

The Science of Pet Food: Role of Fat

What is fat?

Fat is an important nutrient and is composed of fatty acids. Most fat found in pet food is in the form of 'triglycerides', which contain three fatty acids. **Essential fatty acids** are those that must be provided in the diet as they cannot be produced in the body. The cat and dog's requirement for fatty acids may change according to their life stage e.g. during growth or due to

a specific health condition. Also, there are some key differences between the needs of dogs and cats. For example, arachidonic acid (AA) is an essential fatty acid for adult cats but not for adult dogs who can make this fatty acid from linolenic acid (LA), another fatty acid. Cat foods are therefore specifically formulated with ingredients that provide AA.

What is the main role of fat?

- Provides energy – fat is the most concentrated source of calories in the diet, providing more than twice that supplied from carbohydrates or protein on a per gram basis
- Provides the essential fatty acids which cannot be produced in the body e.g. linoleic acid
- Carries fat-soluble vitamins (A, D, E, and K) and facilitates their absorption from the intestine
- Key component of cell structure and various hormones
- Helps promote healthy skin by supporting moisture retention, as well as a soft, shiny coat
- Enhances the taste and influences the texture of food



Some pets may benefit from a diet higher in fat to help meet increased energy needs. This could include highly active or working dogs, during gestation and reproduction, during growth and also for pets that have difficulty maintaining body weight e.g. geriatric cats.

By contrast, pets that are overweight or obese can benefit from diets that are lower in fat together with controlled feeding and more exercise. In general, senior dogs have lower energy requirements and may also benefit from lower fat diets. Additionally, some health

conditions such as hyperlipidaemia can be nutritionally managed with a lower fat diet.

While humans are often recommended to reduce their intake of saturated fat, since diets high in these fats can increase cholesterol and possibly lead to the development of “blocked arteries” for humans, this is not always the case for pets. Due to genetic and metabolic differences, dogs and cats are far less susceptible to developing blocked arteries, and can typically tolerate higher levels of any type of fat in their diets.



Additional Benefits of fat in pet food

Beyond the important roles of fat discussed above, certain fat sources contain specific fatty acids that have additional health benefits for pets.

For example, vegetable oils such as sunflower oil and safflower oil are good sources of linoleic acid (LA), an omega-6 fatty acid which supports healthy skin. Flaxseed oil and soyabean oil contain omega-3 fatty acids

such as alpha-linolenic acid (ALA), which also supports healthy skin. Other important omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are typically found in fish oil. EPA and DHA have been shown to have an anti-inflammatory effect and can be beneficial to support skin and joint health. DHA is also critical in brain and vision development.

What are the main sources of fats?

Dietary fats can come from animal, vegetable sources and algae sources. Typical sources of animal fat in pet food are beef and chicken, and fish oil is a common marine source. Some common vegetable oils found in pet foods include corn oil, flaxseed oil, soyabean oil and sunflower oil.

The selection of a dietary fat source is typically determined by the fatty acid composition and the benefits the fatty acids provide. When in a complete and balanced pet food recipe, these ingredients must satisfy the nutritional needs of pets.

| g/100 g | LA (omega-6) | ALA (omega-3) | AA (omega-6) | EPA (omega-3) | DHA (omega-3) |
|------------------------|-----------------|------------------|-----------------|------------------|------------------|
| Chicken Fat | 19.5 | 1.0 | 0.1 | 0 | 0 |
| Corn oil | 51.9 | 1.0 | 0.0 | 0.0 | 0.0 |
| Canola oil | 19.0 | 9.1 | 0.0 | 0.0 | 0.0 |
| Flaxseed oil | 14.3 | 53.4 | 0.0 | 0.0 | 0.0 |
| Fish oil (menhaden) | 2.2 | 1.5 | 1.2 | 13.2 | 8.6 |

Source: Adapted from USDA FoodData Central (<https://fdc.nal.usda.gov/index.html>), accessed 9-2-21

Fatty Acids in Pet Food and Antioxidants

For fats to deliver their nutritional benefits, it is necessary to protect them from oxidation which can lead to rancidity and loss of nutritional value and palatability. Fatty acids are at a high risk for oxidation or rancidity because of their chemical structure, and polyunsaturated fatty acids (those with more double bonds such as EPA and DHA from fish oil) are especially vulnerable. Vitamin E and other antioxidants are included in many pet foods to help protect fatty acids from oxidation.

When storing pet food and to minimize oxidation of fats, it is important to keep the package sealed, store pet food in a cool place or at room temperature, and check the expiration date.

