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affected by imbalance ($P = 0.478$). The protein:fat ratio of milk fell from 0.91 to 0.75 due to His deficiency ($P = 0.012$).

Key Words: milk composition, milk yield, histidine

MI58 Effects of a shortened dry period on milk production and composition in early lactating Holstein cows. S. Safa¹, A. Heravi Moussavi^{*1}, M. Danesh Mesgaran¹, A. Golian¹, and A. Soleimani^{1,2}. ¹Department of Animal Science, Ferdowsi University of Mashhad, Mashhad, Khorasan Razavi, Iran, ²Islamic Azad University-Kashmar Branch, Kashmar, Khorasan Razavi, Iran.

The study was designed to test the effects of a shortened dry period on milk production and composition in early lactating Holstein cows. Cows were randomly assigned in 1 of 2 treatments: 1) traditional 60 d dry period ($n=12$) and 2) a shortened 20 d dry period ($n=12$). Holstein cows were blocked in pairs based on their previous 305 d milk, parity and expected calving dates. All cows were fed by routine ration of farm (total mixed diet) twice a day and had at all time free access to water. Milk samples were collected from each milking on 1 d per week until 50 d after parturition and composited for analysis of milk composition. The data were analyzed using the MIXED procedure of SAS for a completely randomized design with repeated measures. The reduction in dry period reduced milk production dramatically ($p<0.01$; 38.11 and 28.57 \pm 1.1 kg/d, respectively). The effect of time was significant and the milk yields increased over the time ($p<0.01$). The cows in different dry periods behaved similarly over the time. Milk protein content tended to increase in the shortened dry period group ($p=0.066$; 3.07 and 3.17 \pm 0.04%, respectively). The lactose content was numerically higher in the shortened dry period group ($p=0.07$; 4.59 and 4.73 \pm 0.05%, respectively). Milk fat content was similar among the groups. The yields of milk fat ($p<0.01$; 1.45 and 1.09 \pm 0.09 kg/d, respectively), protein ($p<0.01$; 1.17 and 0.92 \pm 0.06 kg/d, respectively) and lactose ($p<0.01$; 1.76 and 1.36 \pm 0.09 kg/d, respectively) were all decreased due to the reduction in dry period. The milk fat content was decreased and yields of protein and lactose increased over the time ($p<0.01$). The results of this study demonstrated that reduction of dry period to 21 d significantly reduced milk production and milk components yields compare with the convention 60 d dry period.

Key Words: dairy cows, dry period, milk production

MI59 Udder morphology of the Holstein cows, primiparous and multiparous. M. Porcionato^{*}, J. Negrão, F. Paiva, and T. Delgado, University of São Paulo, Pirassumunga, São Paulo, Brazil.

This trial aimed to evaluate the morphological characteristics of udder and teats with ultrasound, estimate the cisternal areas of mammary gland and teats, as well as the relation between these images and the productive parameters. One hundred lactating primiparous and multiparous Holstein cows at the beginning and at the end of 1st, 2nd, and 3rd, lactations were

milking twice a day with mechanical milker. Data were analyzed using SAS (version 8.2). Differences were considered significant at $P<0.05$. The ultrasonography showed higher ($P<0.05$) teat channel in 3rd (12.74 mm) than 1st (14.64 mm) lactation. The distance for the teat to floor was lower ($P<0.05$) in 3rd (48.82 cm) than 1st (57.07 cm) lactation. It was observed high and positive correlation ($r = 0.84$) between cisternal area and cisternal milk. The number of lactation had influence on the morphology of their mammary gland and teats, as well as in the milking duration and milk yield of the Holstein cows. The ultrasound technique used in this trial, carried before early milkings at minimum intervals of eight hours between milkings, presented satisfactory results of cisternal areas estimation of the mammary gland and teats in the primiparous and multiparous cows.

Key Words: adaptation, cisternal milk, morphology

MI60 Effects of increased milking frequency on milk yield and selected measures of mammary gland health in lactating cows. S. L. Shields^{*}, D. Sevier, J. Peak, K. S. Seo, P. Rezamand, and M. A. McGuire, University of Idaho, Moscow.

Increased milking frequency during early lactation increases milk yield; however, it may alter milk composition and measures of mammary gland health. The objective of this study was to determine the effects of increased milking frequency on milk yield and composition, and measures of mammary gland health in a unilateral frequent milking (UFM) model. Sixteen Holstein cows at parturition were assigned to UFM, in which, the left udder half of each cow was milked four-times daily (4 \times ; at 0500, 0900, 1600, and 2000 h) and the right udder half was milked twice daily (2 \times ; at 0500 and 1600 h). Milk yields were measured from 1 through 21 days in milk (DIM) and samples were collected on d 3, 7, 10, 14, and 21. Milk composition and somatic cell count (SCC) was determined. In addition, flow cytometric analysis with bovine monoclonal antibodies was used to identify the composition of leukocytes from the milk samples collected. Data were statistically analyzed in a paired t-test setting by SAS (v. 9.2). No clinical case of mastitis was observed. Milk yield was greater during the first 21 DIM for the udder halves milked 4 \times as compared with those milked 2 \times (13.3 vs 9.91 kg/d; $P < 0.001$). Milk fat percent was greater for the udder half milked 4 \times as compared with the udder half milked 2 \times (4.96 vs 4.57%; $P = 0.009$). No significant difference was observed in SCC ($P = 0.20$) or the SCC linear score (3.54 vs 2.77 for 4 \times vs 2 \times , respectively; $P > 0.9$) between milking frequencies. In addition, no significant difference was detected for cell population of total leukocytes (45.5 vs 40.5% for 4 \times vs 2 \times , respectively), granulocytes (12.7 vs 8.75% for 4 \times vs 2 \times), mononuclear cells (30 vs 29.2% for 4 \times vs 2 \times), or CD4 to CD8 ratio (2.90 vs 2.75 for 4 \times vs 2 \times) for the udder halves milked 4 \times as compared with the udder halves milked 2 \times ($P \geq 0.46$ for all). We conclude that using a UFM model, increased milking frequency resulted in greater milk yield and milk fat percent; however, milking frequency did not affect selected measures of mammary gland health.

Key Words: milking frequency, somatic cell count, milk leukocyte