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Feeding management for optimal financial performance

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Introduction

Feed cost is the single greatest expense in the production of pork. Consequently, the entirety of feeding management, extending from the determination of on-farm nutrient requirements to the limiting of feed wastage, has an enormous impact on the financial performance of swine production enterprises. The purpose of this paper is to highlight practices that should be employed to fine tune nutrition and feeding programs and thereby optimize profitability.

Economic optimization of nutrition and feeding programs can be gained by the following directives:

- Feed appropriately formulated diets
- Don't pay too much for feed
- Limit feed waste

While the truth in these statements is quite obvious, the difficulty—and the potential for reward to the swine production system—lies in their proper execution.

Customized diet formulation

In order to maximize pork profitability, swine diets must be custom formulated based on performance observed under actual production conditions. This step is vital to maximizing profit because underestimating nutrient needs impairs performance by, for example, increasing days to market, reducing carcass quality, and potentially reducing immunocompetence. Conversely, overfeeding of nutrients unnecessarily inflates diet costs, leads to increased environmental concerns and, despite long-held industry biases to the contrary, can negatively impact performance and carcass quality. Historically, many swine industry participants believed that the overfeeding of nutrients was an acceptable practice to ensure maximum biological performance. However, this erroneous "more is better" nutritional philosophy simply does not stand up to scientific scrutiny.

Lysine, the first limiting amino acid in corn-soy swine diets, is the key nutrient to consider in custom formulation. Based on data from studies in which barrows and gilts were fed corn-soy diets with varying lysine, Dr. Tim Stahly of Iowa State University determined the performance and economic implications of over- or underfeeding lysine (**Table 1**). His findings clearly illustrate negative impacts on production parameters and economic costs due to both overfeeding and underfeeding of lysine.

Additional data from the NPPC Quality Lean Growth Modeling Project, completed in 1998, also illustrate the dangers of overfeeding lysine. Pigs that were fed the sequence of diets with the highest lysine levels (intentionally designed to provide excessive lysine intakes) had significant reductions in loin eye area compared to pigs fed intermediate levels of lysine. The bottom line regarding the determination of nutrient requirements is clear: Either feed pigs according to their actual nutrient requirements or you will pay for it—both economically and in reduced biological performance.

Shortfalls of standardized and genetic-based nutrition programs

Genetic specific growth curves and nutrient requirements are a myth. Standardized tables of nutrient specifications,

Table 1: Response of high lean pigs to inadequate or excessive amino acid intakes (40 to 244 pounds body weight). Values represent variations from pigs fed optimum dietary lysine concentrations at each stage of growth.

	Dietary lysine	
	0.045% deficiency	**0.045% excess**
Days to market	+4.8	+2.0
Feed, lb/pig	+29	+12
Carcass backfat, in	+0.030	-0.015
Production cost, $/pig[a]	+2.15	+1.61

[a]Assumptions: fixed cost = 13(/pig/day; corn = $2.43/bu; dehulled soybean meal = $240/ton

such as those presented in pre-1998 versions of the NRC publication *Nutrient Requirements of Swine* and those commonly distributed by genetics companies, are of very limited value. The formulation of diets based on some mythical "genetic potential" or on "expected performance levels" for a given genotype is of little benefit because these diets are based on idealized or predicted data which may bear no resemblance to actual on-farm performance. In order to provide the degree of accuracy that is essential for financial optimization, the determination of appropriate diets must be practiced on a case-by-case basis. The gathering and summarizing of actual performance and carcass composition data are essential to this process.

Determining nutrient requirements

Although simple in concept, the actual determination of required nutrient levels to achieve economic optimization is a complicated process. Taken to its literal extreme, it can be stated that each individual pig on a farm or within a contemporary group has its own unique set of nutrient requirements, yet we must supply feeds according to the cumulative needs of groups of swine. A growing pig's specific nutrient needs are influenced by three major factors:

- Its lean growth rate
- Its level of feed intake
- Its efficiency of nutrient utilization

For lactating sows, level of milk production replaces lean growth rate as the major factor in determining nutrient needs. When we refer to the nutrient requirements of a group or class of pigs under defined performance conditions, we are, in fact, referring to economically optimal nutrient levels averaged over the given group of animals.

