

Where is fiber fermented in the pig digestive tract?

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Domestic pig. Credit: Scott Bauer, USDA

Fiber is increasingly being added to pig diets, but digestion of fiber in pigs is inefficient and poorly understood. In a new study from the University of Illinois, scientists pinpoint the locations within the digestive tract where fiber is fermented.

"We're trying to figure out the specifics of fiber fermentation in [pigs](#) and what can we potentially do to increase it," says Hans Stein, professor in the Department of Animal Sciences and the Division of Nutritional Sciences at U of I.

Stein's research group formulated four experimental diets, including a standard corn-soybean meal [diet](#) as a control. Different fiber sources replaced 30 percent of the control diet in the remaining three diets: distillers dried grains with solubles (DDGS), wheat middlings, and soybean hulls.

The researchers placed two cannulas in each of eight barrows, which allowed them to collect digesta from the end of the [small intestine](#) and from the colon, just after the cecum. Fecal samples were also collected from each pig. Values were calculated for apparent ileal digestibility (AID), apparent cecal digestibility (ACD), and apparent total tract digestibility (ATTD).

"This allowed us to quantify disappearance of nutrients and energy through fermentation at every point along the [digestive tract](#). We know there's fermentation in the cecum, but we didn't know how much there was. And we also were able to quantify what happens in the colon," Stein says.

The insoluble fiber in wheat middlings was fermented more readily than in soybean hulls or DDGS, suggesting it may be the best fiber source of the three. For the soluble fiber fraction, there were no differences among the diets.

The site of fermentation for soluble fiber was either in the small intestine or in the cecum, whereas for insoluble fiber, fermentation occurred in the colon.

"This is the first study to determine the different places in the pig digestive tract where fiber is fermented. We will use this information to conduct more research and determine if we can solubilize more fiber and therefore get more energy out of it early in the digestive tract," Stein says. "We can potentially target enzymes or other additives to help microbes ferment more fiber."

The article, "Disappearance of nutrients and energy in the stomach, and small intestine, cecum, and colon of pigs fed corn-soybean meal diets containing distillers dried grains with solubles, wheat middlings, or soybean hulls," is published in the *Journal of Animal Science*. Former Ph.D. student Neil Jaworski and Stein co-authored the article. Financial support was provided by the National Pork Board.

More information: N. W. Jaworski et al. Disappearance of nutrients and energy in the stomach and small intestine, cecum, and colon of pigs fed corn-soybean meal diets containing distillers dried grains with solubles, wheat middlings, or soybean hulls, *Journal of Animal Science* (2017). [DOI: 10.2527/jas2016.0752](https://doi.org/10.2527/jas2016.0752)

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