

THE EFFECT OF CATTLE BREED AND LACTATION STAGE ON NUTRIENT CONCENTRATIONS IN MILK AND THE FATTY ACID PROFILE OF MILK FAT

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Abstract. The aim of this study was to determine the effect of cattle breed (Holstein-Friesian – HF, Jersey – JE, HF x JE) and lactation stage (days 160, 220 and 280) on nutrient concentrations in milk and the fatty acid profile of milk fat. An analysis of lactation stage on the chemical composition of milk revealed that the concentrations of dry matter, protein and fat tended to increase until day 220. The content of dry matter, ash and fat in milk increased further until day 280. Cattle breed had a significant effect on the levels of saturated fatty acids (SFA) in milk fat. The concentrations of long-chain fatty acids (LCFA) in bovine milk were considerably higher (66.26% on average), compared with short-chain fatty acids (SCFA) (9.11% on average). SCFA content tended to decrease with the progress of lactation. The differences among the analyzed stages of lactation were significant at $p \leq 0.05$ for C_{4:0} and C_{10:0} fatty acids. In the group of LCFA, the content of C_{12:0} and C_{18:0} fatty acids was higher on day 160 of lactation, and the content of C_{14:0 iso} and C_{16:0} fatty acids was higher towards the end of lactation, on day 280. The average concentrations of monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA) in milk fat were 21.97% and only 2.79%, respectively. The highest MUFA (C_{10:1}, C_{12:1}, C_{14:1}, C_{18:1 cis9}) content of milk was noted in HF cows, and the lowest in HF x JE crossbreeds. HF x JE cows were characterized by the highest content of only trans-isomers of monounsaturated fatty acid C_{18:1 16+19+10+11}. The concentrations of n-3 fatty acids were highest in HF cows. HF cows had also a desirable n-6/n-3 fatty acid ratio, at 3.92. The difference between this value and those noted in the other breeds was significant at $p \leq 0.01$.

Keywords: cows milk, nutrients, fatty acids, cattle breed, lactation stage.