Actual performance levels and, consequently, the pigs' nutrient requirements, are determined by the interplay of many factors, with genetics, sex, and health status being the three most important. As mentioned previously, the genetic makeup of pigs, while important, is but one factor in the determination of pig performance and nutrient needs. However, industry experiences clearly indicate that growth performance, feed intake levels, and to a lesser extent, carcass traits vary widely within a given genotype. Important factors include:

- Genetics
- Sex
- Health status
- Thermal environment
- Chemical environment (air and water quality)
- Facility type
- Feeder type
- Water access
- Pen density
- Management factors

Due to the impact of health on performance parameters, the producer is best served when both qualified nutritionists and swine veterinarians are included as key members of the swine management team. When properly practiced, both of these fields have great potential to increase the economic well being of the swine production enterprise. Keeping abreast of current concepts and developments in both the veterinary and nutrition professions requires a continual and significant amount of effort. While these fields do overlap in regard to their impacts on performance and profitability, few individuals are qualified to serve in both veterinary and nutritional roles.

Nutrition modeling

Simply stated, the goal of nutrition modeling is to determine actual nutrient requirements of pigs under given conditions. Accurate assessment of requirements allows for the formulation of economically optimized "best cost" diets that minimize nutrient over- and underfeeding.

Presently, most of the models that are specifically designed to develop farm-specific nutrition recommendations are in the hands of nutrition companies, nutrition consultants, and university researchers (Schinckel et al., 1994; NRC, 1998). Therefore, producers or veterinarians who are interested in utilizing this technology generally need to establish a relationship with one of these entities or work with pork production enterprises that have established such a relationship.

As **Table 2** describes, nutrition modeling for the growing pig can be conducted based on closeout data or from more intensive efforts such as lean growth curve analysis.

Closeout data

Reliable closeout data sets are likely to provide the best estimates of overall rates of weight gain and feed conversion. However, the obvious shortfall of typical closeout data is that it fails to provide a description of performance at various points during growth. Therefore, if information is limited to closeout data alone, standardized curve shapes must be applied to the overall data. These standardized patterns of feed intake, body weight gain, and carcass fat and lean accretion may not be descriptive of actual curves.

Lean growth curves (ultrasound)

The use of ultrasound techniques to measure loin eye area and backfat depth is a valuable tool for the determination of body composition at various weights. Furthermore, pig weights and feed consumption data gathered in conjunction with growth curve analyses provide information on

Table 2: Information required to determine nutrient requirements using nutrition modeling. Empty cells (-) follow parameters for which method of determination is trivial.

Parameter	Information required: Minimum	Preferred
Growing pigs		
Initial weight	-	-
Market weight	-	-
Growth Rate (ADG or days to market)	Close-out data	Determined at multiple time points
Lean growth rate determined from analyzed lean content	Cut-out data	Periodic determination of lean content at multiple time points (using real-time ultrasound)
Feed intake (or F/G)	Close-out data	Determined at multiple time points
Lactating sows		
Lactation length	-	-
Litter growth (milk output)	Separate determinations of 1st parity & mature sow data[a] Actual—not NSIF parity adjusted (PigCHAMP, etc.)	
Feed Intake	Separate determinations of 1st parity & mature sow data[a]	

[a] Individual analysis of separate parities is preferred.

the shape of weight gain, fat and lean accretion, and feed intake curves. These curve shapes can be applied to close-out data to generate farm specific feed intake and gain curves. The result is a set of curves that follows observed patterns over time and corresponds with overall herd performance levels.

