

CONTENT OF FATTY ACIDS, VITAMIN E AND CAROTENOIDS IN MILK AND HERBAGE AS AFFECTED BY SWARD COMPOSITION AND PERIOD OF GRAZING

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Abstract

The quality of organic milk is affected by feed composition, and especially the high use of legumes has been identified as the reason for high levels of polyunsaturated fatty acids, carotenoids and tocopherols in organic milk.

Four different pastures composed of mainly white clover (WCL), red clover (RCL), lucerne (LUC) or chicory (CIK), respectively, were established to investigate the influence of sward composition on the milk quality of grazing cows. On three occasions during the grazing period (May, June and August), groups of 12 Holstein cows were grazing the pastures for two weeks. About 70% of the daily dry matter intake was pasture, and the remaining dry matter intake was a mixture of oats, hay and minerals (82%, 16%, 2%, respectively). The swards were sampled, and their feed quality as well as their composition of carotenoids, tocopherols and fatty acids was analysed. On each occasion, milk was sampled after two weeks of grazing, and the content of tocopherols and carotenoids as well as the composition of fatty acids was analysed.

The overall feed quality expressed as IVOMD (in vitro organic matter disappearance) and NDF (neutral detergent fibre) was affected by period and to a lesser extent by forage type. The content of carotenoids was higher in RCL compared to the other forages, while no effect of period was observed. Alpha-tocopherol was neither affected by period nor by forage type. Fatty acid content, in particular content of linolenic acid, decreased during the grazing period, and it was highest in RCL, intermediate in CIK and lowest in WCL and LUC.

Milk yield was neither affected by period nor by forage type. Milk fatty acid composition and content of alpha-tocopherol and carotenoids showed minor differences between forage types and sampling occasions. However, multivariate analysis of these data showed grouping according to sampling occasion, but no clear grouping according to forage types.

Despite the differences in composition of forage and in composition of milk, it was not possible to predict milk content of specific fatty acids, carotenoids or tocopherols from the feed content of these compounds. This was partly explained by differences in feed digestibility.

Comparison of the milk with previous studies showed higher concentrations of beneficiary compounds such as linolenic acid (12 mg/g fatty acids), conjugated linoleic acid (13 mg/g fatty acids), carotenoids (6 µg/g milk fat) and alpha-tocopherol (21 µg/g milk fat), and it was concluded that all the forages tested could be used in production of a milk with such properties.

Key words: *pasture, milk, fatty acids, tocopherol, carotenoids*

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