
Ten herds (n = 6 Jersey, JE, n = 3 Holstein, HO, n = 1 mixed) were enrolled to determine the impact of management practices and breed on milk FA composition. Bulk tank samples were collected monthly (7 samples/month) and analyzed for milk and FA composition (de novo, DNF; mixed origin, MOFA; and preformed, PRFA). Data were analyzed using PROC CORR and REG of SAS. A positive relationship was observed between milk fat %, protein % and DNF in JE herds (r = 0.7473 and 0.6474, R^2 = 0.5571 and 0.6474, P < 0.0001). HO herds showed similar results for fat and protein % (r = 0.7476 and 0.7433, R^2 = 0.8653, respectively, P < 0.0001). DNFA and milk protein (kg) were positively correlated in JE and HO herds (r = 0.8053; R^2 = 0.6474, JE; r = 0.8628; R^2 = 0.7433, HO; P < 0.001). A stronger relationship was observed between MOFA and milk protein % with HO herds than JE herds (r = 0.8341 and 0.4849, R^2 = 0.2339 and 0.6944 and 0.2329, respectively, P < 0.001). Herd visits were conducted quarterly to collect body condition and locomotion scores, stocking rates, and ration composition and particle size. Herds were classified as high and low de novo (HDN, LDN), mixed origin (HMO, LMO), and preformed (HPF, LPF) at each visit. Data were analyzed using PROC GLIMMIX of SAS; herd classification was the fixed effect. Means were separated using Fisher’s LSD, and significance was declared when P < 0.05. Compared with LMO herds, HMO herds fed more NDF (20.87% and 42.10%, respectively) and ADF (17.82% and 38.32%, respectively, P < 0.05). HO herds classified as HMO produced more milk fat than LMO herds (3.90 v. 3.56%, respectively, P < 0.05). FA content was not affected by body condition, stocking rate, or lameness (P > 0.05). The relationship between FA content and milk fat varies with breed and nutrition. Milk FA, particularly DNFA and MOFA, could be used as predictors of disorders or stressors to the cow.

Key Words: de novo, milk fat

102 Milk fat and protein yield in Holstein California herds with different milk production levels. M. B. Abreu*,1, M. I. Marcondes1, F. C. Ferreira2, B. Verboort1, and N. Silva-Del-Rio2, 1Universidade Federal de Vicsousa, Vicsousa, MG, Brazil, 2Veterinary Medicine Teaching and Research Center, University of California-Davis, Tulare, CA, 3Agritech Analytics, Visalia, CA.

The objective of the present study was to benchmark milk components (fat and protein) across Holstein California dairy herds with different milk production levels (MPL). Dairy Herd Improvement Association records from 2017 were obtained from Agritech Analytics (Visalia, CA). The initial data set included information from 343 herds, 572,893 cows, and 3,182,862 milk tests. Data was screened using proc Means of SAS. The effect of MPL on milk components was evaluated using the GLIMMIX of SAS. Least squares means were considered different when P ≤ 0.05. The final data set included herds with ≥200 cows and >50 test, and cows with until 200 d in milk (DIM). Cow observations with <2% or >6% of fat and protein content, and milk yield ≥ 10 kg were considered outliers. After data screening, the final data set include 238 herds, 462,550 cows, and 1,830,884 milk tests. Herds were classified according to MPL as low (LP), 1: < 32 kg; n = 59, medium (MP), Q1 ≤ to ≤ Q3: 32 ≤ to ≤38 kg; n = 118, and high (HP), > Q3: > 38 kg: n = 61) production level. On the average, the final enrolled herds had 2,763, 2,365, and 2,882 cows and produced 31, 39, 43 kg/d respectively for LP, MP, and HP. Milk fat (%) [4.39%(LP); 3.64%(MP); 3.63%(HP)] and milk protein (%) [3.47%(LP); 3.07%(MP); 3.02%(HP)] significantly decreased as MPL increased. However, average milk fat yield (kg/cow/d) [1.31 (LP); 1.40 (MP); 1.58 (HP)] and protein yield (kg/cow/d) [1.03 (LP); 1.19 (MP); 1.31 (HP)] significantly increased as MPL increased. There was a significant effect of the month and a month by MPL interaction for milk fat and protein (%). For the top 10 fat and protein producing herds (9 HP, 1 MP), fat per cow ranged from 1.66 to 1.84 kg/d (3.46 to 3.86%) and protein per cow 1.37 to 1.59 kg/d (2.93 to 3.24%) respectively. In conclusion, although LP herds had the greatest association with milk fat and protein content, HP herds showed greatest association with milk fat and protein yield.

Key Words: milk production level, milk components, California dairies

103 Do biological and management causes of a short or long dry period induce the same effects on dairy cattle productivity? K. E. Olagaray*,1, M. W. Overton2, and B. J. Bradford1, 1Kansas State University, Manhattan, KS, 2Elanco Animal Health, Greenfield, IN.

