

## ANIMAL SCIENCE

**Title:** Effects of pelleting and extrusion on energy and nutrient digestibility in diets fed to pigs – NPB #13-041 revised

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**Date Submitted:** Sep. 15, 2014

### Scientific abstract

An experiment was conducted 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. Three diets were formulated. The low fiber diet contained mainly corn and soybean meal, the medium fiber diet contained corn, soybean meal, and 25% distillers dried grains with solubles (DDGS), and the high fiber diet contained corn, soybean meal, 25% DDGS, and 20% soybean hulls. All diets were formulated to meet the nutrient requirements of growing pigs. Concentrations of NDF were approximately 7, 11, and 20% in the low, medium, and high fiber diets, respectively. Each diet was divided into 4 sub-batches after mixing. One batch was not further processed and fed in a meal form. One batch was pelleted at 95°C, one batch was extruded at 115°C using a single screw extruder, and the last batch was first extruded at 115°C and then pelleted at 95°C. Thus, 12 different diets were produced. A total of 24 growing pigs with a T-cannula installed in the distal ileum were allotted to the diets with 8 pigs allotted to low fiber, medium fiber, and high fiber diets, respectively. Within each type of diets, the 8 pigs were allotted to a replicated 4 × 4 Latin square design with four 14-d periods and the 4 different diet technologies in each square. Thus, there were 8 replicate pigs per diet. Pigs were adjusted to their diets for 14 d

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These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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before the experiment started. After a 5 d adaptation period, fecal samples were collected for 5 d according to the marker to marker approach and ileal digesta were collected on d 13 and 14 of each period. Results indicated that pelleting, extrusion, or pelleting and extrusion improved ( $P < 0.05$ ) the apparent ileal digestibility (AID) of starch and most indispensable AA. In most cases, there were no differences between the pelleted, the extruded, and the extruded plus pelleted diets, but AID values for starch and AA were in most cases greater ( $P < 0.05$ ) than for the meal diet. The apparent total tract digestibility of energy was also improved ( $P < 0.05$ ) by pelleting in the low fiber and the medium fiber diets, but in the high fiber diets, only extrusion or extrusion and pelleting improved ATTD of GE. Because of the increased ATTD of GE, ME values for pelleted or extruded and pelleted low fiber diets, pelleted or extruded medium fiber diets, and extruded or extruded and pelleted high fiber diets were greater ( $P < 0.05$ ) than in the meal diets. These data indicate that energy utilization may be improved by pelleting or extrusion or by the combination of the 2 technologies, but the response seems to be greater for extrusion in diets that are relatively high in fiber.