

## Session 75

## Theatre 2

Empirical validation of implementing high energy in soybean meal: soybean oil equivalence of soybean meal in diets fed to growing pigs

J. Ibagón<sup>1</sup>, S. A. Lee<sup>1</sup>, H. Stein<sup>1</sup>

<sup>1</sup> University of Illinois, 1207 W Gregory Dr, IL 61801 Urbana, United States

The objective was to test the hypothesis that the energy value for soybean meal (SBM) fed to pigs is greater than current book values. Four diets based on corn, soy protein concentrate, and synthetic cellulose contained 0, 2, 4, or 6% soybean oil (SBO). The fifth diet contained corn, soy protein concentrate, and 12% SBM, but did not contain synthetic cellulose or SBO. A total of 120 pigs (initial weight = 24.7 kg; standard deviation = 3.06) were allotted to the six diets with two pigs per pen and 12 replicate pens per treatment. Pigs were fed experimental diets for four weeks. Average daily gain, average daily feed intake, and gain to feed ratio (G:F) were calculated for each treatment. The statistical model included diet as fixed effect and replicate and weaning group as random effects. Linear and quadratic effects of increasing SBO in diets were determined using contrast coefficients. Regression of G:F for pigs fed diets containing no SBM against the increasing levels of SBO was performed and an equation was generated. Results demonstrated that the overall G:F of pigs was increased (linear,  $P < 0.05$ ) by increasing SBO in diets containing no SBM. From the prediction equation it was calculated that the G:F of pigs fed the diet containing 12% SBM corresponded to the inclusion of 4.84% SBO in the diet. Assuming there is 7,504 kcal net energy (NE) in SBO, this corresponds to a NE value of 363 kcal/kg from adding 12% SBM and removing 12% cellulose, which corresponds to 3,027 kcal NE per kg SBM. The hypothesis that there is more NE in SBM than indicated in current book values, therefore, was confirmed. In conclusion, the improvement in G:F obtained by adding SBM to the diets was not different from the improvement in G:F obtained by adding 4.84% SBO to the diets, which indicates that SBM provides more NE to pigs than previously thought.

## Session 75

## Theatre 3

Dietary fiber supplementation during gestation promotes placental angiogenesis by gut microbiota regulation of serotonin signaling pathway in sows

Y. Li<sup>1,2,3</sup>, D. Wu<sup>1</sup>, N. Everaert<sup>3</sup>

<sup>1</sup> Sichuan Agricultural University, Institute of Animal Nutrition, Huimin Road 211, 611130 Chengdu, China,

<sup>2</sup> Shandong Agricultural University, Department of Animal Science and Veterinary Medicine, Daizong Street 61, 271018 Tai'an, China, <sup>3</sup> KU Leuven, Department of Biosystems, Kasteelpark Arenberg 30, 3001 Leuven, Belgium

The study aimed to investigate the potential mechanisms of dietary fiber improving the placental development of sows. Thirty gilts were assigned randomly to two groups, and fed a basal diet (CON group) or a basal diet supplemented with inulin and cellulose [high-fiber (HF) group] during gestation period. Sow blood and feces samples were collected on gestation day 30 for metabolomics and metagenomic analysis, respectively, and placenta samples were collected immediately after farrowing in the third parity. The results demonstrated that dietary fiber changed the serum metabolites related to tryptophan metabolism pathway, and decreased serum indole concentration. Dietary fiber supplementation increased the Firmicutes\_bacterium CAG.110 abundance which was negatively correlated with the serum indole concentration. Then the serum concentration of serotonin was found to be higher in the HF group compared with the CON group. Moreover, CD31 protein expression of the HF group in placenta was significantly higher than that in the CON group ( $P < 0.05$ ). The study in vitro showed that 75  $\mu\text{mol/L}$  serotonin increased the cell viability and angiogenesis of porcine vascular endothelial cells; meanwhile, serotonin elevated the serotonin receptor 1B and PI3K/Akt pathway-related genes expression as well as the CD31 protein expression ( $P < 0.05$ ). Our finding indicated that dietary fiber supplementation during gestation promoted placental angiogenesis by gut microbiota regulation of serotonin signaling pathway in sows.