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The effect of fishmeal or peameal on milk fatty acid composition in organic farming

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Feed fatty acid (FA) composition influences the FA composition of cow milk. In a continuous production experiment with 32 Norwegian red dairy cows fishmeal (FM) was compared to peameal (PM) as protein supplement to home-grown cereals and grass silage in organic farming. The protein supplements were together with cereals formulated to be isonitrogenous and isoenergetic (NEL) and were compared at high (HC) and low concentrate (LC) level.

The concentrate rations did not affect the intake of silage. Fishmeal resulted in significantly higher milk yield (kg) with a lower fat concentration (HC) compared to PM. Lower concentrations of urea and FFA were found in milk produced with FM compared to PM. Milk flavour and odour was equal or better when FM rather than PM was fed. Fishmeal diets increased significantly the proportions of several long-chain FAs: oleic acid (C18:1c9), vaccenic acid (C18:1c11), CLA (C18:2c9,t11, not significant at HC), C20:0, C18:1t10, and DHA (C22:6 n-3) in milk fat compared to PM. DHA, which is found in high concentrations in FM (14 g/100g FAME), had the most significant increase. The proportion of C18:3 n-3 (ALA) was significantly lower when FM was fed compared to PM. The percentage of saturated FA was significantly lower and the percentage of monounsaturated FA was higher when FM rather than PM was fed. For cows on HC the n-6/n-3 ratio was lower in the FM group than in the PM group, and the ratio was lower at LC than at HC ($p = 0.006$, interaction $p = 0.02$).

Fishmeal diets included higher proportions of oats than PM diets. Oats have high content of oleic acid and may therefore have influenced the composition of FAs in milk fat as well as the protein supplements.

Fishmeal increased the proportion of beneficial FAs without reducing the sensoric quality of milk. It remains unclear whether this is an effect of protein source or an effect of the higher oat proportions in FM diets.