

# Soybean meal positively affects pigs with PRRSV

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A domestic pig on an organic farm in Solothurn, Switzerland. Image: Wikimedia Commons

Porcine reproductive and respiratory syndrome virus (PRRSV) is the most widespread disease in the swine industry. In sows, PRRSV causes reproductive problems during gestation, including abnormal litters or abortions. Growing pigs with the disease will have respiratory problems and poor growth.

In 2012, Holtkamp and colleagues estimated the annual losses due to PRRSV to be a staggering \$664 million in the U.S. alone. Producers on larger farms use vaccines and enhanced biosecurity measures to prevent eradicating an entire herd during a PRRSV outbreak. Unfortunately, these methods sometimes yield little success.

Thus, other measures, like increasing the amount of soybean meal in the diet are being used.

Increased soybean meal concentrations may help alleviate the effects of PRRSV. Soybean meal is the primary protein source fed to swine. It also contains isoflavones, compounds that have anti-inflammatory and antiviral properties.

In the June 2015 issue of the *Journal of Animal Science*, Dr. Ryan Dilger, Assistant Professor at the University of Illinois, and colleagues determined the "Effects of dietary soybean meal concentration on growth performance and immune response of [pigs](#) infected with [PRRSV]".

"Prior research suggested there are value-added benefits for adding soybean meal to health-challenged weanling pigs, but a specific mode of action was not identified," said Dilger. "Our objective in this research was to provide 'proof of concept' evidence that addition of soybean meal to a weanling pig diet at concentrations above typical industry standards would [benefit] pigs experimentally infected with PRRSV."

The team fed 64 weanling pigs either a low or high concentration of soybean meal to pigs either inoculated or not inoculated with PRRSV. Blood was taken to determine soybean meal's effects on immune responses and to determine a possible mode of action. The trial lasted for 14 days.

"Analyses corresponded to early, mid, and recovery periods of PRRSV infection, which typically lasts 14 days," said Dilger.

All pigs infected with PRRSV had increased temperatures, decreased daily feed intake and decreased feed efficiency compared to pigs not infected. However, within the PRRSV-infected group, pigs that were fed

the high concentration of soybean meal tended to have increased average daily gain compared to those fed low concentrations.

Pigs not infected with PRRSV had similar growth performance whether or not they were fed high or low concentrations of soybean meal.

On day 14, PRRSV-infected pigs fed the high soybean meal concentrations had lower serum PRRSV loads and decreased TNF- $\alpha$  (a cytokine involved with systemic inflammation) compared to pigs fed a low soybean meal diet. This suggests that infected pigs fed high soybean meal concentrations had more efficient virus elimination compared to infected pigs fed the low soybean meal diet.

Overall, feeding a higher level of soybean meal in the diet to pigs with PRRSV could increase growth and performance in certain production settings.

Dilger hypothesized that "two independent modes of action may be involved," either through non-essential amino acids, like glutamine, or through isoflavones in soybean meal.

In the future, Dilger's lab will identify immune-cell phenotypes and functions throughout a 14 day period.

"Eliciting health benefits to the weanling pig has great potential for improving the efficiency of production during later growth phases," said Dilger. "While our focus has been on immune and growth benefits only in the starter phase, future research will also need to incorporate longer-term benefits over the entire grow-out period."

**More information:** Holtkamp, D., J. Kliebenstein, J. Zimmerman, E. Neumann, H. Rotto, T. Yoder, C. Wang, P. Yeske, C. Mowrer, and C. Haley. 2012. Economic impact of porcine reproductive and respiratory

syndrome virus on U.S. pork producers. Anim. Ind. Rep. No. AS 658. [lib.dr.iastate.edu/ans\\_air/vol658/iss1/3](http://lib.dr.iastate.edu/ans_air/vol658/iss1/3) (Accessed June 25, 2015.)

Rochell, S. J., L. S. Alexander, G. C. Rocha, W. G. VanAlstine, R. D. Boyd, J. E. Pettigrew, and R. N. Dilger. 2015. Effects of dietary soybean meal concentration on growth and immune response of pigs infected with porcine reproductive and respiratory syndrome virus. J. Anim. Sci. 93:2987-2997. DOI: [10.2527/jas2014-8462](https://doi.org/10.2527/jas2014-8462).

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