211 Effect of soybean cultivar on growth performance of broilers. G. Hosotani*, M. S. Kerley, M. C. Shannon, *Division of Animal Sciences, University of Missouri, Columbia,.*

A 19-d study was conducted to compare soybean meal (SBM) from 10 soybean cultivars owned by Missouri Soybean Association on growth performance of broiler chicks. Soybean meal was prepared by laboratory-scale mechanical extraction. Two hundred and fifty 1-d-old male broilers (Ross 308) were randomly placed in battery cages and allocated to 10 dietary treatments with 5 replicates and 5 birds per replicate. All SBM sources were heated in a convection oven at 120°C for 20 min and included from 38.2 to 43.5% in the diets. Isocaloric diets were formulated to meet or exceed NRC (1994) and Aviagen nutrient requirements. Broilers were weighed and feed disappearance measured on d 7, 14, and 19. Statistical analyses were performed as a randomized complete block design using PROC GLM of SAS with significance level set at $P < 0.05$. No differences were observed in final body weight, body weight gain, feed intake, and feed conversion of broilers fed different SBM ($P > 0.05$). The body weight gain ranged from 552 to 595 g, resulting in 7.8% variation and feed conversion ranged from 1.42 to 1.36, resulting in 4.4% variation. Although there were no statistical differences in growth performance of broilers fed different soybean meals, the numerical difference in feed efficiency observed among treatments would affect the production cost margins. Nutrient digestibility may be the main factor of growth performance among the different SBM sources, suggesting further investigation.

Key Words: broiler soybean growth
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212 Effect of crumbled diet on growth performance, market day age and meat quality of growing-finishing pigs. D. H. Nguyen*, S. Kathannan, Y. H. Liu, I. H. Kim, *Department of Animal Resource & Science, Dankook University, Cheonan, South Korea.*

This study was conducted to determine the effect of crumbled diet on growth performance, market day age, and meat quality of growing-finishing pigs. A total of 120 crossbred pigs [(Landrace × Yorkshire) × Duroc] with an average initial body weight (BW) of 25.89 ± 1.93 kg were randomly allotted to 2 experimental diets based on initial BW (15 replicate pens per treatment, 4 pigs per pen). The trial lasted for 120 d. Dietary treatments included: 1) T1 (mash diet); 2) T2 (crumble diet). Individual pig BW and pen feed consumption were recorded at the end of 6, 12, and 18 wk to calculate the average daily gain (ADG), average feed intake (ADFI), and gain to feed ratio (G:F). Backfat thickness of all pigs was measured at 6 cm off the midline at the 10th rib using a real-time ultrasound instrument (Piglot 105; SFK Technology, Herlev, Denmark). Reflectance spectrometry measurements of lightness (L*), redness (a*), and yellowness (b*) values were determined using a Minolta CR410 chroma meter (Konica Minolta Sensing, Inc., Osaka, Japan). The pH values of each sample were measured with a pH meter (Fisher Scientific, Pittsburgh, PA). The areas of pressed sample and expressed moisture were delineated and determined with a digitizing area-line sensor (MT– 10S; M.T. Precision Co. Ltd., Tokyo, Japan). All data were subjected to the GLM procedures of SAS and differences among treatments were separated by Tukey's multiple range test with a $P < 0.05$ indicating a significance. During the overall study period pigs fed the T2 (crumble diet) had significant greater ($P < 0.05$) average daily gain (ADG) (T1 = 803 g, T2 = 839 g) and gain to feed ratio (G:F) (T1 = 0.346, T2 = 0.359). Moreover, the number of pigs fed crumble diet reached the marketing age on d 177 is higher than the pigs fed mash diet. No significant difference was observed in back-fat thickness, meat color, sensory evaluation (including: color, firmness, marbling), cooking loss, drip loss, water holding capacity, and longgissimus muscle area (LAM) between T1 and T2 groups. Our results revealed that the growth performance was significantly enhanced in pigs fed with the crumble diet. In addition, crumble diet reduced market day age of growing-finishing pigs.

Key Words: Crumble form, mash form, growing-finishing pigs
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213 Effects of creep feed pellet diameter on suckling and nursery pig performance. A. B. Clark*, J. A. De Jong, J. M. DeRouchey, M. D. Tokach, S. S. Dritz, R. D. Goodband, J. C. Woodworth, *Kansas State University, Manhattan.*

A total of 26 litters of pigs (PIC 327 × 1050; initially 3.2 kg BW and 10-d of age) were used to evaluate the effects of creep feed pellet diameter on suckling pig and nursery growth performance. On d 10 of suckling, litters were allotted to 1 of 2 dietary treatments by parity and BW in a randomized complete block design with 13 replications per treatment. Starting on d 10 of lactation, pigs were fed common pelleted creep feed processed using either a 3.2 mm (small) or a 12.7 mm (large) die. Chromic oxide was included as a fecal marker and fecal swabs were taken on d 14, 17, and 21 to determine percentage of pigs consuming creep feed. On d 21, pigs were weaned and re-allotted to nursery treatments for 21-d and fed in 2 phases. Phase 1 (d 0 to 7 postweaning) treatment diets were the same diets fed during the suckling period with 50% of the pigs remaining on their previously allotted pellet diameter treatment and the other 50% of pigs were re-allotted to the opposite pellet diameter treatment in the nursery. A common meal form diet was fed from d 7 to 21 postweaning. During the suckling phase (d 10 to 21), litters of pigs fed the large creep pellet had decreased ($P < 0.03$) pre-weaning mortality

