

Meat and Bone Meal in Swine Diets

Meat and bone meal (MBM) is the rendered product from mammalian tissues including bone but exclusive of blood, hair, hoof, horn and hide trimmings. The rules of the Association of American Feed Control Officials (AAFCO) state that MBM must contain a minimum of 4% phosphorus, with a calcium level no more than 2.2 times the actual phosphorus level. The discovery of a cow in Washington State with BSE in December 2003 caused prices for MBM to decrease dramatically. Depending on price of other ingredients such as soybean meal and phosphorus source, MBM may result in significant diet cost savings. All MBM are not created equal (Table 1). Marked differences in protein and ash levels are common and may influence desirability of the product. High ash content, for example, is correlated with reductions in essential AA levels.

Table 1. Typical Nutrient Composition of Meat & Bone Meal Sources

Nutrient	Meat & Bone Meal Source		
	Beef	Pork	Poultry
Dry Matter, %	92-96	92-96	94-97
Protein, %	47-51	50-54	58-62
Fat, %	9-13	9-13	9-14
Ash, %	26-34	23-34	16-20
Calcium, %	9-12	6.5-9.0	4.6-6.0
Phosphorus, %	4.5-6.0	3.5-4.5	2.3-2.8
Sodium, %	0.4-0.8	0.4-0.8	0.4-0.8

Akey has an extensive nutrient database for many different kinds of MBM, including some that are plant specific. This information is used to formulate diets, extracting the greatest value from individual sources of MBM. For customers with a known, consistent MBM source, higher levels are used in grow-finish and sow feeds, enabling greater cost savings. For customers purchasing MBM from multiple suppliers or brokers and not segregating product, lower levels of MBM are used to protect diet palatability and available nutrient content.

MBM should be stabilized with ethoxyquin alone or in combination with BHT or BTA. Antioxidants should be added at the source plant during processing to help ensure a more stable, higher quality product. MBM should be stabilized when higher levels (>50 lb/ton) are fed, when the risk of increased rate of oxidation of fat is higher (i.e., in warm weather), when renderers are using dead stock, or when sludge is added back to the offal. Oxidation of product is generally a problem when feeding younger animals that are less resistant to stress, when low levels of antioxidants are in feed, when fat in MBM is high in free fatty acids, or when the user is not checking for peroxide or oxidative stability.

Customers are encouraged to use single sources of MBM if possible, and to analyze loads often enough to know the source's nutrient profile. Recommended analyses include protein, fat, calcium, phosphorus, sodium, and ash. Customers should also periodically check for oxidative stability. In some cases, amino acid analyses are helpful.

MBM is not an easy ingredient to handle. Storage bins must be designed so that product can be agitated or air forced through the bin to keep it flowing. Otherwise, MBM may set up in the bin and cause big problems. Some mills have made the decision not to handle any MBM, and others handle only nonruminant sources because they manufacture products for ruminant animals. Feeding ruminant MBM to ruminants is strictly prohibited. Akey recommends feed mills manufacturing or delivering ruminant feeds not mix or deliver any products containing restricted use proteins (RUPP) to prevent cross-contamination. There is much discussion regarding further restrictions in MBM feeding, including banning all mammalian (including pork) and poultry proteins in ruminant feeds, and expanding these restrictions to nonruminant animals. Unless these restrictions become mandated, use of MBM in swine diets will continue as long as ingredient price relationships allow significant cost savings to producers.