

# Nutritional management of grow-finish pigs: energy and feed efficiency

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Feed efficiency is a dangerous target when used in isolation, says Dr. John Patience, from the Department of Animal Science at Iowa State University. It is influenced by many feed composition factors, including, energy, amino acid concentration and nutrient balance in addition to feed processing factors and additives that are used. It is also influenced by environmental factors such as temperature, pig health, access to feed and the pig itself, in terms of growth rate, protein:lipid ratio, start and finish weights and mortality. What really matters is caloric efficiency, says Dr. Patience. AgriStats performance records for 30 million grow-finish hogs (during 2011) show that while FCE for Canadian pigs was 2.97 as compared to 2.72 for US pigs. Caloric efficiency was exactly the same at 9.2 Mcal/kg gain. FCE is different due to the higher energy concentration in corn, but Canadian pigs grow faster, due to their better health status in addition to lower feed cost, in terms of cost per Mcal energy, indicating that the critical issue in this comparison is the cost of calories, says Dr. Patience. Why feed efficiency should always be a secondary driver for management decisions in the grow-finish herd?

"The cost per Mcal went up from 2.7 cents to 11.8 comparing 2005 with 2012 so we need to think about the cost of energy differently," says Dr. Patience. "We also need to consider the relative cost of energy in different ingredients, for example the cost of energy from DDGS is far higher, at 14.5 cents/Mcal, than for corn at 11.8 cents. Therefore we need to know and monitor the cost of energy in the diet continually.

"One feed conversion point is now worth \$.47 cents per pig compared with \$.31 a few years



*Dr. John Patience, speaking at the Saskatchewan Pork Symposium*

ago, so we need to consider the value of FCE differently," Dr. Patience continues. "Over 50% of the cost of getting a pig to market is the energy component. And it's something producers have control over, so we need to pay more attention to it."

Energy level in the diet may have some performance implications. For example, research shows that increasing the ME content of the diet increases backfat thickness but has no effect of loin depth. Increasing the energy in the diet will increase growth rate, but only up to a point where it can't be increased any more. "Where is your farm?" asked Dr. Patience. "If energy is expensive, can we reduce energy level in the diet and still maintain growth or if we reduce energy intake, will this also reduce growth?" Unless energy intake is lowered excessively, carcass lean should not be impaired, but it can be reduced as energy intake declines if the decline is excessive, or if amino acid balance is not appropriately adjusted, he concludes. He notes that increasing the energy content of the diet will always improve feed efficiency.

About one-third of the energy that the pig eats goes to maintenance, 20% is used in protein

deposition and 46% in fat gain, Dr Patience notes. "To maximize efficiency, we must reduce the energy spent for maintenance," he suggests. "This can be done by optimizing thermal comfort, minimizing social stressors and maintaining the highest possible health standards because fighting disease uses up energy." Maximizing growth rate by various means reduces the time spent in the barn, which results in fewer days of maintenance energy costs, he adds. Reducing maintenance energy costs increases the amount of energy that is directed towards lean gain.

The pigs' energy intake impacts how comfortable they feel in the barn, notes Dr. Patience. "Unthrifty pigs eat less than their healthy contemporaries and, because of this, they are chilled at a temperature that is perfectly comfortable for healthy pigs. Therefore, unthrifty pigs need to be kept in warmer and less drafty conditions, potentially providing localized heating or covering their lying area."

Dr. Patience believes that quality control in the pork production process should focus on outcomes such as growth rate, barn throughput and carcass quality and less on inputs such as  
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**Feeder space per pig in the finishing barn can have a significant impact on growth rate**

diet composition. Having said that, he stresses that the feed production components should be checked to ensure that feed delivered to the pigs meets their requirements for daily nutrient intake. "We need to confirm the composition of incoming ingredients in terms of both desirable and undesirable constituents," he explains. "We also need to ensure that feed mixing is achieving

a uniform mixture according to the formulation."

Feeder space allowance can have an impact on feed intake and growth, notes Dr. Patience. In a trial comparing 4.1, 4.9 and 5.7 cm space per pig for finishing pigs, final body weights were 121.5, 122.2 and 122.9 respectively. "Along with final body weight being decreased, daily gain was significantly reduced with decreasing

feeder space," comments Dr. Patience. "As pigs grow and their shoulder width increases, the effective feeding space per pig decreases, thus impacting gain." There was also a trend for poorer feed efficiency as feeder space was reduced. "Although there was no difference in apparent daily feed intake, this could have been due to pigs having their mouths full of feed and backing up from the feeder and thus not utilizing the feed that supposedly disappeared," he suggests. Because of the impact of feeder space on growth, Dr. Patience believes that feeder space is much more critical economically when the cost of feed is high.

Dr. Patience concludes by stressing the need to pay more attention to the cost of energy in pig diets and to optimizing the efficiency of its use. "We must pay more attention to dietary energy because it is by far the most costly specification to meet in practical diets," he says. "We must also know the energy intake for our herds because herds differ widely in their daily energy intake and thus in their response to changes in dietary energy content." 

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The Canadian Society for Bioengineering presented a series of awards at its annual conference held at the University of Saskatchewan.

The graduate Thesis award was presented to Alvin Alvarado by Dr. Qiang Zhang (CSBE/SCGAB President). Alvin is a Research Associate for the Engineering group at Prairie Swine Centre.