

Milk Fatty Acid Composition of Dairy Cows Fed Increasing Amounts of Linseed Oil.

Chaouki Benchaar

Dairy and Swine Research and Development Centre, Agriculture and Agri-Food Canada, Sherbrooke, QC J1M 1Z3
E-mail: Benchaarc@agr.gc.ca

Certain fatty acids (FA) in milk may exert beneficial effects on health, such as the anti-carcinogenic properties of conjugated linoleic acids (CLA) and a possible role of *n*-3 FA in preventing coronary disease. Thus, researchers are seeking to improve milk FA profile. Linseed and linseed oil are excellent sources of *n*-3 FA (50-60% of α -linolenic acid) and they can be used to enhance milk fat content of CLA and *n*-3 FA.

This study was conducted to determine changes in milk FA composition resulting from incorporating varying amounts of linseed oil (LO) into total mixed rations for dairy cows. Four primiparous cows (BW=566 kg, DIM=73 d) used in a 4×4 Latin square design (21 d adaptation + 7 d sample collection) were fed a control TMR (CON) or a TMR supplemented (DM basis) with LO at 2% (LO-2), 3% (LO-3), or 4% (LO-4). Milk fat content (g/100 g of FA) of C16:0 decreased linearly (27.0, 21.0, 19.1, and 17.4% for CON, LO-2, LO-3, and LO-4; respectively), whereas the concentrations of C18:0 (8.11, 10.2, 11.1, and 11.3%) and *cis*-9 C18:1 (14.2, 16.8, 17.1, and 17.6%) increased linearly with LO addition. The concentrations of several intermediates of ruminal biohydrogenation of polyunsaturated FA were also higher for the CON vs. LO and decreased linearly with LO addition; including *trans*-10 C18:1 (0.25, 0.43, 0.51, and 0.76%), *trans*-11 C18:1 (0.78, 1.54, 2.05, and 2.86%), *cis*-9- *trans*-11 C18:2 (0.36, 0.68, 0.87, and 1.22%), *trans*-11 *cis*-15 C18:2 (0.050, 0.56, 1.03, and 1.68%), and *cis*-9 *trans*-11 *cis*-15 C18:3 (0.01, 0.07, 0.10, and 0.12%). The concentration of *cis*-9- *cis*-12 C18:2 decreased linearly with LO addition (2.06, 1.99, 1.91, and 1.83% for CON, LO-2, LO-3, and LO-4; respectively). Milk fat concentration of *cis*-9 *cis*-12 *cis*-15 C18:3 increased as the level of LO in the diet increased up to 3% but no further increase was observed when 4% of LO was fed (0.33, 0.79, 0.86, and 0.86% for CON to LO-4; respectively).

Implications: Adding linseed oil to diets for dairy cows can improve the nutritive value of milk fat by enhancing concentrations of health-promoting fatty acids such as CLA and *n*-3 FA.