Modeling based on the use of measured versus estimated feed intake levels

Due to the complex interactions between genetic, environmental, and management factors, feed intake patterns tend to be highly farm/facility specific. Therefore, accurate assessment of feed intake levels at various times during the growth phase is critical to proper diet formulation. This is true because, as shown in the formula, feed intake is the denominator in all nutrient concentration calculations. As a result, even if nutrient needs are precisely defined on the basis of required daily intake, errors in the determination of actual feed intake will lead to errors in the calculation of appropriate dietary nutrient concentrations.

(Grams nutrient required per day / Grams feed consumed per day) X 100 = Required % nutrient concentration in diet

Unfortunately, accurate feed intake data can be quite difficult to gather under industry conditions. Therefore, one modeling approach that has been employed is the estimation of feed intake based on the predicted amount of feed that would be required to fuel observed rates of body protein and fat accretion. Typically, lysine to calorie ratios are also estimated based on the quantity of nutrients that are needed to support observed rates of fat and protein gain. However, it seems that the use of estimated feed intake levels in nutrition modeling is inherently less accurate than the use of accurate feed intake information if such data are available. Furthermore, the use of predicted lysine to calorie ratios to develop diet specifications implies that the fat and protein deposition rates observed in the growth curve analysis are fixed. In fact, it has been long understood that lysine to calorie ratios and energy densities of diets can, and should, be used as a tool for modifying carcass and performance levels to maximize profitability (Whittemore, 1985). For example, the energy density of barrow diets could be reduced to limit the accretion of fat, but not of protein, and improve carcass quality. This practice is also likely to reduce growth rates but, as long as these reductions are not excessive, barrows will still reach market weights at the same time as gilts, and facility costs and barn flows will not be compromised. Therefore, lysine to calorie ratios should be employed as a tool to alter carcass and production parameters and maximize profitability and not as a fixed value that is designed to elicit the same levels of fat and lean growth as observed in the original modeling data set.

Designing farm-specific diet sequences

Farm-specific feed mixing and handling capabilities must be evaluated to determine:

- The maximum number of diets that may be fed
- The length of diet phases (amount of each diet fed per pig)
- The maximum number and minimum inclusion rate of ingredients that can be used in diet formulas

Table 3: Impact of number of diet phases on feed cost per pig

Number of grow-finishdiet phases	Diet cost per pig marketed	Savings compared to a two phase G-F program	Incremental savings per additional diet phase
2	$28.75	-	-
3	$28.27	$0.48	48¢
4	$28.10	$0.65	16c
5	$27.96	$0.79	14c
6	$27.86	$0.89	10c
9	$27.72	$1.03	4c
12	$27.64	$1.11	3c

Determining the number of diet phases to feed

System constraints

The maximum number of diets that can be successfully utilized within a swine production enterprise is limited by feed manufacturing, feed delivery, and feed management constraints.

The number of diet phases must be able to be efficiently administered under existing capabilities for the following:

- Feed manufacturing
- Feed inventorying (at the manufacturing site and at animal facilities)
- Scheduling and coordination of feed deliveries

These systems often impose a minimum quantity of each individual diet that can be handled in a cost and time efficient manner. This minimum batch size is influenced by the feed mixer capacity, the size of storage bins in the feed manufacturing facility and at animal facilities, and by the compartment sizes of feed delivery trucks.

Economics

Table 3 lists the projected theoretical savings per pig due to increasing the number of diet phases.

These calculations are based on the following assumptions:

- Corn cost of $1.75/bushel; 44% soybean meal cost of $130/ton (July 1999 prices)
- Equal pig performance across all programs (same amount of feed consumed per pig)

The actual dollar value of feed savings due to an increased number of phases is determined primarily by the price of soybean meal. This is true because the major effect of increasing the number of diet phases is to reduce the overfeeding of lysine (i.e., soybean meal) in the latter portion of each diet phase. For the sake of comparison, if 44% soybean meal were priced at $200/ton instead of $130, the feed savings per pig due to diet phasing would be approximately double those listed in **Table 3**. These calculations demonstrate that the greatest benefit of multi-

