PS28

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Using Meat and Bone Meal in Poultry Diets [1]

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Meat meal is an animal feedstuff produced by recycling animal by-products. These by-products include meat trimmings, inedible parts and organs, fetuses, and certain condemned carcasses. They are cooked (rendered) to produce a nutritional and economical feed ingredient. Blood, hair, hoofs, horns, manure, stomach contents, and hide trimmings are **not** permitted to be added to the meal. When bones are added to the meat meal it becomes meat and bone meal.

Millions of tons of animal by-products are produced annually in the United States. If these by-products were not recycled into animal feeds they would have to be disposed of in landfills. This would result in enormous economic losses for the animal processing industries and would cause problems in our environment.

Nutrient Content

The composition requirements for meat and bone meal, and all other animal feed ingredients used in the United States, are regulated by the Association of American Feed Control Officials (AAFCO).

High quality meat and bone meal is usually guaranteed to contain a minimum of 50 percent crude protein. Meat and bone meal normally contains a minimum of 4 percent total phosphorus. Calcium typically does not exceed 2.2 times the level of total phosphorus.

In a recent survey by the National Renderers' Association of several U.S. feed manufacturers it was reported that there was considerable variation from company to company in the computer nutrient specifications that nutritionists ascribed to meat and bone meal. Twenty-seven feed companies responded and the range in nutrient values for meat and bone meal was as follows in Table 1 :

Surveys of the nutrient levels in meat and bone meal have also reported similar values in nutrient variability.

Meat and bone meal is not a single feed ingredient, but an ingredient resulting from a variety of different products. The sources of raw materials used in the manufacture of meat and bone meal in the United States have changed during the past 20 years. Today, beef and pork by-products account for more than 80 percent of all products processed.

Differences in the types of raw materials incorporated, together with differences in processing

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method and conditions, result in variations in the nutrient profile of meat and bone meal. This variability in the nutrient profile of meat and bone meal can lead to unwanted variability in poultry performance.

Most major poultry companies have high standards for quality control. Their quality control laboratories analyze incoming ingredients for their nutrient content. However, even when nutritionists have a good handle on the nutrient profile of meat and bone meal, there is often a reluctancy to use higher than traditional quantities of meat and bone meal in poultry diets. Concerns about microbiological quality and palatability often limit the use of higher dietary quantities. In addition, some nutritionists impose tight restrictions on the use of meat and bone meal in the diet due to their concern for the nutrient variability associated with some meals.

Microbiology and Palatability of Meat and Bone Meal

As with most feed ingredients used by the animal industry, meat and bone meal is a relatively dry material which has been rendered and heat-sterilized. Many of the microbiological concerns that nutritionists have about meat and bone meal are often not warranted. It is important to protect **all** feed ingredients from contamination (before and after they arrive at the feed mill). There is a misconception that only products of animal origin may be contaminated with micro-organisms such as *Salmonella* . This is not true.

It is also important to routinely rotate inventory. Long-term storage of meat and bone meal and other animal by-product meals is not possible, primarily due to the possibility of oxidative spoilage. Meat and bone meal has a high fat content. With prolonged storage, this fat can become rancid.

Palatability problems with meat and bone meal are usually associated with a high fat-rancid meal that has not been properly treated with an antioxidant. Today, most of the high quality meat and bone meal products are adequately treated with an anti-oxidant.

Inclusion Levels

The use of meat and bone meal in poultry diets is often restricted to less than 5 percent. The poultry and swine industries are the predominant consumers of meat and bone meal because of its high calcium, available phosphorus, and lysine contents. Researchers at the University of Georgia have fed up to 40 percent meat and bone meal in a corn-soybean meal basal diet and found that the upper acceptable limit in the diet was about 10 percent. These researchers emphasized that feeding higher levels in the diet will cause imbalances of calcium and phosphorus. However, they also emphasized that their research was conducted with only one sample of meat and bone meal and performance results obtained with other samples may not be the same due to the reasons previously discussed.

Considering what has been published in the literature related to the use of meat and bone meal in poultry diets, most nutritionists consider levels between 2 - 7 percent acceptable.

Table 1.

Table 1: Nutrient values for meat and bone meal according to survey of feed companies.

Moisture	3.0 - 11.2%
Crude protein	49.0 - 52.8%
Crude fat	8.5 - 14.8%
Calcium	6.0 - 12.0%
Total phosphorus	3.5 - 5.0%
Lysine	2.2 - 3.0%
Metabolizable energy for poultry	1770 - 2420 MCal/kg