(0 vs. 2.54%; SEM = 0.008) and increased ($P < 0.05$) ADFI from d 17 to 21 (30.8 vs. 17.6 g; SEM = 4.41). There were no significant differences in suckling pig BW gain (3.21 vs. 3.25 kg; SEM = 0.107, for small and large pellet treatments, respectively) or percentage of pigs consuming creep feed (58 vs. 59%; SEM = 0.008, for small and large pellet treatments, respectively). During the nursery phase, pigs fed a large nursery pellet, regardless of creep feed treatment, had increased ($P < 0.01$) ADFI from d 0 to 7 (138 vs. 153 g; SEM = 3.6). Pigs fed the large creep feed pellet, regardless of nursery pellet diameter, had improved ($P < 0.03$) ADG (67 vs. 50 g; SEM = 5.0) and G:F (0.452 vs. 0.334; SEM = 0.0349) from d 0 to 7 post-weaning, as well as improved G:F overall (0.828 vs. 0.779; SEM = 0.0129). There were no significant differences in ADG or ADFI during the common or overall period. In summary, feeding a large creep feed pellet improved late suckling creep ADFI and nursery G:F, while feeding a large nursery pellet increased ADFI during the first week in the nursery.

Key Words: creep feed, nursery pigs, pellets
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214 Stability of commercial phytase products under increasing thermal conditioning temperatures.

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The objective was to determine the stability of 4 commercial phytase products exposed to increasing thermal conditioning temperatures. The 4 commercial products used were: Quantum Blue 5G (AB Vista, Marlborough, United Kingdom); Ronozyme Hi Phos GT (DSM Nutritional Products, Parsippany, NJ); Axtra Phy TPT (Dupont, Wilmington, DE), and Microtech 5000 Plus (Guangdong VTR Bio-Tech Co., Ltd., Guangdong, China). The phytase products were mixed as part of a corn-soybean meal-based swine diet at a concentration recommended by the manufacturer to provide a 0.12% aP release. Diets were exposed to each of 4 thermal conditioning temperatures (65, 75, 85, and 95°C) for approximately 40 s and the entire process was repeated on 4 consecutive days to create 4 replicates. Samples were taken while feed exited the conditioner and before entering the pellet die. Phytase activity was determined from complete feed samples before conditioning to establish a baseline diet phytase activity level for each product. Phytase stability was measured as the residual phytase activity (% of initial) at each conditioning temperature. There were no product × temperature interactions for conditioning temperature, throughput, or residual phytase activity. As expected, as the target temperature was increased, conditioning temperature increased (linear, $P < 0.001$) and conditioner throughput decreased (linear, $P < 0.001$). As target temperature increased, phytase activity decreased (linear, $P < 0.001$) for each product. There was a significant phytase product main effect which was primarily caused by Microtech 5000 Plus having decreased ($P < 0.05$) phytase activity when compared to all other products at all conditioning temperatures. In summary, increasing conditioning temperatures decreased phytase stability regardless of product. In addition, Microtech 5000 Plus had decreased residual phytase activity (% of initial) when compared to all other products.

Table 214. Effect of conditioning temperature and phytase product on residual phytase activity[1]

	Conditioning temperature, °C					Probability, $P <$	
Item	65	75	85	95	SEM	Linear temperature	Product main effect
Residual phytase activity,[2]%							
Quantum Blue 5G	99.0	78.2	37.9	21.1	8.80	0.001	0.001
Ronozyme Hi Phos GT	87.5	59.7	43.3	22.9			
Axtra Phy TPT	80.6	62.0	36.2	33.1			
Microtech 5000 Plus	37.6	21.4	3.5	3.5			

[1] Within each of 4 conditioning runs at each temperature, a composite sample consisting of 4 subsamples was used for analysis for each product.

[2] Stability was measured as the analyzed post-conditioning phytase concentration divided by phytase concentration before conditioning.

Key Words: conditioning temperature, pelleting, phytase stability
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215 Effects of grinding corn through a 2-, 3-, or 4-high roller mill on pig performance and feed preference of nursery pigs.

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A total of 410 pigs were used in 2 experiments to determine the effects of grinding corn through various roller mill configurations on feed preference and performance of nursery pigs. In Exp. 1, 320 pigs (DNA 400 × 200; initial BW = 10.7 kg) were randomly allotted to 1 of 4 dietary treatments with 16 pens/treatment and 5 pigs/pen for a 21-d growth trial. The 4 dietary treatments used the same corn-soybean meal-based formulation that were mixed from the same batch of ingredients. Corn was ground through the same 4-high roller mill, but using different roller configurations including feed with corn fraction ground to 650 µm using 2 sets of rolls (2-high), feed with corn fraction ground to 495 µm using 3 sets of rolls (3-high), feed with corn fraction ground to 340 µm using 4 sets of rolls in a fine grind configuration (4-high fine), and feed with the corn fraction ground to 490 µm using 4 sets of rolls