Figure 1. Feed Cost per Pig by Number of Grow-Finish Diet Phases

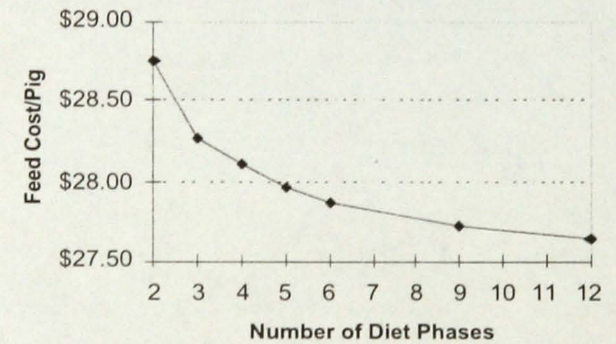
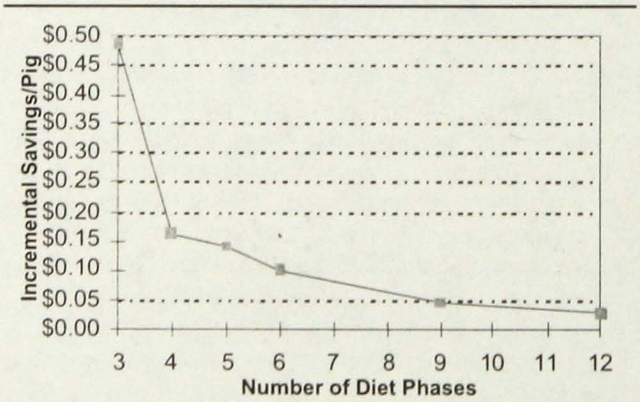


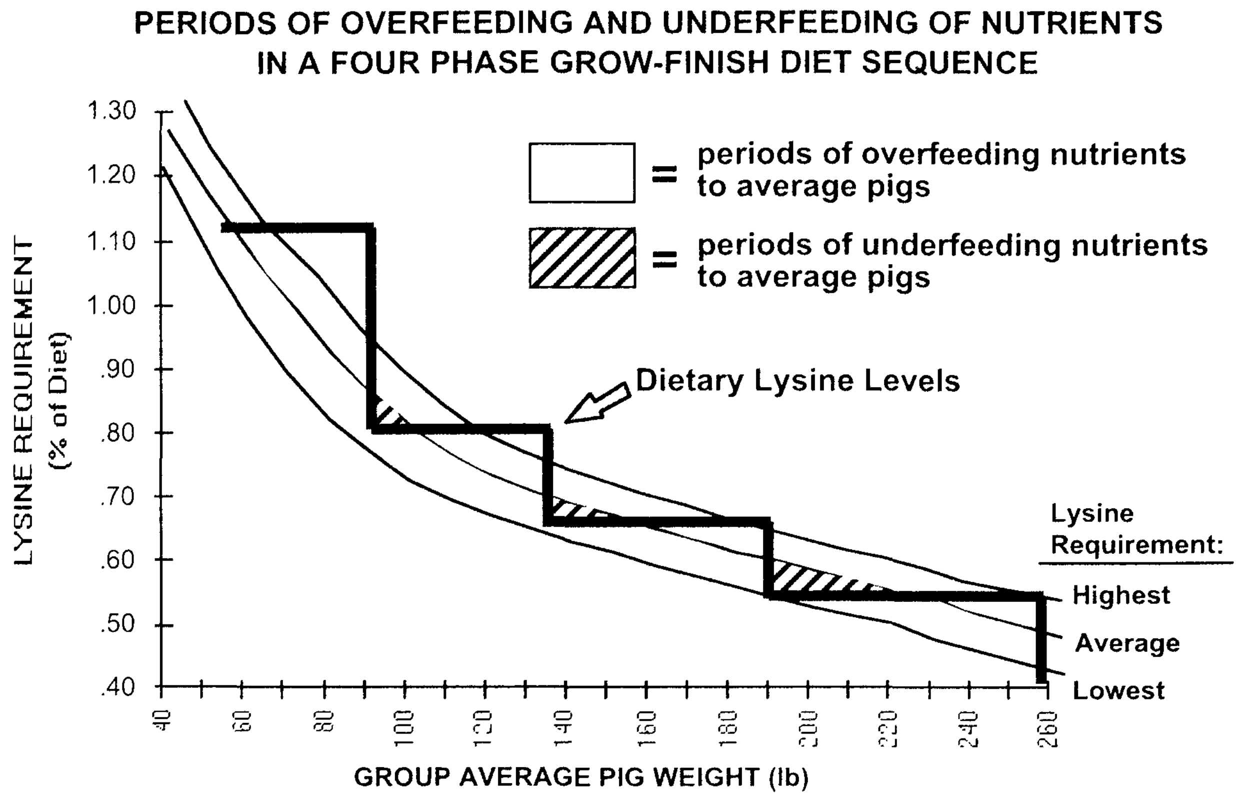
Figure 2. Incremental Feed Savings per Pig due to Addition of Grow-Finish Phases



