



# National Swine Nutrition Guide

## Authors

Duane E. Reese, University of Nebraska  
Joel M. DeRouchey, Kansas State University  
David J. Meisinger, US Pork Center of Excellence

## Reviewers

Palmer Holden, Iowa State University  
Jim Smith, Hubbard Feeds

## Methods of Supplying Nutrients to Swine

---

### Introduction

An essential part of designing a sound feeding strategy involves making decisions on how to best provide the energy and nutrients (amino acids, vitamins and minerals) that pigs need in their diet. Pork producers have many options to provide nutrients to their pigs, with varying levels of cost, labor and feasibility involved with each method.

### Objectives

- Define four basic methods of supplying nutrients to pigs
- Provide guidelines on how to choose which method(s) to employ

### Basic methods of supplying nutrients

There are four basic methods of supplying nutrients to pigs: 1) purchased **complete feed**; 2) grain combined with a **concentrate**; 3) grain blended with an amino acid source(s) and a **basemix**; or 4) grain, an amino acid source(s), salt, calcium and phosphorus source(s) and a **premix**. A description of these options follows.

**Complete feed.** A complete feed is a ready to feed product containing ingredients that meet the total nutritional needs of the pig. The feed manufacturer assumes all responsibilities for ingredient quality and mixing issues. The producer is responsible for using the product correctly. This feed may be in meal form, pelleted, or fed as a liquid feed. The major advantage of this option is the producer does not need to own and operate any feed manufacturing equipment.

**Concentrate.** A concentrate is a mixture of ingredients formulated to complement nutrients present in grain. When it is correctly mixed with grain, the resulting diet will meet the total nutritional needs of pigs. Typical inclusion rates are 300 to 500 lb/ton for all classes of pigs except nursery pigs. The major advantage of this option is producers can utilize cereal grains that they produce; if those supplies are not sufficient to meet the year-round needs of the swine enterprise, grain can be purchased as-needed. A disadvantage is the producer must own and operate feed processing and manufacturing equipment. The producer assumes the responsibility for proper complete feed mixing and to mix the correct ratio of concentrate and grain. In addition, the producer must have equipment to transport the complete mixed diet to the feed bins for each barn.

**Basemix.** A basemix is a product generally containing ingredients rich in minerals and vitamins. Basemixes correctly mixed with grain and an amino acid source(s) will satisfy the total nutritional needs of pigs. The most common amino acid source in the US is soybean meal which when mixed with grain (and other ingredient alternatives if used) and the basemix makes up a balanced diet. Some basemixes also contain crystalline amino acids, phytase, and animal protein products. Typical inclusion rates are 35

to 100 lb/ton for mid to late nursery, growing, finishing and sow diets. Some basemixes for nursery diets are added at 200 to 400 lb/ton which generally contain some specialty ingredients and are a concentrate/basemix hybrid.

The major advantage of basemixes is that the producer can utilize home-raised or purchased corn for added flexibility and reduced diet cost. Also, producers can purchase their own soybean meal and ingredient alternatives (i.e. DDGS, wheat middlings, etc.). However, bin space for ingredient storage maybe a limitation on the number of ingredients producers can utilize. Basemixes can be custom purchased or formulated to match the needs of the diet based on the other ingredients to be used. Also, producers can competitively bid a custom basemix or price basemixes of commercial manufacturers to reduce feed cost. Disadvantages of this option include the producer assumes the responsibility for variation in the quality of the protein source(s) and for correct blending of ingredients. Again, the producer must invest in on-farm feed manufacturing and feed delivery equipment, as well as incur additional labor expenses from these activities. The producer must also process or have access to nutritional knowledge to properly formulate and compare basemixes available.

**Premix.** A premix is a product containing sources of vitamins and (or) trace minerals. The total nutritional needs of pigs can be met by combining premixes with grain, salt, and sources of amino acids, calcium, and phosphorus. Typical inclusion rates are 1.5 to 7.5 lb/ton. Premixes are available with trace minerals and vitamins combined or packaged separately. The major advantage of this option is that producers can take advantage of competitively bidding either custom premix or utilizing a commercial premix from a feed manufacturer. However, the producer can purchase all other ingredients used in the diet. The producer also assumes more responsibility for correct diet formulation and preparation and variation in the quality of the amino acid, calcium, and phosphorus sources with this option as compared to any of the three other options. Also, the producer must have proper equipment and mixing systems to accurately utilize low inclusion ingredients.

