

Strategies to Reduce Feed Costs, Feed Formulation, Feed Efficiency, and Economics of Feeding Programs



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Feed economics

With feed costs making up 70% of total costs of production on average, it is not surprising that ways to reduce the cost of feed is foremost in producer's minds, especially during times of reduced availability of common feed ingredients and rising costs for others. While it may be tempting to simply pick the cheapest feeding program available, the question that should be asked is do you know what your feed is actually costing you?

The overall cost of your feeding program is inherently tied to feed efficiency, as greater feed efficiency allows for more growth with less feed and, subsequently, lower cost, however, this is only part of the equation. As changes in dietary ingredients and nutrient content often result in changes in pig performance, tying the cost of your feed to the performance of your pigs is critical to feeding program evaluation.

The most basic calculation to consider is feed cost per kilogram of gain (\$/kg gain), which is feed efficiency (kg feed/kg gain) × feed cost (\$/kg feed). While this will give you a general idea of the cost of your feeding program, it is strictly related to feed cost and animal performance and fails to take into account revenue or operating costs. Therefore, determination of either the margin over feed cost or margin over feed and operating costs (see insert) will provide a more accurate picture of economic value of your nutrition program. You will notice that a common feature of determining the economic value of your feeding program is knowing how much your pigs are eating and how fast your pigs are growing, with more accurate measures of feed intake and growth performance resulting in more accurate measures of economic value.

Margin over feed cost (\$/pig) = revenue (\$/pig) – feed cost (\$/pig)

Margin over feed and operating cost (\$/pig) = revenue (\$/pig) – (feed cost + operating cost [\$ /pig])

Feed cost (\$/pig) = feed intake (kg/pig) × feed cost (\$/kg)

Feed formulation

When formulating diets to maximize feed efficiency, the critical detail is meeting the pig's requirements for growth. Like with determining economics, the more information you know about WHO you are feeding and WHAT you are feeding will allow you to make adjust feed formulation to more accurately meet requirements. Errors in feed formulation due to inaccurate measures of feed intake or formulating for the wrong pig weight are inefficient and increase cost. At the most basic level, knowing the actual weight of your pigs at the start and end of each phase, instead of relying on assumed weight ranges, will allow for more accurate feed formulation. At a more advanced level, information on the lean gain potential of your animals, either through carcass evaluation of lean yield or provided to you from your pig supplier, instead of assumed potential will allow for even more targeted formulation. This is because nutrient requirements of a growing pig are largely determined by its potential for lean gain. Providing nutrients below the requirement or unbalanced nutrients will result in slower growth, whereas providing nutrients above the requirements will end up with more fat gain.

At the most fundamental level, diet formulation is all about meeting the pig's requirements, with dietary content of energy and lysine largely dictating the inclusion of all other nutrients. Therefore, two key values to consider first when formulation are the dietary energy content (metabolizable energy or net energy) and the lysine:energy ratio. While net energy is currently considered the gold standard for understanding energy content of the diet and supply to the pig, it is more important in high-fibre diets where the difference between metabolizable and net energy is larger due the impact of fibre fermentation.

Whichever energy value you determine for your feed, the next step is meeting the lysine:energy ratio. As feed intake changes with energy content, formulating dietary lysine as an energy to ratio ensures that the daily lysine intake will be sufficient to meet requirements for lean gain. After, all other essential amino acids are formulated according to their required ratio to lysine.

The other half of the feed formulation equation is knowing what you are feeding. This is more than just the basic ingredients being used and includes accurate measures of the nutrient content of the ingredients. Assays of ingredients should be done routinely for nutrient levels and digestibility values to make sure that the feed you have formulated will meet the requirements you have identified. This has become fairly easy to achieve with the widespread availability of NIR technology. Determination of nutrient content should be determined on each individual batch of ingredient used, with less frequent evaluation necessary, and more consistency achieved, when ingredients are purchased from a single source. Regardless of the specifics of formulation and requirements, the expected goals of any feeding program should be weighed against the actual performance and costs achieved.



Considerations to improve feed efficiency and reduce feed costs

Now that you know how to determine the economic value of your feeding program and you understand the importance of knowing who and what you are feeding, there are a few feed formulation and management strategies to consider that may improve your feed costs.

- **Protein source and crystalline amino acids** – In general, meeting amino acid requirements through inclusion of standard protein ingredients (e.g., soybean meal) is costly and wasteful. The availability of crystalline amino acids, such as lysine, methionine, threonine, and tryptophan, have increased and the cost of these products has decreased to the point that replacement of a portion of protein-yielding ingredients can reduce feed costs. The use of crystalline amino acids also allows for more accurately matching dietary nutrient levels with nutrient requirements. Another consideration is the inclusion of animal-based protein ingredients, as these tend to be the

most costly and pigs often can performance quite well with their removal from the diet and replacement with plant-based sources.

- **Phase-feeding** – Phase-feeding allows for more tailored diets to be fed at multiple stages of production. Providing more dietary phases results in a reduction in the over- and under-supply of nutrients that would result from the feeding of a single diet and can result in significant savings, although the savings achieved are less significant as the number of phases increases. It is important to note that while feed efficiency and feed costs may be improved with more diet phases, a difference in growth may not be evident.

“Understanding who and what you are feeding will help you adjust feed formulations to meet your goals.”

- **Split-sex feeding** – As nutrient requirements differ across growth stages, the nutrient requirements of barrows and gilts differ. Barrows tend to gain weight faster and tend to be less efficient than gilts. This can be accounted for through formulating diets for barrows that contains less lysine and energy content. As with phase-feeding, the goal here is to more accurately meet the nutrient requirements of the pig.
- **Least-cost formulation** – Every diet should be formulated with consideration given to least-cost as well as the potential performance of the pig, and reformulation should occur often to account for price changes. It is also important to understand that the lowest cost diet may not result in the best margin over feed cost and vice versa, and the economic analysis of the diet as well as the performance analysis of the animal are both critical parts of the equation. Know your break-even cost.
- **Re-evaluate safety margins** – Many nutritionists will include safety margins in nutrient levels to account for variation in ingredient nutrient composition, feed mixing, and pig requirements. However, large safety margins can result in significantly higher feed costs with little return and, therefore, reducing safety margins can save you money. This is especially the case if you are able to more accurately identify your pig's nutrient requirements and consistently evaluate ingredient nutrient content, reducing reliance on larger safety margins.

While there are many key considerations to take into account when developing and evaluation feeding programs, the general concept is to know who and what you are feeding to really understanding what your feed is costing you.