phasing occurs as the number of grow-finish phases is increased from two to six. **Figures 1** and **2** depict graphical representations of these same data. It is plain to see that there is only a minimal incremental benefit when adding greater than six diet phases. Furthermore, one should keep in mind that these calculations represent the maximum theoretical savings. In actual practice, these full incremental benefits are not likely to be attained because group average performance is reduced by more frequent dietary changes due to differences in the actual nutrient needs of individual pigs.

Figure 3 illustrates the range of actual nutrient needs that may be present within a group of market hogs. Periods of overfeeding and underfeeding of nutrients based on the

Figure 3. Overfeeding and Underfeeding of Nutrients in Phased Feeding Programs



average requirement level of a group of pigs are also indicated. The purpose of changing diets on a frequent basis is to keep actual dietary nutrients as close as possible to the cumulative needs of the group of hogs. However, this also ensures that the pigs within the group that have the highest nutrient needs (upper line) will spend a greater proportion of their lifetimes consuming diets containing insufficient nutrient concentrations to support their maximal levels of performance. In general, the smaller, poorer performing pigs that are less able to compete for feed require the greatest nutrient density.

If more than four diets were to be fed, the situation illustrated in the figure would be exacerbated. Overly aggressive staging of diets progressively handicaps the smallest pigs and leaves them farther and farther behind the rest of the group. In fact, if weight spreads are high at the time that a group is formed, the smallest pigs within the group may almost never receive their optimal level of nutrition. As a result, pig flow and sort loss problems are amplified.

Impact of biological variation on nutrition management (fill time)

The more uniform that the pig group is initially in terms of age and size, the greater the number of diet phases that can be utilized without fears of artificially increasing the weight spread at marketing time. With frequent phasing of diets, there is a danger that a significant number of pigs may spend a high proportion of time consuming diets that do not meet their nutrient needs. Therefore, using more than four or five grow-finish diet phases is generally not justified unless pigs are placed into feeding groups with a "fill time" of approximately one week or less and are very uniform in size and health status.

Feed budgeting and feed tracking

The final step in the implementation of farm-specific nutrition programs is the ongoing use of feed budgets based on farm performance data. Feed budgets and growth curves should be tracked for each group of pigs so that aberrations from expected performance parameters can be detected. In many cases, non-conforming data can be directly attributed to readily identifiable health challenges with a pig group. However, it is important to monitor changes over time because changes in overall performance can indicate alterations in overall herd health status, environmental conditions, feedstuff variation/palatability concerns, or changes in pig phenotype. These changes should serve as warning beacons for potential production problems or indicate that more intensive efforts should be made to re-define nutrient needs for the herd based on real changes in overall biological performance profiles.

Feed ingredient purchasing

Feed ingredient purchasing procedures have a significant impact on total diet costs. Buying quality ingredients at the right price is essential to the provision of cost effective diets. When analyzing purchasing procedures, one needs to be aware of variation in ingredient costs among different suppliers.

