

for CP1 and CP4 respectively. This lower HP was mainly due to a reduction of TEF ( $P < .03$ ) which corresponded to 19.9 and 15.8% of ME intake for CP1 and CP4, respectively. The reduced HP for identical ME intake resulted in a greater quantity of retained energy with lower CP diets. It is concluded that the reduction of the CP content in pig diets with essential amino acids levels kept optimal allows to reduce the quantity of nitrogen excreted, but is also accompanied by a more efficient utilization of energy. In situations where performance is limited by ME intake, a greater efficiency of resources can be obtained.

**Key Words:** Growing Pigs, Dietary Protein, Heat Production

**330 Effects of increasing lysine:calorie ratio and dietary fat addition on growth performance and carcass characteristics of gilts from 27 to 120 kg.** M. De La Llata\*, S. S. Dritz, M. D. Tokach, R. D. Goodband, and J. L. Nelssen, *Kansas State University, Manhattan, KS.*

A total of 1,200 gilts (PIC C22 x 337) with an initial weight of 27 kg were used in a 120 d growth trial to determine the effect of lysine:calorie ratio and dietary fat (choice white grease) addition on growth performance and carcass characteristics. Pigs were allotted to one of 8 dietary treatments in a completely randomized design with 25 pigs/pen and 6 pens/treatment. The corn soybean meal-based diets were arranged in a 2 x 4 factorial with two levels of added dietary fat (0 and 6%) and four lysine:calorie ratios in each phase. The four phases were 27 to 45, 45 to 75, 75 to 100, and 100 to 120 kg. Lysine:calorie ratios (g lysine/Mcal ME) were 2.96, 3.26, 3.56 and 3.86 in phase 1, 2.25, 2.50, 2.75 and 3.0 in phase 2, 1.64, 1.84, 2.04 and 2.24 in phase 3, and 1.12, 1.32, 1.52 and 1.72 in phase 4. No interactions occurred between lysine:calorie ratio and dietary fat except for ADFI in phase 1 ( $P < .06$ ) and 3 ( $P < .08$ ). During every phase, ADG and feed efficiency (G/F) linearly increased ( $P < .01$ ) with increasing lysine:calorie ratio. However, for the overall experiment, the greatest response was observed in gilts fed the third lysine:calorie ratio (quadratic,  $P < .05$ ). Increasing added dietary fat increased ( $P < .03$ ) ADG during phase 1 and 2. Increasing added dietary fat from 0 to 6% decreased ( $P < .01$ ) ADFI in all phases and increased ( $P < .01$ ) G/F in phases 1, 2, 3, and overall. Fat depth decreased linearly ( $P < .01$ ), and loin depth, percent lean and fat free lean index (FFLI) increased linearly ( $P < .01$ ) with increasing lysine:calorie ratio. Fat addition to the diet numerically increased ( $P < .17$ ) fat depth and decreased ( $P < .12$ ) FFLI. The results from this experiment indicate that the addition of 6% dietary fat decreases feed intake and increases G/F, and that the third lysine:calorie ratio regimen used was appropriate to maximize growth performance of gilts in a commercial finishing environment.

**Key Words:** Fat, Lysine:calorie ratio, Gilts

**331 Effects of increasing lysine:calorie ratio and dietary fat addition on growth performance and carcass characteristics of barrows from 34 to 120 kg.** M. De La Llata\*, S. S. Dritz, M. D. Tokach, R. D. Goodband, and J. L. Nelssen, *Kansas State University, Manhattan, KS.*

A total of 1,200 barrows (PIC C22 x 337) with an initial weight of 34 kg were used in a 120 d growth trial to determine the effect of lysine:calorie ratio and dietary fat (choice white grease) addition on growth performance and carcass characteristics. Pigs were allotted to one of 8 dietary treatments in a completely randomized design with 25 pigs/pen and 6 pens/treatment. The corn soybean meal-based diets were arranged in a 2 x 4 factorial with two levels of added dietary fat (0 and 6%) and four lysine:calorie ratios in each phase. The four phases were 34 to 60, 60 to 80, 80 to 100, and 100 to 120 kg. Lysine:calorie ratios (g lysine/Mcal ME) were 2.41, 2.71, 3.01 and 3.31 in phase 1, 1.75, 2.0, 2.25 and 3.5 in phase 2, 1.38, 1.58, 1.78 and 1.98 in phase 3, and 1.02, 1.22, 1.42 and 1.62 in phase 4. No interactions occurred between lysine:calorie ratio and dietary fat except for ADFI in phase 3 ( $P < .09$ ). During every phase and for the overall trial, ADG and feed efficiency (G/F) increased linearly ( $P < .02$ ) with increasing lysine:calorie ratios. However, the greatest response occurred when increasing lysine:calorie ratio to the third level in each phase, with a smaller further increase at the highest level. Increasing lysine:calorie ratio did not influence ADFI for any phase. Increasing added dietary fat from 0 to 6% decreased ADFI and increased G/F ( $P < .01$ ) in all phases, while ADG was increased during phase 1 ( $P < .06$ ), 2 ( $P < .11$ ), and overall ( $P < .04$ ). Fat depth decreased linearly ( $P < .01$ ), and loin depth, percent lean and

fat free lean index (FFLI) increased linearly ( $P < .01$ ) with increasing lysine:calorie ratio. Dietary fat addition increased ( $P < .08$ ) fat depth and decreased ( $P < .08$ ) FFLI. These results indicate that the addition of 6% dietary fat decreases feed intake and increases G/F, and that the fourth lysine:calorie ratio regimen used was most appropriate to obtain the best performance of barrows in this experiment.

