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Incremental effects of feeding a rumen-inert MUFA supplement to dairy cows on milk *trans* fatty acid isomer composition

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Milk and dairy products contribute to about 20% of the average daily intake of *trans*-fatty acids (TFA) in UK adults⁽¹⁾. The evidence of their effects on human subjects health are equivocal, but at current intakes and food compositional levels TFA from ruminant products are thought not to be a significant risk factor for CVD. However, there is concern that current strategies to reduce milk SFA will lead to substantial increases in TFA concentrations. Feeding rumen-protected sources of *cis*-MUFA to dairy cows would minimise the appearance of TFA in milk fat, but research to date has been inconsistent⁽²⁾. The aim of the present study was to measure the effect of feeding incremental amounts of a novel calcium salt (CS) of *cis*-MUFA on TFA isomer composition of milk fat.

Four multiparous, late-lactation Holstein–Friesian cows were randomly allocated to one of four dietary treatments in a 4 × 4 Latin Square design with 21 d experimental periods. Treatments were a control diet (control) containing no supplemental fat, or the same basal diet with CS of *cis*-MUFA (Volac International Ltd.) fed at 20, 40 and 60 g/kg DM (CS2, CS4 and CS6, respectively). Milk composition was analysed during the last 3 d of each experimental period⁽³⁾.

	Least square means (g/100 g fatty acids)				SEM	P (LIN)
	Control	CS2	CS4	CS6		
ΣSFA	71.0	63.1	57.1	51.6	1.66	<0.001
Σ <i>cis</i> -MUFA	19.9	24.4	27.7	30.8	0.91	<0.001
Σ <i>trans</i> -MUFA	4.7	7.4	9.6	11.7	0.80	<0.001
<i>trans</i> -6–8 18:1	0.23	0.52	1.01	1.33	0.078	<0.001
<i>trans</i> -9 18:1	0.22	0.52	0.78	0.96	0.060	<0.001
<i>trans</i> -10 18:1	0.37	0.76	0.89	1.10	0.075	<0.001
<i>trans</i> -11 18:1	1.3	2.4	3.4	4.4	0.45	<0.001
<i>trans</i> -12 18:1	0.44	0.74	1.03	1.26	0.082	<0.001
<i>trans</i> -13–14 18:1	1.2	1.2	1.5	1.6	0.071	0.006
Σ <i>trans</i> -PUFA	1.9	2.9	3.6	4.3	0.26	<0.001
Σ CLA	0.69	1.21	1.62	1.90	0.135	<0.001
Σ <i>trans</i> -fatty acids	6.5	10.0	13.3	16.2	1.02	<0.001

P (LIN) represents linear effect. CS2, CS4 and CS6 – treatment diets containing 20, 40 or 60 g/kg DM calcium salts.

Incremental inclusion of CS linearly ($P < 0.001$) decreased milk fat SFA and increased *cis*-MUFA concentrations. However, there were also significant increases ($P < 0.001$) in all *trans*-18:1 isomers measured, some *trans*-PUFA, and total conjugated linoleic acid (CLA), leading to an overall increase in total TFA (16 g/100 g fatty acids for CS6). This indicates CS of *cis*-MUFA were at least partially metabolised in the rumen and that alternative rumen-protection methods for MUFA are needed to minimise increases in TFA concentrations that accompanied decreased SFA in milk fat.

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