The type of feed manufacturing program that is utilized by the swine production enterprise greatly influences the flexibility of diet formulations in regard to the number of ingredients that are used. Diets formulated from basic ingredients (as opposed to pre-combined ingredients such as basemixes and concentrates) offer greater options for input pricing.

Figure 4 describes the characteristics of various types of feed programs. For the sake of this discussion, the following list of definitions will be used to describe various types of feed ingredients. (The list is in agreement with the definitions of the American Feed Control Officials.)

Complete Feeds: Contain a proper balance of nutrients and are intended to be fed as the sole diet.

Concentrates: Provide the proper balance of amino acids (protein), minerals, vitamins and trace minerals when mixed with grain. They are typically included into the final diet at 300 to 500 lb/ton.

Basemixes: Provide macro minerals, vitamins, trace minerals and, occasionally, amino acids or medications. They are typically added at 50 to 100 lb/ton and are mixed with a protein source and grain.

Premixes: Contain one or more of the classes of microingredients (vitamins, trace minerals, drugs) mixed with a carrier. They are typically added at 1 to 50 lb/ton and are mixed with macro minerals, a protein source, and grain to make the complete diet.

Note that within the feed industry actual product names may fall outside of these definitions. For example, a product that forms a complete diet when mixed with a grain source is generally referred to as a "concentrate," yet some companies may refer to this product as a "premix."

Table 4 contains an example cost breakdown of a typical 0.72% lysine grow-finish diet using July 1999 ingredient prices. Approximate costs and degree of cost variability of each ingredient class are listed. This cost breakdown points out the relative cost impacts of ingredients in a typical diet. Obviously, grain and amino acid (protein) sources constitute the major share of total diet expense and, therefore, cost-effective purchasing of these inputs is the first step in controlling feed costs.

The listed cost variabilities are a measure of market price volatility of basic inputs over time. However, at any given time, input costs from various suppliers may also vary significantly. These input costs are most likely to be high when basic commodity inputs are sold as components of ingredient mixes and/or labeled products.

One of the basic tenets of controlling feed input costs is to treat commodity ingredients as commodities. Any further handling, blending, processing, bagging, etc. of an ingredient carries additional fees and/or margins that increase the cost of the ingredient. For ingredients such as grains, soybean meal, and macro minerals, the lowest

Figure 4. Characteristics of Different Feed Programs

Types of Feed Programs

	Complete Feed	Concentrate	Basemix	Vitamin - Trace Mineral Premix
Approx. Inclusion Rate (lb/ton)		300 - 500	50 - 150	1 - 50
Mixed with:		Grain	Grain and Protein Source	Grain, Protein Source & Macro Minerals

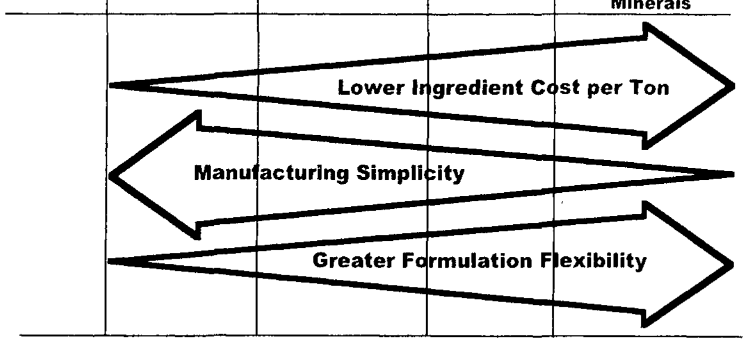


Table 4: Cost breakdown of a typical grow-finish swine diet

Ingredient	Nutrients provided	Pounds per ton	Approx. diet cost	% of total cost	Cost variability over time
Corn (grain)	Energy & amino acids	1673	$58.56	65.7%	High
Soybean Meal	Amino acids & energy	270	$17.55	19.7%	High
L-Lysine HCl	Lysine	3	$1.56	1.8%	High
Macro minerals	Macro minerals	50	$7.80	8.8%	Low
Vitamins & trace minerals	Vitamins & trace minerals	3	$3.63	4.1%	Low
Total		2000	$89.10	100%	

purchase price can typically be obtained by dealing directly with the original source or manufacturer of the ingredient or with their immediate marketing representatives. To ensure most competitive pricing, these inputs should be purchased as individual ingredients if this is possible within feed manufacturing capabilities.

