**696 Expression profiles of iron-related genes in the intestine and liver of young pigs fed three types of dietary inulin.** K. Yasuda*[1], H. D. Dawson[2], E. Wasmuth[1], K. R. Roneker[1], K. Kohn[2], C. Chen[2], J. F. Urban[2], R. M. Welch[3], D. D. Miller[1], and X. G. Lei[1], [1]*Cornell University*, *Ithaca, NY*, [2]*USDA-Beltsville Human Nutrition Research Center*, *Beltsville, MD*, [3]*USDA-ARS U.S. Plant, Soil and Nutrition Laboratory, Cornell University*, *Ithaca, NY*.

Dietary inulin has been shown to improve hemoglobin repletion efficiency in young anemic pigs. To elucidate the mechanism, we compared the expression of 27 Fe-related genes in intestine and liver of pigs fed three types of inulin (BENEO-Orafti, Tienen, Belgium): P95 (oligofructose), HP (long-chain), and Synergy 1 (50:50 mixture of P95 and HP). A total of 20 pigs (5-wk old) were fed a corn-soybean meal based diet (BD) without supplemental inorganic iron, or the BD plus 4% of Synergy 1, HP, or P95. After 5 wks, all pigs were killed to collect total RNA from the liver and mucosa of duodenum, ileum, cecum, and colon. Relative mRNA expression of the 27 genes was quantified using real-time qRT-PCR (ABI 7700, Applied Biosystems, Foster City, CA) and normalized with levels of four housekeeping genes. Dietary inulin affected ($P < 0.05$) 2 genes in the duodenum, 6 genes in the colon, and 7 genes each in the cecum and liver. An additional 1 or 2 genes were marginally affected ($P = 0.06$ to 0.09) by inulin in each of the five tissues. Gene expression of solute carrier family 11 member 1, lactoferrin, and ferritin showed similar responses to dietary inulin in multiple tissues. In conclusion, expression of Fe-related genes was affected by dietary inulin supplementation in young pigs not only in the large intestines but also in the small intestines and liver. The regulatory mechanism and physiological relevance of these responses need further exploration.
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**Key Words:** Inulin, mRNA, Gene Expression

**697 Variation in chemical composition of soybean hulls.** F. F. Barbosa*[1,2], M. D. Tokach[2], J. M. DeRouchey[2], R. D. Goodband[2], J. L. Nelssen[2], and S. S. Dritz[2], [1]*Federal University of Viçosa*, *Viçosa, Minas Gerais, Brazil*, [2]*Kansas State University*, *Manhattan*.

The objective of this study was to examine the variation in chemical composition of soybean hulls. Our goal was to develop regression equations characterizing the nutritive value of soybean hulls for use in swine diets. Samples (n=39) were collected from different processing plants across the U.S. and analyzed for CP, GE, crude fiber (CF), ADF, NDF, fat, ash, Ca, and P. One sample was excluded because it contained approximately 10-times the amount of Ca (5.22% vs a mean of 0.57%) as other samples. The results of chemical analysis of the 38 samples were used to determine maximum, minimum, and mean values on a DM basis. Estimated DE values were calculated according to an equation described by Noblet and Perez (1993). Regression equations among the nutrients also were established. A high correlation was observed between CF and CP, with the CF predicting 94.7% of the variation in CP content ($Y = -1.160x + 55.49$; $R^2 = 0.95$). Crude fiber also was highly correlated to ADF ($Y = 1.256x + 0.612$; $R^2 = 0.96$); NDF ($Y = 1.657x + 2.234$; $R^2 = 0.97$); and estimated DE ($Y = -90.86x + 4819$; $R^2 = 0.94$). A high correlation also was observed between CP and estimated DE ($Y = 74.79x + 521.9$; $R^2 = 0.90$). Lower correlations were observed between ash concentration and Ca and P. Also, lower correlations were observed between GE and all the other nutrients. In summary, the chemical composition of soybean hulls can be highly variable; however, CF content can help explain much of the variation in CP, ADF, NDF, and estimated DE.

