KEY POINTS:

I. BY-PRODUCTS AND ANIMAL DIGEST

- By-product meals can be an excellent source of high-quality protein and amino acids.
- Animal digest plays a key role in palatability enhancement for dogs and cats.

II. WHEAT GLUTEN

- Wheat gluten is a source of high-quality protein in dry and wet pet foods.
- Wheat gluten produces the texture and consistency desired in many high-quality food products, for consumption by both people and pets.

By-Products and Animal Digest: Misunderstood Ingredients

Pet owners are sometimes confused or misinformed about nutritional facts pertaining to pet food ingredients and quality. Occasionally, misinformation is disseminated in the press or on the internet. One common misconception that is often reported states that by-product ingredients in pet foods are of lesser quality than whole meat, fish or poultry. This “Nutrition Brief” will address the topic of by-products and help define and clarify their role in commercial pet foods. Another misunderstood ingredient, animal digest, will also be defined and discussed in this issue.

By-Products Defined

Because the wild canine and feline relatives of our domestic pets often kill prey for their sustenance, many people may think that a diet composed mainly of skeletal muscle, or whole meat, is what they eat. In reality, when animals kill prey, they usually eat the organ meats and intestines first, saving the skeletal muscle and bones for last. These organ meats, or “by-products,” are important sources of vitamins and minerals that cannot be obtained from muscle tissue alone. For example, liver provides vitamin A and iron, and bone marrow and bones provide calcium, fatty acids and antioxidants.¹

Animal by-products are a combination of organs, bone and meat trimmings, and their composition is defined by the Association of American Feed Control Officials (AAFCO). According to their guidelines, by-products, when used as ingredients in pet foods, may include the heart, lungs, liver or other organs; and bone and meat trimmings from poultry or mammals. Some of the by-products used in pet foods are ingredients that are intended for human consumption, and are considered to be delicacies by many people. These include liver, kidneys and tripe. Items such as feathers, hair, hide, hooves, manure or stomach contents are NOT included in meat by-products.²

By-Product Quality

In addition to providing vitamins and minerals in a pet food diet, by-products are an excellent source of protein and amino acids. One example is poultry by-product meal. This valuable ingredient is highly digestible, contains 70% protein, on an as fed basis, and provides a high percentage of essential amino acids.³

Taurine, an essential amino acid for cats, is important in reproduction, and for cardiac and ocular health. This amino acid is available in higher levels in poultry by-product meal than in mammalian muscle tissue.

Animal Digest Defined

Animal digest gets its name from the digestive process used in production. Purina produces its own animal digest from striated muscle and soft tissue supplied by USDA-inspected facilities. The ingredients are slowly cooked and enzymatically digested to break the protein down into peptides. The digest is initially in the form of a liquid or paste, but can also be dried to a powder. A somewhat similar process is utilized to create bouillon, a common flavoring ingredient used in human foods. Animal digest is an excellent source of high-quality protein and it is extremely palatable. It is most often used as a flavoring agent on dry diets. It can be sprayed on the kibble or mixed with the food.

High Palatability Standards

Because flavoring is such an important aspect of palatability, Purina has done extensive testing with dogs and cats to help determine their flavor preferences. Dogs and cats differ in their preferences; for example, dogs tend to prefer a single flavor and cats like a combination of flavors, so different flavoring may be added to dry dog versus dry cat food. Purina creates these unique flavors in its own kitchens to help ensure that all products meet the highest standards of palatability.

### Taurine Content Of Cooked Foods

<table>
<thead>
<tr>
<th></th>
<th>MEAN CONCENTRATION</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAMMALIAN MUSCLE</td>
<td>203</td>
<td>96-390</td>
</tr>
<tr>
<td>POULTRY BY-PRODUCT MEAL</td>
<td>969</td>
<td>962-975</td>
</tr>
</tbody>
</table>

¹
²
³
Wheat Gluten Quality: Nutritious Ingredient for Both Human and Pet Foods

Wheat Gluten in Human Products

Wheat gluten has been a trusted ingredient in human foods for decades, used in the preparation of high quality pastas, whole wheat bakery goods, breakfast cereals and other foods. Baking represents more than 60% of the total wheat gluten usage worldwide\(^1\); and many multi-grain and whole grain breads would not be appealing without it.

Wheat Gluten in Pet Products

Just as wheat gluten is used in human foods, such as baked goods, to provide a desired consistency and texture, wheat gluten is used in pet foods for similar reasons. Many pet foods use wheat gluten to help other ingredients combine, enhancing texture to form nutritious, palatable and appealing foods. It’s also important to note that the wheat gluten used in most pet foods is the same quality wheat gluten used in human food.

High Quality Protein Source

Wheat gluten is an excellent source of protein that can be used in pet food, providing a 75% concentration of protein by weight. This is higher than other grain-based protein sources such as corn gluten meal and soybean meal, and it also exceeds the protein content of chicken and fish meals. When used with complementary protein sources, the protein in wheat gluten contributes to high quality, highly digestible protein in complete diets.

Highly Digestible

Appropriate nutrient levels in pet foods are very important in a balanced diet. Of equal importance is the digestibility of the nutrients, as this important first step can be the rate-limiting factor in the total bioavailability of the food.

Safety of Wheat Gluten

Many human and pet food manufacturers have used wheat gluten in their products for decades. Nestlé Purina has utilized wheat gluten in its pet food products for nearly 20 years. Independent regulatory organizations, including the U.S. FDA and the Association of American Feed Control Officials, as well as respected professional organizations like the American Veterinary Medical Association and the American Institute of Baking, all acknowledge the nutritional value and suitability of wheat gluten in foods for human or pet consumption.

Nestlé Purina Quality Control

Nestlé Purina has an ongoing, rigorous evaluation and sampling food safety program for all raw materials used in its products. There are quality assurance specialists at each of the North American pet food manufacturing facilities who are trained to sample and/or analyze incoming ingredients. With Purina’s food safety program, every load of ingredients, including wheat gluten, is evaluated to eliminate potential risks.

\(^1\) JoGayle Howard and Mary E. Allen, National Zoological Park, Smithsonian Institution, Washington, DC 20008 and Susan D. Crissey, Chicago Zoological Society, Brookfield IL 60513. Husbandsry manual, Chapter 4.


\(^4\) Small Animal Clinical Nutrition, 3\(^{rd}\) ed.


\(^6\) Feed Commodity Bulletin. Oklahoma State University, Stillwater.


