Rumen protected conjugated linoleic acids: effects on milk composition in dairy cows

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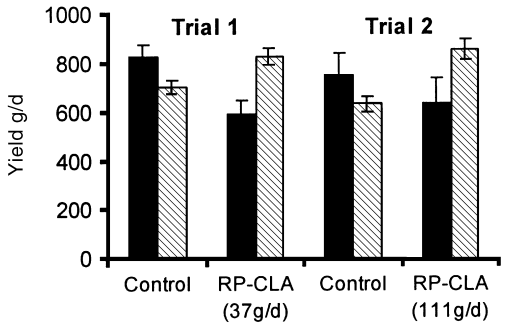
Conjugated linoleic acids (CLA) are geometrical and positional isomers of conjugated linoleic acid having potent metabolic effects. They reduce plasma triacylglycerol, cholesterol, fat deposition and have anti-cancer and anti-inflammatory properties (1). In ruminants CLA are formed either by partial hydrogenation of C18-di and tri-unsaturated fatty acids in the rumen or are synthesised in tissues from trans-11-octadecanoic acid via the △9 desaturase pathway (2). Ruminant-derived foods provide significant sources of CLA in the human diet and because of their potential health benefits, current research is directed towards increasing the CLA content of meat and milk products. Previous studies have shown abomasal infusions of CLA and dietary supplements of unsaturated oils increased the CLA content in milk but had no effect on milk protein yield (2).

The effect of feeding CLA protected from ruminal hydrogenation (RP-CLA) by encapsulation in an inert matrix of protein (3) on milk composition are presented in the figure below.



Protein yield ▨ and fat yield ■ in Holstein cows (trial 1, n = 5; trial 2, n = 3) at pasture, supplemented with RP-CLA for 4 days.

In short term feeding trials supplements of RP-CLA significantly increased milk protein yield ($P < 0.05$) and reduced milk fat yield ($P < 0.05$); the proportion of CLA in milk increased from 1.4 to 2.2%. The CLA-induced increase in milk protein yield reflects a major re-channeling of nutrient use in the dairy cow; where protein synthesis and secretion is enhanced and lipogenesis is inhibited. Long term feeding trials are required to assess the impact of RP-CLA on lactation and reproductive performance.

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