diet supplemented with 400 mg/kg of natural vitamin E

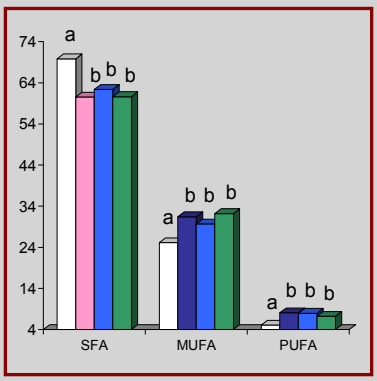
Results

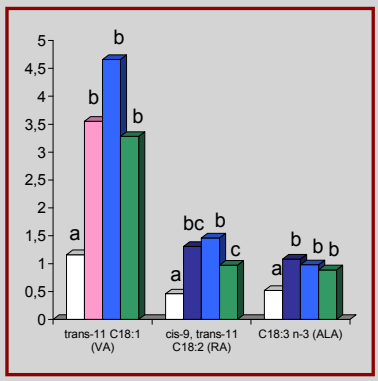
Milk production and chemical composition of milk

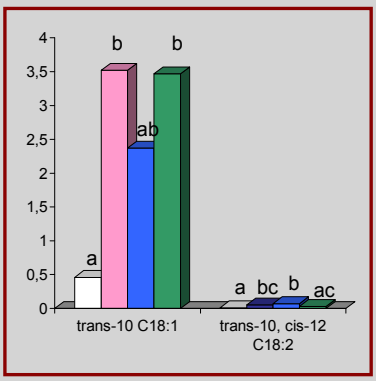
	Diets					Pvalue[1]		
	Control	LO	LO+Syn E	LO+Nat E	SED	D	T	D x T
Yield, g/day	2174	2203	2357	2491	223.4	ns	ns	ns
Composition %								
Fat	5,67[a]	6.16[ab]	6.71[b]	6.74[b]	0.385	*	*	ns
Protein	4.54[a]	4.56[a]	4.28[b]	4.39[ab]	0.102	*	***	ns

SED: standard error of difference; [1]Effects caused by experimental diet (D), time on diet (T), and their interaction (D x T)
a,b: different letters indicate significant differences (P< 0.05); ns P > 0,05; * P < 0.05; *** P < 0.001;

Milk fatty acid composition (g/100 g FAME)







Conclusions

Feeding linseed oil to lactating ewes could be a way to increase vaccenic acid, rumenic acid and PUFA n-3 in milk, whereas the type of vitamin E (natural or synthetic) added to the linseed oil diet could influence the content of some conjugated C18:2 isomers in milk.

Acknowledgements

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