

# Enrichment of conjugated linoleic acid (CLA) in the eggs of laying hens fed pure isomers of CLA or vaccenic acid

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## Abstract

Conjugated linoleic acid (CLA) is a complex mixture of positional and geometric conjugated isomers of linoleic acid. Dairy products are principal dietary CLA source with *cis*-9, *trans*-11 CLA (9,11 CLA) the predominant isomer derived from vaccenic acid (VA, *trans*-11C18:1). Due to potential human health benefits attributed with CLA intake, several studies have attempted to enrich eggs with CLA. Results are consistent with  $\Delta$ -9 desaturase inhibition by *trans*-10, *cis*-12 CLA isomer (10,12 CLA) in CLA mixtures.

We supplemented laying hens diets with relatively pure forms of 9,11 CLA, 10,12 CLA, or mixture of the two isomers and determined the transfer efficiencies of these isomers into egg yolk and examined endogenous conversion of VA to 9,11 CLA in hens. Treatment diets were supplemented with 0, 0.5, 1.0 and 1.5 g/d of CLA or VA and fed to three hens per treatment for 21 days.

Transfer efficiencies of 9,11 CLA and 10,12 CLA in egg yolk total lipids of 21 and <1%, 24 and 12%, 20 and 9%, respectively were measured per CLA source. Regression showed that 74% of VA available for desaturation was converted to 9,11 CLA. Studies examining other limitations of VA transfer to the liver and availability for conversion by  $\Delta$ -9 desaturase are envisaged.

**Keywords:** CLA; vaccenic acid; laying hens;  $\Delta$ -9 desaturase

## Effect of CLA supplementation on chicken egg quality after 6 wk at 4°C

Variable	Control	Treatment								
		9,11 CLA			10,12 CLA			CLA Mix		
		0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5
Hardness <sup>3</sup>	0.53	0.52	0.46	0.42	0.36	0.33	0.33	0.44	0.46	0.45 <sup>1,2</sup>
pH										
Yolk	6.57	6.42	6.57	6.46	6.50	8.13	7.94	6.41	6.57	7.32
Albumen	9.21	9.30	9.11	9.29	9.21	8.92	8.91	9.20	9.16	9.04

<sup>1</sup>Standard errors for hardness, yolk pH and albumen pH were 0.113, 0.575 and 0.151, respectively.

<sup>2</sup>Overall p-values for hardness, yolk pH and albumen pH were 0.265, 0.038 and 0.156, respectively.

<sup>3</sup>Hardness of boiled egg yolk (proportional indentation of the yolk when placed under a weight of 4.7N standardized by egg yolk weight).