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Influence of CLA supplementation on the lipid quality of rabbit meat

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RIASSUNTO – Effetti dell'integrazione di CLA sulla qualità dei lipidi della carne di coniglio. *Per la prova sono stati utilizzati 24 conigli, ibridi californiani, alimentati con 3 diete diversificate per quantità e qualità della fonte lipidica: la dieta di controllo conteneva olio di soia all'1%, mentre le altre sono state integrate rispettivamente con l'1 ed il 2% di un olio di girasole arricchito industrialmente di Acido Linoleico Coniugato (CLA). Le diete in esame hanno mostrato una buona appetibilità e gli animali in prova non hanno evidenziato alcuna patologia. Le carni ottenute hanno presentato un arricchimento in CLA, in maniera del tutto paragonabile alla percentuale di inclusione di tale acido grasso nella dieta.*

Key words: CLA, nutraceuticals, rabbit meat, fatty acids.

INTRODUCTION – Lately, animal science researchers are getting more and more interested in natural nutraceuticals in feeds because of their beneficial effect both to the animal and to the consumer. Conjugated Linoleic Acid (CLA) consists of a pool of geometrical and positional isomers, acknowledged as a potent anti-carcinogenic, anti-atherogenic, anti-obesity, anti-diabetes and immune stimulating factor (Parodi, 1999). Food products from ruminant animals, milk in particular, are naturally more or less rich in CLA, depending on feeding. CLA may be increased by dietary means. Aim of the present study was an attempt to upgrade the lipid quality of rabbit meat by supplementing the diet with CLA.

MATERIALS AND METHODS – 24 hybrid California rabbits of both sexes, in the finishing period (60 to 81 d), were randomly allotted to 3 groups, but separated in single cages and fed 3 diets supplemented with 2 different lipid sources: soy bean oil (1%) and sunflower oil (1 and 2%) industrially enriched with CLA (CLA oil). The pelleted basal diet was composed of barley (25.3%), sunflower meal (20.0%), dehydrated alfalfa (21.0%), middlings (26.0%), molasses (2.0%), oil (1.0 or 2.0%) and a mineral-vitamin supplement. The 3 diets were at the same levels of CP and of CF.
The CLA enriched oil, used in the present trial, was included in the diet in the liquid form at different levels: 0% in the control group (S), 1% CLA oil (group C1), 2% CLA oil (group C2). CLA oil was analysed for fatty acids by a gas-chromatograph fitted with a FID detector and equipped with a 100 m fused silica capillary column. CLA isomers were separated by silver ion HPLC. The proximate analysis fractions of the diet and the major fatty acids of the oil supplement are reported in Tables 1 and 2.

Feed intakes were recorded daily for each rabbit. Gains and feed efficiencies were recorded weekly. At the end of the trial (third week), muscle samples from thighs were analysed to test the fatty acid composition (Folch *et al.*, 1957). Dressing out percentages were measured at the slaughter house (81 d). Data were processed using the SAS procedure (SAS, 1999).

Table 1. Chemical composition of diets (% DM).

	DM	CP	EE	Ash	CF	P
Group S	91.5	16.5	3.6	9.1	15.8	0.6
Group C1	91.4	16.7	3.6	9.1	15.7	0.6
Group C2	91.6	16.6	4.6	8.6	15.8	0.6

Table 2. Fatty acids composition of oil supplements (g/100g of fatty acid).

Fatty Acids	Soy bean oil	CLA oil	Fatty Acids	Soy bean oil	CLA oil
C14:0	0.1	0.4	CLA t10, c12	-	20.0
C16:0	10.5	9.9	CLA t11, c13	-	4.5
C16:1	0.2	0.3	CLA cis, cis total	-	2.3
C18:0	3.8	4.1	CLA trans, trans total	-	1.7
C18:1 c9	21.7	30.5	Other CLA isomers	-	3.5
C18:2 c9, c12	53.1	1.5	C20:0	0.3	-
CLA c8, t10	-	4.0	C20:1	0.2	-
CLA c9, t11	-	17.3	C22:1	0.3	-
C18 :3 n3	7.4	-			

RESULTS AND CONCLUSIONS – Growth parameters are reported in table 3.
The fatty acids analysis of muscle samples from thighs showed an efficient transfer of CLA isomers to the rabbit meat during the finishing period, though only for three weeks (table 4). The growth parameters showed that gain and feed efficiencies were comparable for all diets.
The results obtained in this study showed that the use of CLA oil supplement in rabbit feeding could be an efficient strategy in order to get safer and safer foods with nutraceutical properties to the consumer.
The present work is a preliminary study, which provides further information of the possibility of enriching the rabbit fat with CLA (Corino *et al.*, 2003). Further studies are needed to verify these results, above all the immune modulating properties of CLA isomers in the perspective that the European Union is about to ban antibiotics in animal feeds.

Table 3. Average weight gains (g/d), feed efficiencies and final dressing out percentages.

	Diet S	Diet C1	Diet C2	SE
Gain (60-67 d)	335.6	336.3	318.1	23.8
Feed eff. (60-67 d)	4.0	4.2	3.7	0.2
Gain (68-74 d)	309.4	272.5	265.5	20.5
Feed eff. (68-74 d)	4.3	4.9	4.7	0.2
Gain (75-81d)	220.0 a	268.8 b	205.7 a	18.0
Feed eff. (75-81 d)	6.5 a	5.1 b	5.6 ab	0.4
Gain (60-81 d)	865.0	877.5	762.5	44.1
Feed eff. (60-81 d)	4.5	4.6	4.6	0.2
Dressing out %	60	59	60	0.1

a, b: $P \leq 0.05$.

Table 4. Major fatty acids in muscle samples from thighs (g/100g of lipid).

Fatty acids	Diet S	Diet C1	Diet C2	SE
C14	0.69a	0.15b	0.54a	0.10
C14:1	0.06a	0.01b	0.02b	0.01
C15	0.12a	0.04b	0.07b	0.02
C16	7.51a	1.99b	4.62c	0.81
C16:1 n7	0.87a	0.07b	0.23c	0.04
C17	0.11	0.05	0.08	0.02
C18	1.23a	0.64b	1.19a	0.23
C18:1 c9	7.86a	1.80b	3.92c	0.83
C18:1 c11	0.39a	0.05b	0.13b	0.03
C18:2 c9,c12	6.69a	2.20b	3.29b	0.64
CLA c9, t11	0,00a	0.01a	0,12b	0.02
CLA t10, c12	0,00a	0.03a	0,14b	0.02
CLA other isomers	0,00a	0.03a	0.09b	0.02
C18-3 n 3	0.44a	0.11b	0.21b	0.06

a, b $P \leq 0.05$.

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REFERENCES – **Corino**, C., Filetti, F., Gambacorta, M., Manchisi, A., Magni, S., Pastorelli, G., Rossi, R., Maiorano G. 2003. Influence of dietary conjugated linoleic acid (CLA) and age at slaughtering on meat quality and intramuscular collagen in rabbits. Meat Sci. 66: 97-103. **Parodi**, P.W., 1999. Conjugated linoleic acid and other anticarcinogenic agents of bovine milk fat. J. Dairy Sci. 82: 1339-1349.