**Key Words:** Fat, Lysine:calorie ratio, Barrows

**332 Effects of increasing neutral detergent fiber (NDF) on the performance and carcass characteristics of growing-finishing swine.** J. D. F. Gomes\*<sup>1</sup>, P. J. A. Sobral<sup>1</sup>, R. S. Fukushima<sup>1</sup>, C. G. Lima<sup>1</sup>, A. C. A. Fagundes<sup>2</sup>, L. W. O. Souza<sup>2</sup>, S. M. Putrino<sup>1</sup>, C. E. Utyama<sup>1</sup>, C. Grossklaus<sup>1</sup>, and L. L. Oetting<sup>1</sup>, <sup>1</sup>*Faculdade de Zootecnia e Engenharia de Alimentos da Universidade de Sao Paulo, Brazil*, <sup>2</sup>*Faculdade de Medicina Veterinária e Zootecnia da Universidade de Sao Paulo, Brazil.*

Despite high utilization of the dietary fiber fraction in ruminant animals, swine can show positive responses when fed diets containing this alternative source of energy. The utilization of fibrous food for swine may control possible problems with stress caused by housing and excessive feed. Furthermore, adding fiber to the diet may allow better control of carcass standards, resulting in adequate weight gain to lean meat yield. Thus, it is possible to ensure reduction in the backfat, a positive aspect very important to the actual market. This study was conducted to evaluate the effects caused by inclusion of neutral detergent fiber (NDF), through the utilization of Tifton hay as the source of dietary fiber, on performance and carcass characteristics of growing-finishing swine (73-150 d). The experimental design employed was a completely randomized block with 20 male and 20 female crossbred (Large White x Landrace) pigs. Daily feed consumption (DC), daily weight gain (DG), and feed/gain (FG), hot carcass yield (HC), cool carcass yield (CC), lean carcass yield (LC), loin area (LA), and backfat (BF) were measured. Data were analyzed using GLM procedure (SAS<sup>®</sup>). The results showed no differences ( $P > 0.17$ ) between experimental treatments relative to DC, DG, and FG. In relation to carcass characteristics, no differences were observed ( $P > 0.20$ ) between treatments, although was occurred reduction in HC, CC and BF of animals fed with 10% of hay grass (8% NDF). The utilization of the low NDF (8%) diet, did not promote alterations in performance and carcass characteristics of growing-finishing swine. These results indicate that inclusion of fiber in the ration does not alter the development and, thus, performance and carcass characteristics.

**Key Words:** Neutral detergent fiber, Performance, Carcass characteristics

**333 The effects of Hemicell<sup>®</sup> on digestibilities of minerals, energy, and amino acids in pigs fitted with steered ileo-cecal valve cannulas and fed a low and high protein corn-soybean meal diet.** J. S. Radcliffe, B. C. Robbins\*, J. P. Rice, R. S. Pleasant, and E. T. Kornegay, *Virginia Polytechnic Institute and State University, Blacksburg, VA.*

Twelve crossbred barrows (BW = 44 kg), fitted with steered ileo-cecal valve (SICV) cannulas, were used to investigate the effects of Hemicell<sup>®</sup> ( $\beta$ -mannanase) on the apparent total tract digestibilities (ATTD) of energy, Ca, P, DM, and the apparent ileal digestibilities (AID) of Ca, P, DM and amino acids. All diets were corn-soybean meal-based. Diets 1 and 3 contained 12% and 16% CP, respectively. Diets 2 and 4 contained 12% and 16% CP, respectively, and were supplemented with Hemicell<sup>®</sup> at a level of .50% of the diet. Calcium and P levels were .54% and .45% for the low CP diets and .53% and .45% for the high CP diets, respectively. Pigs were randomly allotted to one of the four dietary treatments in 3 blocks of a 4 x 4 Latin square. Pigs were individually housed in metabolic pens (1.2m x 1.2m). Water was supplied ad libitum, and feed was given at a level of 9% of the pigs metabolic BW (BW<sup>.75</sup>)/d. Each 2-wk period consisted of a 7-d adjustment, a 3-d total collection, a 12-h ileal digesta collection, a 3-d readjustment, and a second 12-h ileal digesta collection. There were no interactive effects of Hemicell<sup>®</sup> and CP level; therefore, only main effects are reported. Increasing the level of CP in the diet from 12 to 16% improved ( $P < .001$ ), ADG, G/F, and the AID of DM, Ca, P, N and all amino acids measured. In addition, the ATTD of P ( $P < .01$ ) was increased while there was no effect ( $P > .1$ ) on ATTD of Ca, energy, or DM. The addition of Hemicell<sup>®</sup> to the diet increased AID of DM ( $P < .001$ ) and ATTD of energy ( $P < .05$ ).