**Table 1. Nutritional values of soybean hulls on a DM basis**

| Nutrient | Minimum | Mean | Maximum | SD |
|---|---|---|---|---|
| Moisture, % | 3.39 | 8.18 | 9.51 | 1.16 |
| CP, % | 9.90 | 13.40 | 29.40 | 3.99 |
| GE, kcal/kg | 4036 | 4375 | 4825 | 177 |
| Est. DE, kcal/kg | 1166 | 1553 | 2654 | 365 |
| CF, % | 23.90 | 36.30 | 39.90 | 3.35 |
| ADF, % | 30.20 | 46.20 | 50.50 | 4.30 |
| NDF, % | 41.50 | 62.40 | 68.00 | 5.36 |
| Fat, % | 0.70 | 1.70 | 4.50 | 0.90 |
| NFE, % | 39.50 | 42.70 | 44.90 | 1.40 |
| Ash, % | 4.50 | 5.30 | 6.70 | 0.50 |
| Ca, % | 0.46 | 0.57 | 0.76 | 0.06 |
| P, % | 0.11 | 0.16 | 0.35 | 0.05 |

**Key Words:** Nutritive Value, Soybean Hulls

**698 Influence of soybean hulls on active nutrient transport in the gastrointestinal tract of nursery pigs.** D. M. Sholly*[1], B. E. Aldridge[1], J. G. Stevens[1], L. L. Snyder[1], J. S. Radcliffe[1], K. E. Bach Knudsen[2], A. L. Sutton[1], and B. T. Richert[1], [1]*Purdue University*, *West Lafayette, IN*, [2]*University of Aarhus*, *Tjele, Denmark*.

Twenty four barrows and 24 gilts (initial BW=5.65 kg) were used to determine the influence of adding soybean hulls (SH) to nursery pig diets on active nutrient absorption. Pigs were weaned at 17 d of age, blocked by BW, sex and ancestry, and housed in individual pens ($0.41 \times 0.86$ m). All pigs were provided ad libitum access to a common, pelleted phase 1 diet (d 0-5) followed by a phase 2 diet (d 6-10) in meal form. Pigs were then fed experimental diets for an additional 15-18 d: 1) Control, C; 2) C + 3% SH; 3) C + 6% SH; and 4) C + 12% SH. Diet C (20.5% CP, 1.1% Lys) was corn-SBM based with 10.75% starch, 5 % lactose, 4% fish meal, and 1.25% soy concentrate. Soy hulls were added to experimental diets in place of starch and soy concentrate. Experimental diets were fed at 9% metabolic BW and intake was adjusted every 4 d. After 15, 16, or 18 d of feeding the experimental diets, pigs were euthanized. Jejunal tissue was removed, mounted in modified Ussing chambers, and active nutrient absorption was estimated based on changes in transepithelial short circuit current (Isc) following mucosal challenges with 10 mM glucose (Glc), phosphorus (P), and glutamine (Gln). Osmotic balance was maintained by adding mannitol to the serosal chamber. Overall ADG (0.36 kg/d), ADFI (0.53 kg/d), G:F (0.68) and active transport of P and Gln were not affected by diet or sex ($P>0.10$). Active Glc transport tended ($P<0.10$) to be increased in pigs fed diets containing 6% SH (59.3 $\mu A/cm^2$) compared to diets with 0 or 3% SH (36.1 $\mu A/cm^2$; 34.2 $\mu A/cm^2$, respectively), with pigs fed diets containing 12% SH (53.8 $\mu A/cm^2$) being intermediate. In summary, enhanced Glc transport observed with the addition of 6% SH could be due to changes in gastrointestinal morphology or an increased abundance of membrane bound SGLT1 resulting from decreased Glc concentrations in the 6% SH diets.

**Key Words:** Soybean Hulls, Active Nutrient Transport, Pigs