

## TECH TALK

# Reduce PRRS Virus Replication in Pigs with Zinc Supplements

### Article Provided By:



Dr. Wes Schweer  
Zinpro Corporation

In a typical year, porcine reproductive and respiratory syndrome, or PRRS, is a seasonal virus in pig herds. It usually spikes between October and April and wanes during the summer months.

But that has not been the case over the past 18 months. Last summer, PRRS persisted with a strain that seemed to be more severe than usual. In addition to causing the usual reproductive issues, this strain of PRRS, identified as strain 1-4-4 lineage 1C, generated a higher rate of mortality (as high as 50 to 60%) in both sows and nursery pigs, leaving many of us in the industry to wonder how bad it could get this fall and winter.

While there are many preventative methods for controlling PRRS, such as vaccines and improving biosecurity measures, proper nutrition is important as well. In particular, research has shown that [zinc slows the replication of viruses, like PRRS in pigs](#).<sup>1</sup>

By giving nursery pigs and sows the ability to mount a rapid immune response to PRRS and other viral infections, we are taking an important step toward building a robust pig.

#### Understand the Replication of RNA Viruses like PRRS

PRRS, much like other viruses in animals and humans, can be transmitted through close contact via the nose or mouth, or through the air. Once inside a pig's body, it starts attacking the immune cells in the lungs and going head-to-head with the immune system.

If the immune response is not fast enough to take the cell back from the PRRS virus, the immune system will kill off those cells to save the rest of the pig. With fewer immune cells available, this decreases the pig's ability to fight off additional infections or other diseases, like the flu. As all of this happens, the virus will continue to replicate, or make more of itself, and spread to other immune cells in the lungs.

Like swine influenza, rotavirus and coronaviruses, PRRS is an RNA virus. This means that its makeup consists of a single strand of genetic material RNA, unlike DNA viruses, which contain multiple strands that are woven together.

Since RNA viruses are made up of a single strand, it's easier to mutate, or make different versions of itself. These different strains can make it difficult to treat or vaccinate against, since vaccines are usually made for one strain. Therefore zinc can help when it comes to reducing the replication of PRRS.

#### Slow Down PRRS in Pigs with Trace Minerals Supplements

When an RNA virus replicates, an enzyme called RNA polymerase transcribes viral DNA into more viral RNA, allowing it to spread to other cells. To do this, it needs a divalent metal ion, or metal with a 2+. One example of this is magnesium (Mg<sup>2+</sup>).

Magnesium is still an important nutrient for many functions in a pig's body, but it must be in the right balance. In this situation, RNA polymerase is like a train and magnesium is what keeps building the tracks for it to keep going and producing more virus.

However, zinc can replace magnesium, slowing down production of the tracks and greatly reducing virus replication. The replication reaction inside the cell actually prefers zinc to magnesium. For zinc to be preferentially used in this reaction, and impair viral replication, zinc has to be inside the cell. RNA polymerase has a greater affinity for zinc than manganese. If zinc is available, the cells will pull it in to get to work before magnesium gets a chance.

This is why it's important to supplement swine nutrition with zinc from [Zinpro Performance Minerals](#)<sup>®</sup>. It is the most metabolically available source of zinc on the market, which allows more of it to reach the immune cells and help reduce the replication of viruses like PRRS.

To learn more about how our products and solutions can prevent and manage PRRS outbreaks in your swine herd, [contact your Zinpro representative today](#).

## References

1 te Velthuis AJW, van den Worm SHE, Sims AC, Baric RS, Snijder EJ, van Hemert MJ (2010) Zn<sup>2+</sup> Inhibits Coronavirus and Arterivirus RNA Polymerase Activity In Vitro and Zinc Ionophores Block the Replication of These Viruses in Cell Culture. PLoS Pathog 6(11): e1001176. <https://doi.org/10.1371/journal.ppat.1001176>