requirements, and feed formulations utilizing only intact protein sources of MET (no synthetic MET). Three genotypes with different growth rates (Slow, Medium, and Fast) were given a low-MET basal diet or diets containing intermediate or high MET levels that were formulated with or without synthetic DL-MET; thus 5 experimental diets were fed to each genotype. Digestible MET levels (for the low, intermediate, and high MET diets) were 0.30%, 0.36%, and 0.42% in the starter phase, 0.26%, 0.30%, and 0.34% in the grower phase, and 0.22%, 0.26%, and 0.30% in the finisher phase. Twenty male birds were randomly assigned to pens with 5 replicate pens per treatment. Slow, Medium, and Fast birds were raised to 77, 63, and 49 d of age, respectively, and placement of the different genotypes was staggered in order to process all birds on the same day. Carcass and parts yield were calculated from 5 birds from each replicate. Genotype had a significant impact on weight gain, feed intake, feed efficiency, and yield ($P < 0.05$). The Fast birds had higher weight gain, feed efficiency, carcass and parts yield than slower-growing birds. Level of MET had a numerical but not significant impact on weight gain and feed efficiency. However, breast yield of all genotypes was affected by MET level, with higher breast yields from treatments with higher levels of MET ($P < 0.05$). The Slow genotype had lower breast yield than Fast but higher wing and leg yield ($P < 0.05$). Diet formulation without DL-MET (using intact-protein diets with higher crude protein levels) did not compromise growth or yield. These data exhibit the impact of genotype and MET level on performance of birds for organic markets, and demonstrate the use of intact-protein sources as an alternative to synthetic DL-MET.

Key Words: Organic, Methionine, Slow-Growing Poultry

W190 Fractional protein synthesis rate in breast muscle and liver tissues of broiler breeder hens before and after sexual maturity based on using ^{15}N-Phe, and LC-MS and GC-C-IRMS. M. K. Manangi* and C. N. Coon, *University of Arkansas*, *Fayetteville*.

Protein turnover is a continuous process of protein synthesis and degradation in the living system. The literature indicates that though whole body protein synthesis increases, the proportion of these proteins synthesized [i.e. the fractional synthesis rate (FSR), k_s] each day declines. The main objective of this study was to measure k_s for breast muscle and liver tissues in broiler breeder hens at 22 wk (before laying) and 26 wk (after first egg) of age. One hundred, 20 wk old, broiler breeder hens (Cobb500) of uniform body weight were placed in individual breeder cages and fed following breeders' recommendation. Seven birds of uniform body weight were selected each sampling time. Birds were injected with a flooding dose of L-Phe solution (150mM, 38 atom percent excess [^{15}N]Phe prepared from L-Phe (^{15}N, 98%+)) via wing vein at a rate of 10 mL/kg body weight. Plasma, muscle, and liver samples were collected after a 10 min isotopic incorporation period. Acid-soluble fraction, extracted in 2% (w/v) perchloric acid, containing free amino acids was separated from the protein precipitate, and the free and protein-bound Phe enrichment ratios (^{15}N:^{14}N) were measured using LC-MS (High Performance Liquid Chromatography Mass Spectrometry) and GC-C-IRMS (Gas chromatography-Combustion-Isotope Ratio Mass Spectrometry), respectively. The results indicate a decline ($P=0.1856$) in k_s from 38.96%/d at 22 wk to 32.84%/d at 26 wk for muscle and a significant ($P<0.05$) increase in k_s from 79.65%/d at 22 wk to 106.36%/d at 26 wk for liver. In conclusion, the decline in k_s for muscle and increase in k_s for liver at sexual maturity shows that breeders are changing tissue protein synthesis rate in conjunction with egg formation. A better understanding of breeder changes in breast muscle and liver FSR, protein degradation rates, and protein accretion may provide an opportunity to optimize the pullet rearing program, body composition, and breeder intake of nutrients for the purpose of increasing hatching egg production.

Key Words: FSR, Broiler Breeder Protein Degradation

W191 Effects of methionine versus cystine supplementation on egg production parameters and feather quality in Bovan strain laying hens from 20 to 70 weeks of age. S. E. Scheideler*, P. Weber, and S. Shields, *University of Nebraska*, *Lincoln*.

