



GAPFA

GLOBAL ALLIANCE OF PET FOOD ASSOCIATIONS

**Guidance on
Dog and Cat Food
Nutrition Guidelines**

2023

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1. INTRODUCTION

The Global Alliance of Pet Food Associations (GAPFA) is a non-profit association, established in Belgium in 2014, representing the following national and regional pet food industry associations and companies of pet food manufacturers across the globe:

- ABINPET, Brazilian Pet Products Manufacturers Association (Brazil)
- AMASCOTA, Consejo Nacional de Fabricantes de Alimentos Balanceados (Mexico)
- CAENA, Camara Argentina de Empresas de Nutricion Animal (Argentina)
- CFIA, China Feed Industry Association (China)
- FEDIAF, European Pet Food Industry Association (Europe)
- JPFA, Japan Pet Food Association (Japan)
- KPFA, Korea Pet Food Association (South Korea)
- NZPFMA, New Zealand Pet Food Manufacturers Association (New Zealand)
- PFAC, Pet Food Association of Canada (Canada)
- PFI, Pet Food Institute (The United States of America)
- PFI-SA, Pet Food Industry Association of Southern Africa (South Africa)
- PFIAA, Pet Food Industry Association of Australia (Australia)
- PIA, Petfood Industry Association (Thailand)
- Hill's Pet Nutrition
- Mars Petcare
- Nestlé Purina PetCare

The GAPFA mission is to support the health and wellbeing of pet dogs and cats and to promote the benefits of living with them by providing a forum for global industry consensus to address key mutual issues. The focus of GAPFA is to harness the collective experience of the global pet food industry and key external stakeholders with the objective to promote science-based global nutritional guidelines for dogs and cats which will provide reference and will facilitate global trade of pet food.

In order to deliver against this objective, GAPFA supports the recognition of and use of the AAFCO (Association of American Feed Control Officials) and FEDIAF (representing the European Petfood industry) nutrition guidelines. Based on the referenced guidelines, the goal of this GAPFA guidance document is to provide general nutritional principles for use by the pet food industry (manufacturers and associations) and other entities in various regions around the world to support them in understanding the principles underpinning the development and use of the existing nutritional guidance from AAFCO and FEDIAF. This document is not intended to be a step-by-step complete nutritional education or product development process or to be used as formal regulation.

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2. OVERVIEW

For the health and wellbeing of dogs and cats around the world, all complete and balanced pet food should be nutritionally adequate and appropriate for its described and intended use/purpose, as well as meeting the appropriate local regulatory/legislative requirements. Extensive work and research has already been done by several groups (principally AAFCO and FEDIAF, see below) in developing entire nutritional guidelines for making nutritionally adequate, complete and balanced pet foods. **GAPFA supports the recognition of and use of the AAFCO and FEDIAF nutrition guidelines.** Whether following AAFCO, FEDIAF or an alternative set of internationally recognized, scientific based nutrition guidelines, the guidelines should be considered in their entirety and used as a whole, because each guidelines was based on a specific set of scientific assumptions.

Much of the foundational research for nutritional adequacy of pet foods can be found in the National Research Council's Nutrient Requirements of Dogs and Cats (2006) (NRC-NRDC), from The National Academies Press (copy can be ordered from www.nap.edu). This document discusses various aspects related to the nutrient requirements and needs of pets: comparative digestion of dogs and cats; pet feeding behaviour; energy requirements of pets; energy content of food; specific nutrient requirements; water needs; needs of laboratory animals; effect of physical activity and some diet formulation plus processing information. It also contains tables of individual nutrient levels for both dogs and cats at different life stages. These tables (and all tables providing nutrient levels) always need to be considered as only one part of developing nutritionally adequate diets. It is strongly recommended that anyone developing pet foods have an understanding of the basics of pet nutrition, and the NRC-NRDC is a very helpful resource.

From the foundational work in the NRC-NRDC, two fully developed and periodically reviewed, practical nutritional guidelines have been established and widely recognized:

- **The Association of American Feed Control Officials (AAFCO)**, www.aafco.org) annually publishes its Official Publication (AAFCO OP), which contains a complete set of methods for nutritional adequacy substantiation along with a recommended set of nutrient profiles for products at various life stages.
- **The European PetFood Association (FEDIAF)**, <https://europeanpetfood.org/>) has developed the FEDIAF Nutritional Guidelines for Cats and Dogs (FEDIAF NG). This provides a complete set of nutritional guidelines for cats and dogs and is available online and reviewed on a regular basis based on existing and new research.

Both the AAFCO OP and FEDIAF NG are complete and available to be used by regions/associations looking to establish nutritional guidelines for cat and dog food products. **It is highly recommended that when either the AAFCO OP or FEDIAF NG is used, it should be considered in its entirety and used as a whole, because each system has its own set of internal assumptions.**

Within each of these two guidelines, there are common nutritional factors/principles considered in developing complete pet foods. These principles include: **intended purpose; energy; nutrient content; digestibility; nutritional adequacy substantiation; and other considerations for targeted species (e.g., processing and ingredients).** These principles are described in further detail in the following chapters.