A retrospective observational study utilized 32,182 lactations from 16 farms to determine if management versus biological reasons for a short or long dry period have the same associations with subsequent lactation performance. Herd inclusion criteria were Holstein cows, herd size ≥900 cows, breeding by artificial insemination, and bimonthly milk testing. Dry period (DP) length and gestation length (GL) were each categorized as short (>1 SD below mean) or long (>1 SD above mean) and combined to generate the following 7 study groups: short DP, short GL (SsDg); short DP, average GL (SdAg); average DP, short GL (AdSg); average DP, short GL; average DP, long GL (AdLg); long DP, short GL (AldSg); and long DP, long GL (AldLg). Continuous data were analyzed by mixed models and time to event data by Cox proportional hazard models, both accounting for clustering at the herd level. First test and whole lactation milk and component yields were least for SsDg. Within cows that experienced calving difficulty, time to first service was delayed 13 and 20% for SsDg and SdAg, respectively. Hazard of leaving the herd by 60 DIM was 34% greater for AgSg than AgAd. Similar outcomes between SsDg and AldSg; however, first test somatic cell linear score was greater and milk yield was lesser for AldAd cows with greater milk at last test before dry-off. Long DP or GL did not impact early lactation or whole lactation milk yield. Cows with a long DP due to management factors (AldLg) likely experienced issues related to excessive lipid mobilization as milk fat concentration and fat:protein ratio at first test were greater and hazard of leaving the herd by 60 DIM was 28% greater compared with AdAd. Hazard of leaving the herd was 30 and 24% greater compared with AdAd by 60 and 365 DIM, respectively. In conclusion, deviations in DP length caused by biology (short GL) were associated with greater impacts than management causes of short DP, whereas management reasons for long DP were associated with more negative outcomes than long GL.

Key Words: gestation length, lactation, survival

104 Economics of capture of phosphorus from liquid dairy manure. J. Harrison*,1, K. Fullerton1, E. Whitefield1, K. Bowers2, and S. Norberg3, 1Washington State University, Puyallup, WA, 2Multiform Harvest, Seattle, WA, 3Washington State University, Pasco, WA.

A project was conducted with the goal of developing a nutrient recycling relationship between the dairy producers and alfalfa forage growers in Washington State. A mobile fluidized-bed cone (32,000 L) was used to evaluate the capture of P in the form of struvite (magnesium-ammonium phosphate) from undigested and anaerobically digested liquid dairy manure. Manure from ~30 dairies was evaluated and In 27 runs when reduction in ortho-P was positive, the average reduction in ortho-P was 32% with a range of 1 to 76%. The greatest capture rates were achieved with anaerobically digested manure since more of the P is in an inorganic form and captured in struvite. The factors that affected performance were: % suspended solids, Calcium, Fe, ratio of ortho-phosphate-P:total
P, and ammonia concentration. When using data from the highest recoveries of P, the cost as calculated on a per cow per d basis when considering chemical costs were: $0.22 (anaerobically digested manure) to $0.39 (undigested manure). The use of a cost per cow per d metric for cost is not the most appropriate way to evaluate the cost to a given farm since the goal is to achieve a net zero balance of P imports and exports from any given farm. The net zero balance will be affected by factors such as: number of cows, number of acres utilized for manure application, phosphorus utilization by crops grown, double or triple cropping strategies, diet manipulation, and manure export off-farm. The factor having the greatest impact on achieving P balance is the land base for growing crops that utilize manure. When using the scenario of 1000 cows, 67 g per d per cow excreted P, and 27 kg P uptake by crops per year, the annual cost to achieve balance for respective hectares were: anaerobically digested manure 242 ha, $275,074; 283 ha, $182,693; 324 ha, $90,312; 344 ha, $44,122, and 362 ha, $2550. The annual cost to achieve balance for respective acres were: undigested manure 242 ha, $523,208; 283 ha, $347,494; 324 ha, $171,779; 344 ha, $83,922, and 362 ha, $4,851.

**Key Words:** manure, phosphorus, nutrient balance

**106 Economic impacts of feeding an immune modulator to multiparous dry Holstein dairy cows.** L. T. Casarotto*1, V. Ouellet1, J. Laporta1, J. D. Chapman2, A. De Vries1, and G. E. Dahl1, 1Department of Animal Sciences, University of Florida, Gainesville, FL, 2Phibro Animal Health Corporation, Teaneck, NJ.

Feeding OmniGen-AF (OMN, Phibro Animal Health) to lactating and dry cows exposed to heat stress lowers respiration rates and rectal temperatures and improves lactational performance and health. Our aim was to evaluate the effects of feeding OMN beginning at dry off until mid-lactation and quantify the economic impact of this supplementation strategy. Cows in a commercial Holstein dairy herd were randomly assigned to OMN (56 g/d, n = 706) or control (CON; 56 g/d of placebo, n = 686) supplementation from dry off (~60 d before calving) to 150 DIM (~210 d total feeding length). Milk yield, reproductive performance, and health events were analyzed using MIXED and LIFETEST procedures of SAS. Milk yield of OMN cows was 0.7 kg/d greater than CON (40.8 kg/d vs. 40.1 kg/d respectively; P<0.01). Using a milk price of $0.44/kg and a lactation length of 150 DIM, income from milk would be increased $46/cow when OMN is fed. During lactation, OMN feeding tended (P<0.11) to reduce the incidence of mastitis (257 vs. 284 cases), retained placenta (38 vs. 52 cases), displaced abomasum (18 vs. 22 cases) and days in hospital relative to CON. Considering the costs of treatment (i.e., labor, medications, veterinarian fees, and replacement costs) and the number of cases of each disorder, feeding OMN reduced health-associated costs by $14/cow relative to CON. Feeding OMN also improved reproductive performance as reflected in a 10-d reduction in days open (P<0.05) compared with CON. Assuming an extra day open cost of $3/d, the enhanced reproductive performance associated with feeding OMN would lead to a savings of $30/cow compared with CON. Ultimately, total economic gain associated with OMN supplementation for 210 d was $890/cow. The cost of supplementation was $32/cow, for a net benefit of $58/cow. In conclusion, our results indicate that OmniGen-AF supplementation from dry-off through 150 DIM benefits cow health and performance and improves herd profitability.

**Key Words:** dairy economics, milk, reproduction