

Improving production efficiency in pigs



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The cost of feed is by far the greatest input cost in pork production (65-70%), anything that can be done to improve the efficiency with which feed is used will have a positive impact on profitability. For this reason Feed Conversion Ratio (FCR) is a good indicator of a piggery performance. $FCR = \text{Feed Intake} / \text{Growth Rate}$

Feed Intake and utilization

How efficiently a pig converts feed into meat is determined by factors such as genetics, nutrition, health, environment, management, stocking density and equipment. A typical FCR for a finishing pig would be around 3; however the range is huge with variations from 2.6 to 3.4. The cost of a 0.1 FCR unit calculation would be: $0.1 \times (\text{slaughter weight} - \text{starting weight}) \times \text{price of feed/kg}$. For example a drop of a 0.1 FCR unit in a 76 kg carcass mass finisher pig would result in a R34.20 cost reduction per pig at slaughter on a finisher feed price of R4500/ ton. The increased return in improving your FCR should always be compared to the cost of achieving this. In the current market environment, factors influencing FCR should be paid close attention to. These include:

1. Feed Wastage

Feed wastage is notoriously difficult to measure however this exists in the majority of systems with floor feeding of meal being particularly poor. Where studies have measured feed wastage, it is not unusual for an amount between 2.5% to 10% to be recorded. Minimizing feed wastage includes daily monitoring of feed flow rates from the feeders and ensuring these are in good working condition. The aim is to cover one third of the feeding pan with feed. Another form of feed wastage is not feeding the pig according to its' nutrient requirements i.e. supplying the incorrect feed at the incorrect developmental stage (phase feeding). The over or under feeding of certain nutrients will result in a mismatch of nutrients to the pigs requirement which impacts on the growth rate; where feed conversion is closely correlated (60%) with growth rate. Even an oversupply of a nutrient such as protein requires additional energy expenditure in order to break down this extra protein resulting in a poorer FCR.

2. Feed nutrient density

Feed nutrient density is generally lower than it was some years ago when fat and protein sources were cheaper. Increasing energy while maintaining the correct lysine: digestible energy ratio often will

result in improvements to the FCR. Cutting corners on feed and formulation work can have a very damaging influence on FCR which will end up costing more for the business than less.

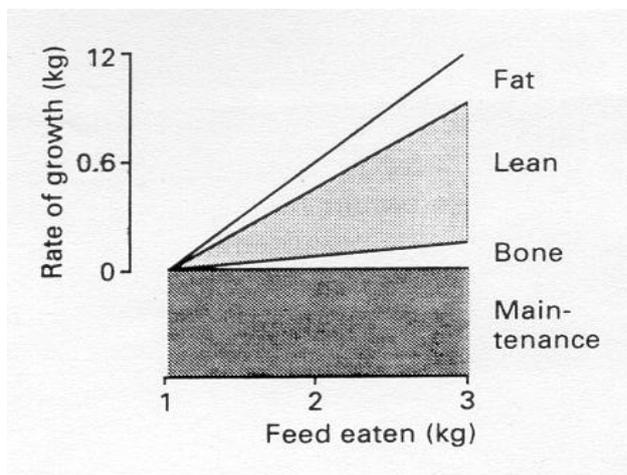
3. Feed form

Feed form (dry/wet/pellets) and particle size influences FCR through changes in energy digestibility, feed intake, gut health and feed wastage. Pellets and wet feeding is often preferred for these reasons. Maintaining the correct particle size to ensure optimum digestibility can be routinely monitored through sieve tests. The extra cost of pelleting and/or feeder replacement should be weighed up against the extra cash saving from a reduction to feed wastage.

4. Average daily feed intake

Average daily feed intake (ADFI) has a significant impact on performance. Graph 1 taken from Whittemore and Kyriazakis (2006) depicts the principle that increasing the daily feed intake results in a higher proportion of nutrients available above the pig's maintenance cost which is used for growth and production.

Graph1 (Whittemore and Kyriazakis, 2006)



Optimum levels of feed intake post weaning will maximize daily growth rate and feed conversion efficiency and reduce costs per kilogram of live weight gain. Factors affecting ADFI will have an important effect on growth performance of pigs. These include:

- Dietary factors (density of diet, amino acid balance, feed additives).
- Health status. Disease diverts nutrients away from growth towards immunity.
- Water intake (water temperature, drinker access, flow rates).
- Feeding systems (feeder space and access to feed, limit feeding/ ad libitum).
- Management (moving/ mixing pigs, stocking density). Studies have shown a negative impact of crowding on productivity and welfare. In Geurts and Hazzledine (2011) the first signs of growth depression in response to crowding occurred much sooner for pigs in large groups (100 pigs) compared to those in small groups (18 pigs).
- Genetics. Genetic selection decisions can have a significant impact on profitability as this will set the upper limit to performance traits.
- Environment (temperature, temperature fluctuations, air quality). Pigs kept below their critical temperature will eat more but convert more poorly due to an increased maintenance cost.

Growth rate and increasing return

An easy way to increase income is to increase the slaughter weight and quality (lean %) per pig.

Growth rate is the key to get the biggest yield per square meter possible. A fast, uniform growth will

help optimize pig flow and maximize facility turnover. With a lowering pork price it becomes increasingly important in order to maximize total throughput of profit maximizing slaughter weights. Age is an important determinant of FCR and in general FCR gradually gets worse as pigs grow older. A new-born piglet will have an FCR below 1. The piglet at this stage is just growing muscle and bone, while muscle has very high water content. Clearly as the pig ages towards slaughter weight it is beginning to deposit fat in the carcass dragging down the efficiency (FCR of +-3). This places emphasis on the producer deciding at what slaughter weight would be the most profitable for the system.

Sow productivity

In farrow-to-finish operations, sow productivity has a substantial impact on overall herd FCR. The aim is for the sow to be fed more efficiently before farrowing to obtain larger litter sizes and birth weights to favour the conversion factors in the fattening stage. Well formulated lactation diets result in heavier weaning weights, which in turn results in more efficient growth and feed efficiency during the grower phase.

Clearly there are a high number of factors that influence growth rate, feed intake and thus FCR which will demand attention to help reduce costs. With a clear understanding of the end goal in mind, cost efficiency can be significantly enhanced through making decisions that increase the number of pigs meeting the profit maximizing weight and carcass quality.

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