

Model evaluation and genetic parameters for milk urea nitrogen in Holstein dairy heifers

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Milk urea nitrogen (MUN) routinely recorded by infrared might be used as a selection trait to prevent higher nitrogen excretion. Therefore, model evaluation and estimation of both heritability and genetic relationships to the important milk production traits are needed. Data of 589 heifers tested between the 8th and the 180th day of lactation from the bull dam performance test at the dairy research farm Karkendamm were analysed. Cows were fed a total mixed ration ad libitum twice daily. Additionally, a fixed amount of concentrates was given via feeding stations. Milk ingredients were analysed weekly, and milk yield was recorded automatically for each milking. In model evaluation five well established parametric functions of days in milk were chosen for modelling both fixed and random regression coefficients. Model fit was judged by two information criteria and by illustration of the residuals against days in milk. Subsequently, on the basis of the best fitted random regression model variance components were estimated by REML. In addition to the fixed and random regressions the model includes the fixed effects test day and age of first calving. Estimations were based on univariate (heritabilities) and bivariate (genetic correlations) runs. The function of Ali and Schaeffer seems to be most suitable for modelling both the fixed and the random regression part of the mixed model. A serious alternative is the Legendre polynomial of fourth degree. Heritability for MUN ranges between 0.28 and 0.48. The yield traits milk, fat and protein are unfavourably genetically correlated with MUN. In contrast, fat and protein content are favourably correlated with MUN. So, a consequent selection on fat and protein content could reduce nitrogen excretion.

Variability of major fatty acid contents in Luxembourg dairy cattle

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Common human health concerns and imminent needs for more sustainable nutrition patterns require from dairy industry and farmers a. o. a closer look at milk fatty acid (FA) profile. Therefore up to date calibration equations using mid-infrared (MIR) spectrometry were developed permitting the estimation of FA contents in bovine milk. The aim of this study was to estimate the variability of the major FA from data collected during the Luxembourg routine milk recording. A total of 148,296 milk samples with MIR-spectra were collected from October 2007 to January 2009 on 36,522 cows belonging to 5 breeds in 718 herds and scanned by Foss MilkoScan FT6000. The contents of saturated FA, monounsaturated FA, omega-9, short chain FA, medium chain FA, and long chain FA were obtained using Belgian MIR calibration equations. Analyses were done by a multi-trait multi-lactation animal mixed models. Fixed effects were herd*test date, lactation stage*lactation number, age*lactation number, and breed effect. Random effects were herd*year of calving, permanent environment within and across lactation, animal effect, and residual effect. Breed differences as well as lactation effects were observed. Our results showed moderate heritability values suggesting the existence of a FA genetic variability. The variability of the first Luxembourg breeding values was large enough to develop selection tools for improving the nutritional quality of bovine milk fat.