

Research ties sow and progeny diet to kyphosis risk

Don't overlook critical nutrients when troubleshooting.

Research from the University of Wisconsin has given pork producers some things to consider when identifying and mitigating the causes of kyphosis, a condition characterized by an abnormal, outward spinal curvature in pigs. While the causes for the condition remain unclear, the research has demonstrated a dietary connection to kyphosis.¹

“This information provides evidence that can help establish a basis for investigating outbreaks of kyphosis and determining possible nutritional deficiencies,” says Jon Bergstrom, Ph.D., senior technical support manager for DSM Nutritional Products.

Kyphosis, sometimes referred to as “humped-back,” typically doesn't appear until pigs are 5 to 6 weeks old. Possible factors include physical or metabolic abnormalities, trauma, genetics, disease stress, environmental stress, or strain on the lumbar spine.

The research by Amundson et al. showed an increased risk of kyphosis in pigs born to sows lacking dietary supplementation of vitamin D₃ throughout gestation and lactation. It also identified an increased risk for kyphosis if the post-weaning diets were deficient in vitamin D₃, calcium, and/or phosphorous. Up to a 45 percent incidence of kyphosis could be observed in extreme cases in which sow and nursery diets were deficient in Vitamin D₃ and nursery diets were low in calcium and – especially – phosphorus. These nutrients are critical for pig growth and skeletal development.


Focus on critical nutrients

While deficiencies in vitamin D₃, calcium and phosphorous can be linked to increased kyphosis risk, the answer is more complex than simply feeding more of those nutrients, Bergstrom says. The relationships between minerals play an important role.

“In my experience, the importance of phosphorus, calcium, certain trace minerals, and their interactions are sometimes overlooked,” he says.

For example, growing evidence indicates some post-weaning diets could be marginal in phosphorus. Feeding high levels of calcium and/or zinc oxide for extended periods could exacerbate phosphorus deficiencies, leading to reductions in performance and an increased risk of bone diseases.

One tool to improve calcium and phosphorous digestibility is feeding phytase. However, phytase brings its own challenges to the mix. Different sources of phytase can perform differently and release different amounts of dietary phosphorous, depending on their stability in premixes and feed manufacturing, and their actual activity in the final feed. If a nutritionist is crediting phytase for



Critical nutrients to focus on in cases of kyphosis

Size (lbs)	Energy (kcal/day)	Calcium (g/day)	Phosphorus (g/day)
11 - 15	904	2.26	1.86
15 - 24	1,592	3.75	3.04
24 - 55	3,033	6.34	5.43
55 - 110	4,959	9.87	8.47
110 - 165	6,989	12.43	10.92

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¹ Rortvedt, L. A., L. A. Zappitelli, J. L. Reichert, J. R. Booth, and T. D. Crenshaw 2010. Expression of kyphosis in young pigs is altered by carryover effects of sow vitamin D status. *J. Anim. Sci.* 88 (E-Suppl. 2):665

improved digestibility of phosphorus, but the phytase activity is lower than expected, a phosphorous deficiency could occur.

Some studies have shown feeding very high levels of phytase, commonly known as “super-dosing,” may overcome these issues. In studies in which pigs responded to super-dosed levels of phytase, the higher levels increased the digestible phosphorus, and may have overcome negative effects of high calcium and/or zinc oxide levels on phosphorous retention, Bergstrom says.

As long as the exact causes of kyphosis remain unclear, producers should consider the possibility of nutritional deficiencies as a possible cause of kyphosis, Bergstrom says. When investigating kyphosis outbreaks, be sure to look closely at possible deficiencies in calcium, phosphorous and vitamin D₃ in sow and pig diets.

“It’s wise to periodically review your diets with a nutritionist, but it’s especially important if kyphosis is a concern,” Bergstrom says. “Your suppliers should help identify the best products and be able to verify the nutrient levels that you expect to achieve results you want.”

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