

The Science of Pet Food: Role of Protein

What is protein?

Protein is an essential nutrient for cats and dogs, and along with carbohydrate and fat, is one of the major nutrients found in pet food.

Proteins are large molecules containing hundreds, or in some cases, thousands of smaller units called amino acids. There are around 20 different types of amino acids that can be strung together to form a huge number of different proteins. While the bodies of all animals can do many amazing things, like their human counterparts, dogs and cats cannot make all the amino acids they require so that means they must consume sufficient quantities of certain amino acids from protein in their food. Because dogs and cats depend on them for optimal health, these amino acids are called “essential amino acids” and there

are 10 for dogs and 11 for cats. When these essential amino acids are not found in the food in high enough amounts, this deficiency can result in illness.



What is the main purpose of protein?

Protein has several functions in the body. These include being a structural component of body tissues and organs such as cartilage, muscle fibres, skin and hair; they make up active components of the body including blood, cells and antibodies in the immune system, enzymes and hormones. This makes it an extremely important nutrient for all body functions.

As a general rule, cats need more protein in their diet than dogs and most other domestic species. They also have a specific need for certain amino acids, for example taurine. The

amount and type of protein may therefore differ between prepared cat and dog foods to account for the species' different needs, and as such, dog food should never be fed to cats to avoid cats missing out on the amino acids they need, in particular taurine.

In addition, a cat or a dog's dietary need for protein depends upon factors such as their age or life stage (e.g. growing animal or an adult), body composition and physiological state (e.g. pregnancy, lactation or a specific health condition).

What are the main sources of protein?

Protein can come from both animal and plant sources.

Animal sources used in pet food come primarily from the human food chain, such as beef, pork, chicken, turkey and fish. Plant sources of protein are obtained from agricultural products such as corn, soybean, oats, peas, lentils, wheat and barley.



A single source of protein does not typically contain all the essential amino acids in the correct proportion that a pet needs. Using multiple sources of protein formulated by a trained pet nutritionist ensures that all the essential amino acids are present in the correct proportions in a pet's diet.

Plant-based protein sources

Plant ingredients such as soybeans, peas, cereals and plant-based protein isolates are good sources of proteins that are often complementary to animal-based protein found in pet food.

Plant-based proteins such as corn or wheat gluten are highly digestible and a source of valuable amino acids.

Animal-based protein-sources

Most animal-based proteins are derived from parts of the animal that are less commonly used in the human food chain, although this may vary by country and culture. For instance, internal organs and meat trimmings are commonly used in pet food. They can appear on the pet food label as “animal by-products” or “animal derivatives.” While many people may not eat these ingredients, they provide an excellent source of animal-based proteins, essential amino acids and other valuable nutrients, while also playing a valuable role in reducing food waste and supporting sustainability.

The priority of pet food manufacturers is to source safe, nutritionally valuable ingredients to produce a high quality, nutritionally balanced and palatable pet food, so even if these parts of an animal might not sound appealing to the consumer, they are excellent sources of nutrients for our pets.

Benefits of animal-based protein sources used in pet food

By using animal-based protein sources in pet food that come from the production of human food, we are utilising more of the animal, which has positive environmental and economic impacts, while ensuring consumers have reliable access to safe food for their dog or cat. Similarly, the use of fish and fish by-products benefits the environment by ensuring all appropriate protein sources of a fish are utilised.

Alternative protein sources

The human population is expected to grow to ten billion by 2050 ([United Nations](#)) and assuming consumption habits continue as they currently are, this is expected to increase global demand for animal-derived protein. Pet food producers are now working to address the anticipated gap between available animal-based proteins for pet food and the projected demand. Research and development centred on new approaches is crucial to address the issue of sustainability and, as ever, there must be no compromise in nutritional quality to ensure pets receive a safe and balanced diet.

Alternative protein sources include a wide range of potential ingredients such as novel agricultural materials and methods of production, including the use of plants, insects and single-cell (e.g. algae, fungi, or yeast) ingredients. Some pet food makers are exploring the use of invasive species, such as Asian carp, which provides environmental benefits and serves as a healthy protein source.

Another example is insect-derived ingredients, which are now increasingly being used in human foods and some pet foods. [With a protein content between 40 and 75%](#), they remain a viable option for some manufacturers. Protein-rich meat alternatives such as “cultured” or “in vitro meat”, soy-based tofu or seitan from wheat gluten are other options.

Algae protein also has great potential, it has a higher protein content than beef, it can grow ten times faster than terrestrial plants – and absorbs CO₂ for an additional sustainability benefit.

Regardless of the source of the protein, pet food makers must ensure that all ingredients they use meet applicable safety requirements, as well as their own quality requirements. When in a complete and balanced pet food recipe, these ingredients must satisfy the nutritional needs of pets as part of a healthy lifestyle.



Ongoing research and innovation will provide alternative protein sources for human and pet foods into the future. Our role as members of the pet food industry will be to transform these into palatable and nutritious pet foods.

For more information regarding the nutritional needs of cats and dogs, please check [here](#) the relevant GAPFA factsheet.