

Providing high-quality feed to pigs involves many aspects along the production chain. It starts with ingredients that are of high nutrient value and are free of contaminants. The processing, delivery and storage of the diet components can also affect the quality and final composition of the feeds. Understanding the factors that affect feed quality and implementing a quality-assurance program will help ensure that the best-possible nutrition is delivered to the pigs.

Mycotoxins

Environmental conditions that place stress on grains may also cause those grains to become susceptible to mold growth. However, it is important to remember that it is not the mold itself that causes performance problems; rather, it is the mycotoxins those molds produce that can lead to negative effects. The mycotoxins that are of primary concern in swine diets include aflatoxin, zearalenone, vomitoxin or deoxynivalenol (DON) and fumonisins.

Guidelines for nursery pigs, ppb

Mycotoxin	Lower level	Moderate level	High level	Effects
Aflatoxins	5	10	20	Liver damage, poor reproductive performance, reduced growth
Vomitoxin (DON)	1,000	2,000	3,000	Reduced feed intake, feed refusal, lower gains, diarrhea
Zearalenone	50	100	150	Vagina reddening, prolapse, abortion, infertility
Fumonisin	1,000	1,750	2,500	Reduced feed intake, lower weight gain, increased diarrhea
Ochratoxins	20	35	50	Kidney damage, liver damage, immune suppression

Guidelines for grow-finish pigs, ppb

Mycotoxin	Lower level	Moderate level	High level	Effects
Aflatoxins	25	50	100	Liver damage, poor reproductive performance, reduced growth
Vomitoxin (DON)	1,000	2,000	3,000	Reduced feed intake, feed refusal, lower gains, diarrhea
Zearalenone	75	150	200	Vagina reddening, prolapse, abortion, infertility
Fumonisin	2,500	3,750	5,000	Reduced feed intake, lower weight gain, increased diarrhea
Ochratoxins	20	35	50	Kidney damage, liver damage, immune suppression

Mycotoxins can have an additive effect. The levels of individual mycotoxins may not be high enough to cause concerns; however, the combination of multiple mycotoxins, even at low levels, can have a significant impact. Drying the grain and adding mold inhibitors to mycotoxin-contaminated grains will decrease any further mold growth but will have no effect on the mycotoxins already present.

Particle Size and Grind

The major health concern associated with feed particle size is gastric ulcers, which are primarily associated with finely ground feed and/or a large percentage of the particles being less than 400 microns. Therefore, the ideal particle size and distribution for the grow-finish herd would be 500–750 microns, with less than 2.1 standard deviations and less than 20% at or just below 400 microns. Farms that struggle with low feed intake or gastric ulcers may consider increasing the particle size to more than 750 microns.

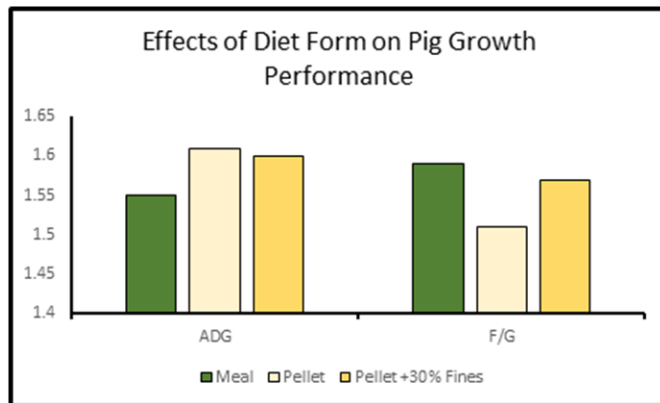


Grinding grains for swine diets improves feed utilization. By reducing the particle size, the surface area of the grain particle is increased, which allows for greater interaction with digestive enzymes. Swine feed efficiency is improved by 1% for each 100-micron reduction in particle size, from 1,000 microns down to 400 microns. As the micron size decreases, the cost of grinding increases and the mill throughput decreases. The ideal micron size may vary based on various economic conditions, feed efficiency, processing costs, the incidence of gastric ulcers and the potential for feed bridging. Understanding how these factors fit the goals of the operation will help determine the ideal micron size and where it falls within the desired range.

Pelleting

Pelleted diets are an effective way of improving feed efficiency in all phases of swine production. In addition to enhancing performance, pelleting decreases diet segregation and reduces dustiness and issues with feed bridging. Multiple studies conducted by Hubbard Feeds have consistently shown a 5% improvement in ADG and a 6% improvement in feed efficiency when healthy nursery pigs were fed pelleted vs. meal diets. To maintain the feed efficiency benefits of feeding pelleted diets, pellet fines must be minimized. Since having zero fines in swine diets is not realistic, Hubbard conducted a study looking at the performance of pigs fed pelleted diets compared to pigs fed pellets that contained fines to determine the level at which fines would be detrimental to performance.

The results of that trial are shown below and indicate that the performance benefits associated with pelleting diets were lost when pigs were fed pelleted diets with more than 30% fines. These findings indicate that some fines can be included in the pellets and not affect performance.



Good Manufacturing Practices (GMP)

Quality ingredients and manufacturing processes are the key components of any nutrition program. The FDA has established guidelines and standards for Good Manufacturing Practices (GMP) for animal feeds that must be followed by all feed mills. These guidelines are designed to ensure the proper usage of feed additives and prevent feed contamination. Providing a residue-free supply of pork for human consumption is extremely important. The [Food Safety Modernization Act \(FSMA\)](#) provides more direction on manufacturing and producing safe feed for animals intended for human consumption. The American Feed Industry Association (AFIA) also offers several resources for feed manufacturers on their website, www.afia.org.

Sampling ingredients and finished feeds is an integral part of any quality assurance program. Keeping retainer samples of manufactured feeds is a good practice so that, if questions arise, the feed sample can be sent off for analysis. In order to get the most accurate feed analysis, it is important to take multiple samples of a single batch of feed to ensure that you are getting the most representative sample. Taking samples of feed as it is being discharged from the auger to the bulk bin is one of the most convenient ways to obtain samples. Another option would be to take probes from each feeder. Regardless of sample location, subsamples should be combined to create one large sample. A small, representative sample can then be taken and stored for later analysis or sent to a lab.

Feed Delivery

The delivery of finished feeds is an important part of GMP. Bins should be properly cleaned out prior to a new feed being delivered. Sequencing the unloading process to make sure non-medicated feeds are unloaded first can prevent drug residues. Flushing between medicated feeds can also help mitigate residue concerns. The proper identification of bulk bins can reduce the chance of unloading feed into the wrong bin, which could potentially create drug withdrawal concerns for pigs near market weight.