

Use of feed technology to improve the nutritional value of feed ingredients

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Two experiments were conducted to test the hypothesis that reduced particle size of corn will improve the caloric utilization of corn fed to weanling pigs and to determine effects of pelleting, extrusion, and extrusion and pelleting on energy and nutrient digestibility in diets containing low, medium, or high levels of fiber. In Exp. 1, a total of 128 pigs were used [initial body weight (BW) of 9.41 ± 1.54]. Pigs were randomly allotted to 4 diets in a randomized complete block design. There were 4 pigs per pen and 8 replicate pens per treatment. The corn that was used was ground to different particle sizes (i.e., 865, 677, 485, or 339 μm). In Exp. 2, three diets were formulated: low fiber diet, medium fiber diet, and high fiber diets. Each diet was divided into 4 batches after mixing and either fed in a meal form without further processing or pelleted, extruded, or extruded and pelleted. A total of 24 growing pigs (initial BW: 26.5 ± 1.5 kg) with a T-cannula installed in the distal ileum were allotted to the diets in a split-plot design with 8 pigs allotted to each level of fiber. Ileal digesta and fecal samples were collected and the apparent ileal digestibility of energy, crude protein, and dry matter were calculated as was

the metabolizable energy (ME) of each diet. Results of Exp. 1, indicated that final BW and average daily gain were not affected by corn particle size, but average daily feed intake decreased (linear, $P < 0.05$) and gain to feed increased (linear, $P < 0.05$) from 0.65 to 0.66, 0.70, and 0.69 for pigs fed diets containing corn ground to a mean particle size of 865, 677, 485, and 339 μm , respectively. In Exp. 2, results indicated that pelleting, extrusion, or pelleting and extrusion improved ($P < 0.05$) the apparent ileal digestibility of energy and dry matter, but in most cases, there were no differences between the pelleted, the extruded, and the extruded plus pelleted diets. Medium and high fiber diets that were extruded had greater ME ($P < 0.05$) compared with the meal diets. In conclusion, results of these experiments indicate that gain to feed of diets containing corn with the smaller particle size was increased compared with diets containing corn with greater particle size. In addition, energy utilization may be improved by pelleting or extrusion or by a combination of the 2 technologies, but the response seems to be greater for extrusion in diets that are relatively high in fiber.