However, when purchasing numerous ingredients, continual tracking ingredient costs and monitoring of quality control practices can become a daunting task. Therefore, it is advisable to establish an ongoing, trust relationship with your nutritionist, nutritional supplier, or purchasing advisor such that they become part of your management team.

Ingredient specifications

It is important that the producer, nutritionist, and feed ingredient supplier have a common understanding of what is meant by ingredient specifications. It is, therefore, important that a common language be spoken when referring to ingredients used in diet formulas. The following information sources are helpful in the interpretation of acceptable ingredient lists.

Ingredient Definitions are quite broad in their wording and are descriptions rather than specifications.

Ingredient Specifications are more detailed than definitions. They are available from vendors, ingredient associations, and the AFIA (American Feed Industries Association).

Trading Rules are established by commodity associations and include standard specifications, procedures for handling compensation for quality adjustments, and other provisions with regard to trade of the ingredient.

Quality Control Assays are used to verify nutrient specifications and determine applicable compensation in the case of off-spec shipments of ingredients. Proper sampling and analytical methods must be used in order to ensure accuracy of quality control procedures. This subject is covered in greater depth elsewhere in this symposium.

Paying the "right" price for basic nutrition inputs

Producers need a way to ensure that they are paying the "right" price for their complete feed, concentrate, basemix, or premix. They should also recognize that the price of these products may include margins intended to cover the costs of feed processing, manufacturing, and other additional services. These further services might include activities such as assistance with:

- Ingredient purchasing assistance
- Ingredient price contracting
- Provision of nutrition information
- Nutrition research and product evaluation
- Diet formulation
- Nutrition modeling and determining requirements
- Compilation and evaluation of nutrition and performance records
- Quality control
- Financing and payment terms

In some instances the costs of additional services may be "unbundled" from purchased nutrition products. That is, the cost of additional services is paid for independently of ingredients on a consulting or hourly basis. In this case, one should expect to purchase commercial products at a lower cost than when additional services are provided as part of the sale of a product. However, it should not automatically be assumed that this purchasing method is the most cost effective. In many situations, the bottom-line profitability impact of deleting bundled services, or the cost of replacing these services on a consulting basis, will easily justify the bundled product-service combination.

Bidding of feed inputs

The concept of bidding out nutritional inputs has been promoted as an effective method of controlling feed costs. It must be emphasized, however, that whenever bidding of nutritional inputs occurs, costs are likely to be reduced by the elimination of previously bundled services. Obviously, this strategy may be cost effective if the eliminated services are unnecessary or are duplicated somewhere else within the pork production system. Nevertheless, in this time of rapid scientific and technological advancement, the value of information sources and services should not be underestimated.

If it is determined that the bidding process will be utilized, the secondary question of how often to seek out bids should be addressed. Too frequent bidding of nutritional inputs runs contrary to the concept of developing trust relationships with suppliers. Furthermore, continual acceptance of the lowest bid is likely to lead to reductions in product quality over time. This is especially true in the case of basemixes and vitamin-trace mineral premixes where product specifications may be met through the use of multiple ingredient sources.

Bidding of complete diets: Ingredient formulas versus nutrient specifications

The best way to bid complete diets is on the basis of ingredient formulas, not on nutrient specifications. That is, actual inclusion levels of each diet ingredient should be specified. If diets are bid on the basis of specified nutrient content, considerable differences in actual ingredient levels may result. These discrepancies can occur because of the existence of significant variations in specified nutrient contents between standard ingredient tables and within-feed formulation databases.

