Feed Processing

Feed processing is an important component of optimizing a grow-finish nutritional program. Factors such as grain particle size, feed form, and pellet quality can influence nutrient digestibility and feed efficiency. Producers also need to consider changes in diet flowability, changes in bulk density, incidence of gastric ulcers, and costs associated with changes in feed processing. The practical considerations of feed processing in grow-finish diets are discussed in this fact sheet.

Particle Size

Particle size of cereal grains is an important consideration as it can influence nutrient digestibility and thus growth performance. For every 100 micron reduction in particle size, down to 300 microns, a ~1% improvement in F/G can be observed due to the improved nutrient digestibility. Reducing the particle size of corn and other ingredients to approximately 550 to 600 microns (when measured with a flow agent) improves the energy digestibility but does not influence the digestibility of phosphorous or amino acids (Mavromichalis et al., 2000; Rojas and Stein, 2015; Saqui-Salces et al., 2017). Diet form should also be considered because reducing grain particle size below 500 microns in mash diets can negatively affect feed flowability (Gebhardt et al., 2018). Reducing particle size also can potentially increase incidence of gastric ulcers leading to decreased growth performance and increased mortality (Ayles et al., 1996; Millet et al., 2012).

In summary, reducing particle size improves F/G due to an improvement in energy digestibility and the recommended particle size of finishing diets is 500 - 600 microns.

Feed Form

Feed is typically fed in grow-finish diets in meal and pelleted form. Feeding pelleted diets in the grow-finish period results in improvements in feed efficiency and average daily gain. The improvement in feed efficiency partly due to decreasing feed wastage and increasing nutrient digestibility (Ball et al., 2015; Nemechek et al., 2015; 2016).

The type of feeder used may also have an effect on whether mash or pelleted diets should be fed to growing-finishing pigs. Pigs fed a meal diet using a wet/dry feeder had improved average daily gain and increased feed intake compared to when a conventional dry feeder was used (Bergstrom et al., 2012). However, the improvement in growth performance with a pelleted diet is dependent on pellet quality as the amount of fines present can influence the magnitude of growth response (Myers et al., 2013). Furthermore, the pelleting process exposes feed ingredients, specifically vitamins and enzymes, to high temperatures which can reduce their stability and efficacy (Svihus and Zimonja, 2011; Truelock et al, 2018). Therefore, heat-stability of enzymes and vitamins should be considered when pelleting swine diets.

Pellet Quality

Pellet quality will affect the level of growth performance improvement. Poor quality pellets are associated with more fines which can lead to more feed sorting and feed wastage and decreased performance (Myers et al., 2013). It is estimated that a 1% change in feed efficiency will be observed with every 10% change in pellet fines (Stark, 1993; Amornthewaphat et al., 2000; Nemechek et al., 2015). Pellet quality can be improved through diet formulation adjustments such as including higher amounts of protein and starch-based products; fat application post-pelleting and not in the mixer, manipulation of the pelleting process such as increasing conditioner temperature or retention time, increasing water content, or using an expansion process (Loar and Corzo, 2011; Lundblad et al., 2012).

Producers should consider the changes in pig performance, diet flow ability, incidence of gastric ulcers, and manufacturing costs when evaluating feed processing methods. Feed cost per lb of gain and income over feed costs should be considered in the economic decision process.

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