

Colostrum and Transition Milk Fatty Acid Profile is Affected by Parity and Milking

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It is unknown if cow parity influences the fatty acid profile of colostrum and transition milk; but, persistent elevation of specific colostrum fatty acids, regardless of parity, could indicate a biological purpose for the neonate. Thus, the objective of the study was to evaluate how colostrum and transitional fatty acid composition differs by parity. Primiparous (PP, $n = 10$) and multiparous (MP, $n = 10$; parity = 3.1 ± 0.4) Holsteins at Breevliet Farms Ltd. (Wetaskiwin, AB) were sampled. Primiparous and MP cows were fed the same pre- and post-partum rations. Colostrum was milked (M1) 5.3 ± 0.7 h after calving and the transition milk (M2-5) inter-milking interval was 12.0 ± 0.13 h. Milking 12 (M12) was considered mature milk. Yield (kg) was recorded at each milking. Fat content was analyzed using MIR spectrometry (CMT, Edmonton, AB) and fatty acids (% of total fatty acids) were determined by gas chromatography and Ag⁺-HPLC (AAFC-LRC, Lacombe, AB). Data were analyzed by parity, milking (repeated), and their interaction (P×M), considering cow as random. Yield was 87% greater (P×M; $P < 0.01$) at M12 for MP than PP cows after a 244% increase from their own yield at M1; whereas M12 and M1 yields (9.2 and 6.9 ± 0.9 kg, respectively) were not different for PP cows. Fat declined (P×M; $P = 0.03$) from M1 by 3.5 %-units at M4 and 3.2 %-units at M5 for PP cows, while MP fat % did not change at any milking. The proportion of short-chain fatty acids increased ($P < 0.01$) by 1.47 %-units at M12 compared to M1 and to a greater extent (P×M; $P < 0.01$) for PP than MP cows. Medium-chain fatty acids were 25% higher ($P < 0.01$) at M2 than M12, though neither M2 ($14.2 \pm 0.9\%$) nor M12 ($11.4 \pm 1.0\%$) differed from M1 ($13.0 \pm 0.6\%$) concentrations. Minor fluctuations (P×M; $P \leq 0.03$) in medium- and long-chain fatty acids were present between parities across milkings. Branched-chain fatty acids were elevated (P×M; $P < 0.01$) in PP compared to MP colostrum and transition milk but not different in mature milk. Colostrum contained the greatest ($P < 0.01$) proportion of polyunsaturated fatty acids compared to all other milkings, varied slightly (P×M; $P < 0.01$) by parity across milkings, but overall did not differ ($P = 0.70$) between PP and MP cows. Implications: The lack of parity-induced variation and the elevation of medium-chain and polyunsaturated fatty acids in the initial milkings suggests a neonatal requirement.