A study was conducted to test the effects of sulfur amino acid supplementation from either methionine (M)(DL-methionine) or cystine (C) (from feather meal) on feather quality and egg production parameters in laying hens from 20 to 70 wks of age. Hens were fed 7 dietary treatments in three phases. Phase I was an 18% protein (P) basal diet with .33% M and .37% C. Diets 2-4 had added M to .38, .40 and .42 % M and diets 5-7 had .41, .44 and .45% C added to the basal C levels. Phase II was a 16 % P basal diet with .28% M and .32% C. Diets 2-4, had added M to .32, .33 and .34% M and diets 5-7 had .32, .36 and .42% added C. Phase III was a 15% P basal diet with .28% M and .35% C. Diets 2-4, had added M to.32, .34 or .37% M and diets 5-7 had .38, .40 or .43% C. Diets were isocaloric and formulated to meet Bovan strain nutrient intake recommendations. Diet significantly affected egg production (EP) during all 3 phases of the trial. During P I, hens fed the highest levels of M (.42%) or C (.45%) had greater EP compared to the other levels of M and C supplementation. This trend was continued through P II and III. However, the lower levels of M and C supplementation did not benefit EP above the basal diet levels of M and C. Egg weights (EW) were only significantly affected during P II, during which time hens fed the highest level of M (.34%) had the greatest EW, followed by hens fed .32% C. C and M supplementation during P III inconsistently improved EW. Feather scores (FS) were conducted every 2 wks during the trial using 2 different scoring systems; a method developed by Tauson and the scales used by Webster and Hurnik. Results indicate no sig effects of diet M or C on feather scores, but sig effects of age (Phase) on FS, with rapid deterioration of FS during P II and III of the study. In summary, FS is more controlled by age than diet M or C during the first cycle of EP from 20-70 wks of age.

Key Words: Feather Score, Methionine, Cystine

W192 Comparison of various methods for endogenous ileal amino acid flow determination in broiler chickens. A. Golian*[1], W. Guenter[1], D. Hoehler[2], and C. M. Nyachoti[1], [1]*University of Manitoba*, *Winnipeg, MB, Canada*, [2]*Degussa Corporation*, *Kennesaw, GA*.

The purpose of this study was to compare estimates of ileal endogenous amino acid flow (IEAA) determined in broiler chicks with a nitrogen-free diet (NfD), diets containing intact casein or enzymatically hydrolyzed casein (EHC) and the regression method (RM). Male Ross broiler chicks were fed a commercial starter diet from d 1 to 15 of age and the following test diets from d 15 to 21: a NfD and diets containing 5, 10 or 15% casein or EHC as the sole protein source. All

diets contained chromic oxide as a digestibility marker. Each diet was assigned to six replicate cages, each with 10 birds. On d 21, birds were killed to sample ileal digesta. Compared with the NfD, the average IEAA values for the casein or EHC diets were higher ($P<0.05$) for all AA except for Arg, Phe and Pro whose values for casein and NfD diets were similar. The ileal flow of Met, Cys, Lys, Val and Ser in birds fed the casein or EHC diets were similar ($P>0.10$) but the flow of all other AA was higher ($P<0.05$) in EHC-fed birds than in those fed the casein diet. Feeding increasing levels of casein or EHC linearly ($P<0.01$) increased ileal AA flow. Estimates of IEAA obtained with the RM were similar ($P>0.10$) for all AA except for His (103 vs. 64 mg/kg DM) and Ser (418 vs. 577 mg/kg DM) whose values were higher and lower, respectively, for casein than for EHC ($P<0.05$). Compared with the NfD method, IEAA values obtained with the RM were similar for all AA except Met (69 vs. 77 mg/kg DM) with casein and Ile (209 vs. 321 mg/kg DM), Val (281 vs. 341 mg/kg DM) and Ser (357 vs. 577 mg/kg DM) with EHC that were higher ($P<0.05$). The present results show that IEAA values determined with NfD, EHC and casein diets are different for some AA and that, for most AA, values obtained with the NfD and the RM involving feeding graded levels of casein or EHC are comparable. Thus, using IEAA values obtained with either the NfD method or the RM to calculate standardized ileal AA digestibilities will give similar values.

Key Words: Ileal Endogenous Amino Acid Flow, Broilers

W193 Ideal ratio of Arg, Ile, Met, Met + Cys, Thr, Trp, and Val relative to Lys for 28 to 34-week-old laying hens. S. Roberts*[1], B. Kerr[2], D. Hoehler[3], and K. Bregendahl[1], [1]*Iowa State University*, *Ames*, [2]*NSRIC, USDA/ARS*, *Ames, IA*, [3]*Degussa Corporation*, *Kennesaw, GA*.

Seven separate experiments were conducted with Hy-Line W-36 hens to determine the ideal ratio of Arg, Ile, Met, Met + Cys, Thr, Trp, and Val relative to Lys for maximal egg mass (EM). The experiments were conducted simultaneously and were each designed as a randomized complete block design with 60 experimental units (each consisting of 1 cage with 2 hens) and 5 dietary treatments. The 35 treatment diets were made from a common basal diet (2,987 kcal/kg ME; 12.3% CP), formulated using corn, soybean meal, and meat and bone meal. The true digestible (TD) amino acid contents in the basal diet were determined using the total fecal collection precision-fed assay with adult cecectomized roosters. Crystalline L-Arg, L-Ile, L-Lys, DL-Met, L-Thr, L-Trp, and L-Val (all considered 100% TD) were added to the test diets at the expense of cornstarch to make the respective test amino acid first limiting and to yield 5 graded inclusions of the test amino acid. Hens were fed the treatment diets from 26 to 34 wk of age, with the first 2 wk considered a depletion period. Egg production was recorded daily and egg weight was determined weekly on 48-h eggs; EM was calculated as egg production × egg weight. The requirement for each amino acid was determined using the broken-line regression method and the ideal amino acid ratio was subsequently calculated. Consumption of Arg did not affect EM, thus an optimum ratio could not be derived. The daily TD amino acid requirements used to calculate the ideal amino acid ratio for maximum EM were 426 mg Ile, 538 mg Lys, 253 mg Met, 506 mg Met + Cys, 414 mg Thr, 120 mg Trp, and 501 mg Val. The ideal amino acid ratio for maximum EM was Ile 79%, Met 47%, Met + Cys 94%, Thr 77%, Trp 22%, and Val 93% on a TD basis relative to Lys.

