

# POULTRY MEAL VS POULTRY BYPRODUCT MEAL

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One of the most common sources of protein in dry dog foods is chicken. In the United States, approximately 1.4 billion kilograms of rendered poultry products are produced annually, as by-products of the human food industry. About 25 per cent of this material ends up in commercial pet foods.

The two most common chicken ingredients in dry pet foods are poultry meal and poultry by-product meal. The Association of American Feed Control Officials (AAFCO) defines these ingredients as follows:

“Poultry meal is the dry rendered product from a combination of clean flesh and skin with or without accompanying bone, derived from the parts of whole carcasses of poultry or a combination thereof, exclusive of feathers, heads, feet and entrails.”

“Poultry by-product meal consists of the ground, rendered, clean parts of the carcass of slaughtered poultry such as necks, feet, undeveloped eggs and intestines, exclusive of feathers, except in such amounts as might occur unavoidably in good processing practices.”

So by definition, the difference between poultry meal and poultry by-product meal is the inclusion of heads, feet and entrails in the latter.

Is this significant? Is this a nutritionally important difference? This article will explore this question.

The most obvious place to start is with the nutrient composition of these two ingredients. Table 1 at right shows the protein, ash, fat and amino acid contents of two samples of poultry by-product meal and one sample of poultry meal.

These data show that there is very little difference between the nutrient contents of these two ingredients. In fact, there is as much variability between the two samples of poultry by-product meal as there is between

either sample of poultry by-product meal and the sample of poultry meal. It might seem logical to think that an ingredient that contains heads and feet would contain a poorer quality protein, but table 1 refutes this assumption. The essential amino acid content of these ingredients is very similar.

But what about digestibility? The fact that those amino acids are present in the ingredient does not necessarily mean that they are well absorbed into the dog.

There are actually very few studies that have measured the digestibility of the protein or amino acids in rendered poultry products when these ingredients are fed to animals. Aldrich and Daristotle in 1998 fed baby chicks diets containing poultry meal and

poultry by-product meal and found no differences in protein quality between the two ingredients. Bednar in 2000 also compared diets containing poultry meal and poultry by-product meal and found no differences in the intestinal digestibility of protein or amino acids when these diets were fed to dogs.

Poultry by-product meal typically contains more ash (mineral) than poultry meal and it has been suggested that higher ash content lowers protein digestibility, but this is not necessarily true. It has been shown that increased ash content does not necessarily reduce the digestibility of the protein or negatively affect the quality of the protein in an ingredient.

All of this would tend to suggest that,

Table 1 Nutrient composition (as a % of dry matter) of two samples of poultry by-product meal and one sample of poultry meal.\*

	Regular Poultry byproduct meal	Low Ash Poultry byproduct meal	Poultry meal
Protein	64.58	68.75	69.3
Ash (mineral)	16.98	7.5	9
Fat	12.5	19.79	16
Essential Amino Acids			
Arginine	4.65	4.8	4.37
Histidine	1.24	1.48	1.71
Isoleucine	2.3	2.85	2.34
Leucine	4.44	5.35	4.77
Lysine	3.58	4.17	3.11
Methionine	1.2	1.45	1.13
Phenylalanine	2.55	3	2.69
Threonine	2.56	3.09	3.02
Tryptophan	n/a	n/a	0.52
Valine	2.94	3.64	3.16

\*The values above were taken from papers published in the *Journal of Animal Science*. Both sets of values for poultry by-product meal are from Johnson et al in 1998. Values for poultry meal are from Yamka in 2003

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nutritionally speaking, there is not much difference between poultry meal and poultry by-product meal. This statement in itself is true. However, this does not mean that all poultry ingredients are of equal quality. There are substantial differences between different grades within each of these ingredients. These differences may be due to differences in processing or to differences in the quality of the parts used to make the ingredient.

The process used to produce both poultry meal and poultry by-product meal is called "rendering". During rendering, raw chicken parts are thoroughly cooked at high temperatures (approximately 140 C) to drive water and fat out of the bone and tissues. The fat is removed and sold as poultry fat. The remaining "cake" is dehydrated, ground to a fine powder and sold as either poultry meal or poultry by-product meal (depending on whether heads, feet and entrails were used).

Rendering can affect the nutritional quality of the final ingredient. Cooking at temperatures higher than necessary or for longer than necessary can greatly reduce the digestibility of the amino acids present in the protein. To maximize the protein quality of either ingredient, the rendering process must be carefully controlled.

A second difference in quality can come from the parts of chicken contained in the ingredient. Aldrich and Daristotle (1998) compared the protein quality of various parts of rendered chickens using Protein Efficiency Ratio (PER) as their measure of protein quality – higher PER means higher quality protein. This study reported that rendered chicken feet had the lowest PER at 0.87, followed by bone at 1.22 and heads at 2.50. Internal organs has a PER of 3.04 and gizzards/liver/hearts had a PER of 3.08. Entire birds without feathers (which would contain the meat that normally goes for human consumption) have a PER of 3.43.

This may appear to contradict the earlier comments in this article. Since poultry by-product meal contains feet and heads and these body parts have a lower PER, it seems logical to think that poultry by-product meal would have a lower PER than poultry meal.

This apparent contradiction overlooks an important detail. At the beginning of this article, I mentioned that only 25% of rendered poultry products end up in pet foods. The remaining 75% largely ends up in livestock feeds. Standard "pet food grade" poultry by-product meal is a much better quality ingredient than "feed grade" poultry by-product meal and a major difference in the two is the relative percentage of different chicken parts they contain. Feed grade poultry by-product meal typically contains more bone, heads and feet and is an inferior ingredient as a result. Table 1 reflects the typical nutritional profile of pet food quality poultry by-product meal and shows that the pet food grade ingredient is very similar in terms of its protein quality to poultry meal.

A final factor that influences the quality of a rendered poultry product is the freshness and quality of the birds that it contains and how quickly the birds are processed after death. Birds that are fit for human consumption and rendered immediately after slaughter will yield the best quality rendered meals. Poultry by-product meal processed immediately from freshly killed birds destined for human consumption is a better quality ingredient than poultry meal originating from birds that were not freshly slaughtered or birds that were deemed not fit for human consumption.

Poultry meal and poultry by-product meal can be easily distinguished on a pet food label, so it would be convenient to be able to draw conclusions about the quality of a pet food based on which of these ingredients it contained. Unfortunately, the parameters that provide the most useful information about ingredient quality are not found on a pet food label. The freshness and quality of the birds that went into the meal, how carefully the rendering process was controlled, and the percentage of different body parts used in the meal, cannot be determined from a pet food label. While it is true that poultry meal is generally a better quality ingredient than feed grade poultry by-product meal, it is not true that all poultry meals are superior to all poultry by-product meals. Within each of these ingredients, there is considerable variability in quality.

Pet food manufacturers realize that pet owners do not like the word "by-product" on an ingredient list. Some manufacturers are currently lobbying AAFCO to remove the word "by" from "poultry by-product meal" so that in future the ingredient is listed as "poultry product meal" on a pet food label. Opponents to the change feel that the new name would be misleading to consumers. Proponents of the change point out that there is no such thing as lamb by-product meal, fish by-product meal or meat by-product meal, and yet lamb meal, fish meal and meat meal all contain by-products of the human food industry.