### Guidelines for decision making

One method does not necessarily promote better pig performance or a lower cost of gain than another. There are many factors for producers to consider in determining the best option including convenience, on-farm equipment availability/needs, labor availability, labor cost, nutritional knowledge, quality control expenses, and ingredient purchasing competitiveness. Determining which method for each individual producer is complex and no one method is best for every producer. Also, producers must evaluate potential advantages of increased bio-security by minimizing feed delivery from trucks that deliver feed to other swine farms.

The major factors to consider in choosing a method of supplying nutrients to pigs are shown in Table 1. Convenience refers to the level of involvement the producer has in making nutritional decisions and feed preparation. Risk is the odds of a diet not containing the intended concentration of nutrients and quality of ingredients. Risk rates the transfer of responsibility from the feed manufacturer to the producer as the producer assumes more or less responsibility for proper quality control and inclusion of nutrient sources in swine diets. Service is the amount of technical advice, farm recordkeeping, and other perks offered. Cost includes costs of ingredients and services such as processing, blending, delivery, technical advice, etc.

<b>Table 1. Considerations in choosing a method of providing pigs nutrients</b>				
<b>Method</b>	<b>Convenience</b>	<b>Risk (Quality)</b>	<b>Service</b>	<b>Cost<sup>a</sup></b>
Complete feed	High	Low	High	High
Concentrate	↓	↑	↓	↓
Basemix				
Premix				
	Low	High	Low	Low

<sup>a</sup>Includes costs of ingredients and service.

Producers who put a high priority on convenience, minimal risk of having feed quality problems, and ample service will want to purchase complete feeds. However, cost is generally higher to justify the manufacturer's assumption of these risks and services offered. On the other hand, there is less cost in a premix program, but it is a less convenient, higher risk, higher labor requirement and lower service oriented program. The risks associated with feed quality can be managed, but it takes a commitment of time and resources. ***Producers are encouraged to select the method that provides the best balance of factors considered important to their business while maintaining a competitive feed cost per unit of gain.***

Before a producer can actually determine which method is best, it is necessary to establish what is desired in a feeding program. That is, know the energy and nutrient (amino acids, minerals, vitamins) levels desired in diets as well as the major ingredients. Provide that information to feed company representatives who offer the method(s) being considered and ask for a complete nutrient, ingredient and cost profile. Be sure to carefully review the information provided to ensure the desired specifications are met before making a final decision.

Current information about nutrient sources and dietary recommendations for various classes of swine is available from The National Swine Nutrition Guide. Consider using the Guide to help decide preferences in a feeding program.

Finally, remember vitamin potency in feed and manufactured products will decrease with exposure to light, high humidity, heat, rancid fat, and oxygen. In addition, vitamin potency is reduced when vitamins are in contact with minerals. For best results, store basemixes and trace mineral vitamin premixes in a cool, dry, and dark place and use them within 30 days of purchase. Premixes containing vitamins and minerals separately can be stored for about 3 to 4 months

## Summary

Four basic methods of supplying the pig's nutrients for optimum growth and reproduction are available to pork producers. There are various factors to consider when determining which method is best for a particular situation. The method of choice should be considered carefully, because the right decision helps ensure the feeding program employed is economically viable.

## Frequently asked questions

### ***Should feed be made on or off the farm?***

Producers can purchase individual ingredients and manufacture diets on the farm or purchase complete feeds in meal or pellet form. Compare the fixed and operating costs associated with manufacturing feed on the farm to custom rates at local feed mills to decide which is best for you. Also, don't forget to examine the cost savings that may result from pelleting feeds. Pelleting corn-soybean meal-based diets improves feed efficiency and daily gain by about 6.5 and 4.5%, respectively. Pelleting is more easily justified when feed is expensive.

Generally, because of problems with stocking several ingredients and the difficulty in securing and maintaining quality, fresh ingredients such as dried whey, blood products and fishmeal, it's recommended that most producers purchase complete pelleted feeds for nursery pigs weighing less than 20 to 25 lb. When feed for pigs weighing less than 20 to 25 lb is made on the farm, it's usually best mixed using a basemix or concentrate that contains many of the speciality ingredients that are necessary in these diets.