Key Words: Ideal Amino Acid Ratio, Laying Hen, Egg Mass

W194 Carcass yield of modern vs 1970's heritage broilers fed drug free recommended and low protein diets. A. Golian*[2], T. A. Woyengo[1], C. Bennett[3], W. Guenter[1], and H. Muc[1], [1]*University of Manitoba*, *Winnipeg, Manitoba, Canada*, [2]*University of Ferdowsi*, *Mashhad, Iran*, [3]*Manitoba Agriculture, Food and Rural Initiatives*, *Winnipeg, Manitoba, Canada*.

Six hundred mixed sex day-old chicks from each of a modern (Ross, RS) and two 1970's heritage breeds (HB1 and HB2) broilers were randomly placed in 10 floor pens and fed two diets containing 3050 kcal ME/kg and either 22 or 19% crude protein (5 pens/diet/breed) from 1 to 30 d of age. All the birds were fed the diet containing 19% crude protein from 31 to 63 d of age. Comparisons of carcass yield cuts were carried out at 49 and 63 d of age. On the day of slaughter 10 birds from each pen were wing banded and deprived of feed at 4:00 AM, weighed at 8:00 AM, shipped and processed 9-10 h after feed removal. Carcasses were chilled on ice overnight, weighed and cut into parts. The level of dietary protein influenced ($P<0.01$) carcass yield and skinless breast fillet but not any other cuts at 49 d of age. Carcass yield of modern RS birds was greater ($P<0.01$) than for the HB1 and HB2 breeds (69.2, 65.8 and 65.6%, respectively). Skinless breast fillet as percent of carcass was 24.1, 18 and 17.5% for the RS, HB1 and HB2 breeds, respectively. Boneless skinless thighs were heavier ($P<0.05$) in RS vs. heritage breeds whereas thigh skin, thigh fat, drumsticks, wings and rack as a percent of carcass were smaller ($P<0.01$) for RS birds than the heritage breeds. A significant diet by breed interaction was only observed for carcass yield and breast fillet. At 63 d of age, diet had no effect ($P>0.05$) on carcass yield, however breast fillets were larger ($P<0.01$) for birds fed the 22% protein diet to 30 d of age. In general the breed response was the same as at 49 days. At 63 d of age carcass yield was significantly ($P<0.01$) greater for males than females whereas the opposite was true for breast fillet yield. Overall the modern day broiler is superior in carcass yield and breast fillet yield.

Key Words: Broiler, Breed, Carcass Yield

W195 Performance and carcass parameters of broiler chicken from 1 to 45 d fed with different levels and source of vitamin D. J. A. G. Brito[1], A. G. Bertechini*[1], J. C. C. Carvalho[1], R. L. Rios[1], J. O. B. Sorbara[2], and F. J. Piraces[2], [1]*Universidade Federal de Lavras, DZO*, *Lavras, MG, Brazil*, [2]*DSM Nutritional Products*, *Sao Paulo, SP, Brazil*.

Different levels and source of vitamin D were investigated in this study. 1500 male Cobb 700 were allocated in 100 wire cages with feed and water ad libitum. Ten programs of vitamin D supplementation according to the broiler chicken age were study (1-21 d; 22-38 d and 39-45 d) with four levels of vitamin D (20-16-10; 37,5-30-18,75; 87,5-70-43,75 and 137,5-110-68,75 mg/ton) another two treatments were add with both source of vitamin D\ (D3 and 25(OH)D3) and two treatments with both source of vitamin D (50 D3 + 37,5 25(OH)D3; 40 D3 + 30 25(OH)D3; 25 D3 + 18,75 25(OH)D3 and 50 D3 + 70 25(OH)D3; 40 D3 + 56 25(OH)D3; 25 D3 + 35 25(OH)D3 mg/ton). The experimental design was a complete randomized in a factorial arrangement (4 levels of vitamin D supplementation according to the bird age and 2 source of vitamin D) plus two treatments (with both source of vitamin D) with 10 replications. The feed were base in corn/soybean meal without growth promoter and with 500 FTU/ton feed of phytase. Performance parameters as body weight gain (BWG, g), feed intake (FI, g), and feed conversion were analyzed from 1 to