

Effect of Forage Proportion and Monensin Supplementation on Milk Conjugated Linoleic Acid Content

R. Mohammed¹, J.J. Kennelly¹ and J.K.G. Kramer²

¹Department of AFNS, University of Alberta, Edmonton, T6G 2P5 Canada ²Guelph Food Research Centre, AAFC, Guelph, N1G 5C9 Canada

Email: rm14@ualberta.ca

Conjugated linoleic acid (cis9, trans11-CLA or simply CLA) is a component of milk fat reported to have anti-cancer effects in animal models. It is believed that humans would also derive similar benefits if milk could be enriched with CLA. Diets supplemented with a source of linoleic acid (eg. sunflower oil, safflower oil) have been reported to increase milk CLA precursor (vaccenic acid or VA) and CLA considerably. However, milk CLA is also influenced by the components in the basal diet. The objective of this study was to investigate the effect of forage proportion, monensin and its interaction on milk CLA content. Forty Holstein cows in mid-lactation were assigned to 4 diets in a 2 x 2 factorial arrangement of treatments. Treatments contained two levels of forage (60% or high forage and 40% or low forage) and two levels of monensin per kg DM (0 ppm or M- and 16 ppm or M+). All diets were supplemented with sunflower seed (3.6% DM basis). Milk samples were collected at the end of 2nd and 4th week during treatment.

Table 1. Effect of forage proportion and monensin on intakes, production and milk concentrations of vaccenic acid and CLA

Variable	Treatments ¹				SEM	Significance ²		
	High forage		Low forage			F	M	F x M
	M+	M-	M+	M-				
DMI, kg/d	16.8	18.4	17.3	17.3	0.72	0.66	0.26	0.27
Milk yield, kg/d	32.8	29.2	33.6	30.6	1.59	0.48	0.05	0.84
Fat yield, kg/d	0.99	0.87	0.92	0.86	0.06	0.48	0.18	0.60
Protein yield, kg/d	0.93	0.82	1.03	0.93	0.05	0.05	0.05	0.92
Fat, %	3.3	2.9	2.8	2.8	0.14	0.05	0.19	0.34
Protein, %	2.9	2.9	3.1	3.1	0.06	< 0.01	0.95	0.69
Vaccenic acid ³	1.2	1.3	1.2	1.7	0.13	0.07	0.02	0.08
c9t11-CLA ³	0.61	0.77	0.70	0.98	0.06	0.02	< 0.01	0.34

¹Treatments were high forage (60% DM basis) with (M+) or without (M-) monensin and low forage (40% DM basis) with or without monensin.

²F = forage proportion; M = monensin; F x M = interaction between forage and monensin.

³ t = *trans*; c = *cis*; CLA = conjugated linoleic acid; % of total fatty acid methyl esters.

Conclusions: Milk CLA precursors and CLA could be enhanced with low forage diets without monensin compared to the other diets. However, monensin supplementation favoured greater milk yield and protein yield.