Improving the fatty acid composition of animal originated food by nutrition

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INTRODUCTION

In recent years several works were focused on possible changing the composition of animal products (meat, milk and egg) in order to better meet human demands. Fat content and fatty acid composition of foods of animal origin have great importance in terms of human nutrition.

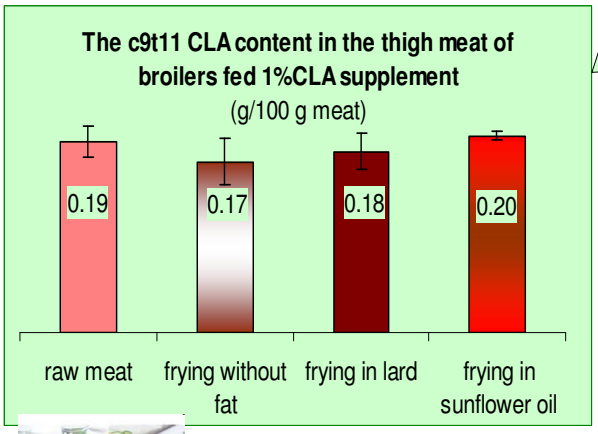
In one part of our experiments the effect of the by us produced CLA supplement on the fatty acid composition of broiler meat and egg yolk was investigated. In other experiments with lambs the aim was to increase the n-3 fatty acid content of lamb meat by feeding bypass linseed oil (calcium soap of linseed oil).

RESULTS

The aim of the broiler and laying hens experiments was to determine the effect of dietary CLA-supplement on the fatty acid profile of the meat and egg. The CLA-supplement used was produced by alkaline isomerisation of sunflower oil in our department. This product contained 53.5% CLA.

Ten Merino lambs (5 lambs/group) were used to assess the effect of the dietary calcium soap of linseed oil on the fatty acid profile of lamb meat. The calcium soap of linseed oil was produced in our laboratory, which contained 51% α-linolenic acid of total fatty acids.

	Broiler (Ross 308 roosters) 50 birds/treatment			**Laying hens** (Shaver 576 hybrids) 40birds/treatment	
Parameters	**Control**	**CLA1**	**CLA2**	**Control**	**Experimental**
CLA in the diet (%)	0	1	2	0	1
Sunflower oil in the diet (%)	4	3	2	3	2
	thigh meat			egg	
SFA	26.13 ± 1.42^{c}	37.70 ± 1.37^{b}	41.78 ± 1.45^{a}	32.1±0.92^{a}	43.8±2.28^{b}
MUFA	38.58 ± 2.27^{a}	30.47 ± 1.29^{b}	26.65 ± 1.15^{c}	42.0±1.96^{b}	28.3 ±1.58^{a}
c9,t11-C18:2 n6	0.01 ± 0.01^{c}	1.84 ± 0.11^{b}	3.49 ± 0.30^{a}	0.06±0.02^{a}	1.20±0.11^{b}
t10,c12-C18:2 n6	0.05 ± 0.01^{c}	1.15 ± 0.09^{b}	2.34 ± 0.29^{a}	0.01±0.01^{a}	0.32±0.06^{b}
PUFA	34.81 ± 3.26^{a}	31.44 ± 1.41^{b}	30.67 ± 2.01^{b}	24.2± 212^{a}	26.7±1.64^{b}



	Merino lambs *biceps semimembranosus* muscle	
	Control	**Soap**
Calcium soap of linseed oil (%)	0	3
Sunflower oil (%)	1	0
SFA	44.39±1.81^{a}	44.49±0.90^{a}
MUFA	43.00±1.95^{a}	40,18±1,48^{b}
C18:2 n6	5.53±0.52^{a}	5.02±0.86^{a}
C18:3 n3	0.51±0.04^{b}	0.80±0.15^{a}
PUFA	7.99±0.53^{a}	7.79±0.75^{a}
n6/n3	8.43:1	5.82:1

SFA=saturated fatty acids, MUFA=monounsaturated fatty acids, PUFA=polyunsaturated fatty acids
a,b,c: different superscripts within a row indicate significant differences (P<0.05)

CONCLUSION

Our results presented that the addition of 1% CLA-product to the diet is an efficient way to improve significantly the CLA content in broiler meat and in eggs, which is favorable in terms of human nutrition. Frying does not alter the increased CLA content of the raw meat, if the frying is done in lard or in sunflower oil. Further studies are needed to eliminate some adverse effects of CLA supplementation on the fatty acid profile.

Feeding of calcium soap of linseed oil is an appropriate method to improve the n-3 fatty acid content in lamb. Further work is needed to determine the optimum level of supplementation to achieve the most beneficial fatty acid profile in terms of human nutrition without impairing the sensory properties.

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