TECH TALK

Considerations in the Transition to Summer Diets

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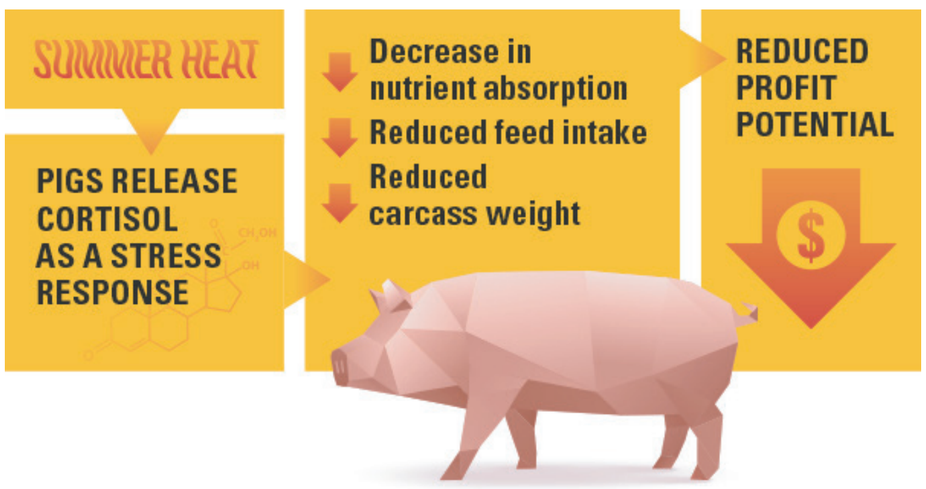
The concentration of energy and nutrients in diets is proportional to an expected feed intake. So, in the absence of heat stress, dietary energy and nutrients may be diluted within the range of voluntary feed intake. This scenario allows the use of fibrous ingredients, mostly from co-products with a lower typical cost than standard cereal grains. The dilution of dietary energy and a larger feed intake also allows the dilution in amino acids. The result is a lower diet cost that maximizes feed intake.



During the winter season, environmental temperatures below the comfort zone will often increase feed intake to obtain extra energy and maintain body temperature. Additionally, co-products that are rich in fiber concentration will promote fermentation in the large intestine – releasing heat known as metabolic heat increment. This extra heat is efficiently released when pigs are in a thermoneutral environment. However, this is not the case during summer heat.

Summer heat commonly decreases voluntary feed intake, which in turn reduces the supply of energy and nutrients. The Swine NRC (2012) reports a loss of 10 to 30% in average daily feed intake when ambient temperature increased from about 66 to 88%. In fact, one study estimates a drop of up to 80 grams in feed intake per each 1% increment in ambient temperature above the upper critical temperature (Le Dividich et al., 1998). In addition, coping with heat stress requires extra energy expenditure and a redirection of nutrients. Thus, the reformulation of diets to help pigs cope with the summer season is a common and necessary practice in the industry.

Perhaps the most important strategy to reformulate diets for the summer season is increasing the net energy supply by minimizing fiber fermentation and therefore reducing the metabolic heat increment. In practice, it means limiting the inclusion of fibrous co-products and increasing the energy supply of rapidly-available carbohydrates from cereal grains, as well as added fat. To put this in perspective, a typical finisher corn-SBM diet with 30% DDGS may have a concentration of neutral detergent fiber (NDF) of about 16% or more, depending on the DDGS composition. Reformulating the same diet without DDGS and using only corn and SBM instead, drops the NDF to about 9% without significant changes in the concentration of metabolizable energy (ME); however, the net energy (NE) concentration in the diet increases.

Added fat is also used to increase total energy concentration in the diet to compensate for reductions in feed intake. The Swine NRC (2012) reports that each 1% of added fat in the diet increases voluntary ME intake by 0.2 to 0.6% due to a reduced heat increment of fat compared to that of carbohydrates under thermoneutral conditions. The use of added fat in diets as a strategy to improve growth rates has been inconsistent due to several factors, such as age of pigs, **fat quality** and inclusion level. However, maintaining a constant lysine to energy ratio helps improve feed efficiency by reducing feed intake (Pettigrew and Moser, 1991). Rauw et al. (2017) reported no significant differences in pig performance under conditions of heat stress when pigs were fed diets with either 8.7 or 13.8% NDF, but maintained similar NE concentration by adding soybean oil. This strategy, however, must be carefully considered based on production objectives, space available at the farm and market conditions.

The supply of amino acids must be maintained along with the changes in dietary NE to ensure a proportional supply of nutrients and energy intake. Thus, a lysine to energy ratio is recommended (Swine NRC, 2012) when modifying dietary energy concentrations. Furthermore, the inclusion of crystalline amino acids should be considered to reduce extra protein and maximize dietary caloric efficiency.

Finally, dietary strategies to help pigs cope with heat stress should also consider the inclusion of chromium. Chromium plays an important role in the response to stressors, like reducing cortisol levels, as well as in the inflammatory response. In a controlled study, dietary supplementation with **KemTRACE® Chromium** (Kemin Industries) improved voluntary feed intake by 3.5% in pigs under thermoneutral conditions, and by 4% in pigs under heat stress conditions. The larger feed intake also improved growth rate and feed efficiency (Mayorga et al., 2019).

In conclusion, the summer is a period of challenge to the swine industry because of the heat stress that pigs may experience. Dietary solutions to help pigs cope with summer heat should be implemented, alongside management strategies that reduce the impact of heat stress.

To learn more about heat stress and the use of the chromium, visit **www.kemin.com/swineheatstress**.

References

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