"Cost plus" programs and toll milling service charges

Toll milling is an option for enterprises that lack feed manufacturing facilities or for situations where pigs are located too distantly from a base mill to make feed deliveries practical. Getting the basic feed mixture into feeders in the form of a complete diet involves additional costs for services including inventorying ingredients, grinding, weighing, mixing, and delivery. A straightforward method of toll milling is the "cost plus" system. Under this scenario, diets are priced according to actual ingredient cost at the mill (typically with a slight per bushel charge for purchased corn) plus an additional service charge to cover grinding, mixing, and delivery. The service charge may vary from mill to mill, but is generally about $12 to $15/ton. Additional charges will be incurred for extra services such as pelleting and for feed deliveries beyond a local delivery zone.

Caution must be exercised, however, because unless all mills submit bids based on a true "cost plus" basis, it is not possible to evaluate toll milling options based on the service charge alone. Some mills may list basic service charges as low as $5/ton; however, one can be quite certain that, in this case, additional margin has been added to the mill's actual ingredient costs. Nevertheless, it is possible that the most competitive final feed price may come from a mill that prices from other than "true" ingredient costs. However, under this scenario it is much more difficult to determine whether the mill is maintaining a constant "fair" per ton service charge above actual ingredient costs. Because, in this case, true input costs are not known by the producer, additional margins may be added without being easily detected.

Bidding of premixes and basemixes

The bidding of the vitamin and trace mineral portion of the diet is a much more complicated process than the specification of energy, amino acid (protein), and macro mineral levels. Vitamin-trace mineral premixes for swine typically contain 9 to 13 different suäjlemental vitamins and 6 different trace minerals. Furthermore, multiple sources of many vitamins and trace minerals exist, each with potential differences in bioavailability. Therefore, great care must be taken to ensure that bidding specifications be precisely defined in terms of sources and levels of vitamins and trace minerals. The services of a qualified nutritionist are essential to the successful execution of this process.

Quality control

It has been stated that there are three different versions of each diet: the one that is formulated, the one that is mixed, and the one that the pig actually eats. Proper purchasing, manufacturing, and quality control guidelines must be established in order to ensure that minimal variation exists between these three diets. As was previously stated, probably the best assurance of quality is the development of an ongoing trust relationship with ingredient suppliers. These relationships might be formalized in a list of approved suppliers based on the following criteria:

- Price
- Quality
- Consistency
- Reputation and credibility

Summary of feed purchasing

Given the considerable economic impact of feed costs, paying the right price for quality ingredients is essential to the maximization of profitability of each swine production enterprise. While there are some basic principles that transcend all types of feed procurement systems, each operation's feed needs are likely to be best met by a unique solution that can best be determined with the involvement of a qualified nutritionist.

Feeder management to minimize feed wastage

One of the simplest methods of improving feed program economic performance is by limiting feed waste. This can be accomplished by adjusting feeders on a regular schedule (preferably daily). Furthermore, most feeders can be managed much more tightly than is commonly practiced in the field without negatively impacting pig growth rates.

Traditional feeder management recommendations have generally endorsed having one-third to one-half of the feed pan covered with feed. However, running feeders much tighter than this can significantly improve feed conversion without reducing daily gains. An appropriate balance of feed waste reduction without slowing growth is often obtained with one inch or less of feed visible in the feed pan or, in the case of tube feeders, around the feed tube.

Of course, no one recommendation will fit all feeder designs or facility situations. However, visual signs of feed wastage, observations of pig feeding behavior, and measured feed efficiency values can be used to determine optimal management strategies. In general, if any feed particles are visible on the floor outside of the feeder, significant feed wastage is occurring and feeder spacings should be narrowed. Conversely, if pigs line up or fight for feed access, the feeder is probably either set too tightly or is plugged. Even when feeders are tightly regulated, some feeder spaces should occasionally be unoccupied even during daytime feeding periods.

If feeders are poorly designed, worn out, or are not matched to the appropriate size pig, significant feed waste can occur simultaneously with excessive competition for feeder access. Feeder replacement is likely the only remedy for excessive feed wastage in these situations.

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