While not recommended by GAPFA, there may be instances where a company/region/association wants to develop a new set of nutritional guidelines, or regional circumstances that require such an approach. It is strongly recommended that any newly developed guidelines are built from the foundational work already completed by the NRC-NRDC, FEDIAF and AAFCO and this document, and that they encompass general nutritional principles (as outlined in the following sections) and include

the most up to date scientifically rigorous research findings where applicable. It is important that nutrition guidelines for pets are developed in consultation with relevant experts. The AAFCO and FEDIAF Nutrition guidelines were developed, and maintained, based on the input of working groups of nutrition experts from both industry and academia. These nutrition experts ensure the AAFCO OP and FEDIAF NG reflect the latest science in the field of cat and dog nutrition.

As the pet nutrition guidelines of reference, the use of the AAFCO OP and FEDIAF NG nutritional guidelines facilitates the trade of pet food. Any newly developed guidelines would ideally take into consideration international trade laws and regulations to avoid potential trade barriers, and maintain trade feasibility.

Likewise, any newly developed guidelines should take into consideration additional elements, on top of scientifically substantiated guidelines for nutritional profiles. These elements include definitions, reference to moisture content, digestibility and energy density (and how to achieve these values), etc. The AAFCO OP and FEDIAF NG nutritional guidelines serve as a great example for that, as well.

3. INTENDED PURPOSE

Pet food must be nutritionally 'adequate' for its intended use. The intended use/purpose of the pet food should be clearly stated on the package label. This document is intended to address products for healthy pets and does not include additional recommendations for pets that may require specialised nutrition such as dietetic veterinary pet food.

The following questions may be helpful in considering the intended use:

- Which species of animal is going to eat the product: dog or cat?
- Is the product designed to be complete and balanced or complementary/supplementary?
- What life stage of the pet is the product designed to be nutritionally adequate: all life stages or growth/reproduction or adult maintenance?
- Is the product designed for some other purpose, and if so, what?

4. ENERGY

Proper nutrition requires that products be formulated to match the pet's life stage/lifestyle needs for both energy (calories) and nutrients. There are two considerations regarding energy: the energy needs of pets (given the intended use of the product) and the energy content of the product itself. These two factors can be then used to develop feeding directions for complete products. Complete products should provide feeding instructions because they are intended as the sole source of nutrition for the pet. The specifics on the labelling requirements are usually described in labelling guidelines/regulations.

It is important that products are made to contain sufficient amounts of available energy to support the pet in good health. The nutrient levels in products should also be considered relative to the overall energy content of the product to ensure both a pet's energy and nutrient needs are met, and this is reflected in nutrient profiles where specific nutrient values are communicated relative to the caloric content of the product.

Methods of determining the energy or calorie content of the product itself can be found in both the AAFCO OP and the FEDIAF NG, as well as in the NRC-NRDC. Two basic methods are used to determine the caloric content. First, and most commonly used, is the use of an equation (several options exist) to calculate the energy content based on the nutrient composition of the product. This is often referred to as a 'calculated' method. The second method is to feed the product (feeding trial or feeding protocol) and run analyses plus calculations. In some instances, the methods for determining the energy in a product and/or the requirement to label the energy content are set by regulatory authorities. For example, in the US, AAFCO requires the label to indicate the calorie content based on the calculation of the metabolic energy (ME) as outlined in the AAFCO OP. In Europe, labelling of the energy content is voluntary (except for certain veterinary dietetic products). The corresponding equations to calculate the energy density are set in the European Standard EN 16967 published in July 2017.

All energy content calculation methods will vary based on the determinations of the other nutrients, which in turn vary based on natural differences between ingredients and variations introduced via processing. For example, in plant based ingredients, nutritional and energy content will change throughout the lifecycle of the ingredient. Sampling of products and reproducibility of analytical methods contribute to the determination of energy and nutritional content.

Energy content can be expressed in kJ or kcal, on dry matter or finished product (as fed) basis. When declared on pack, the energy content can be expressed per units of weight (grams or kg), in household measures such as cups for dry foods or serving units of wet food, e.g. pack size for single serve or portion size for multiple serving units. For dry, extruded pet foods, the bulk density influences the energy content of the food on a volume basis. Hence changes in bulk density between products are reflected in changes in the recommended volumetric feeding amounts. In wet products, the moisture (water) content of the food has a larger impact on the recommended feeding amount.

Determining the daily energy needs of healthy pets (known as the metabolic energy requirement or MER) should be done using a scientifically valid method by the individual manufacturer based on the intended use of the product. The NRC-NRDC contains information pertinent to this determination. The values and equations used for determining pet energy requirements were developed based on research and populations of pets.

The actual energy requirements of individual healthy pets are highly variable based on many factors: age or life stage, activity levels, environment, breed type and temperament of the pet. No single

calculation method for energy requirement covers or precisely predicts energy needs across life stage and lifestyle within all dogs or all cats. Since individual pets differ widely in their energy or caloric needs, it is important to educate owners on how to use feeding guidelines and how to ensure their pets are maintained at their optimal weight which ultimately will impact their quality of life and longevity. This can be achieved by providing education resources, emphasizing the importance of an ideal body weight, and how to measure the body condition and muscle condition of their pets and the importance of exercise. The concept of using body condition scores (BCS) and muscle condition scores to assess optimal weight are becoming more widespread among veterinarians, but as we know, not all pets are taken to the veterinarians on a regular basis. One resource that can support the explanation of BCS to owners can be found at <http://www.wsava.org/nutrition-toolkit>

5. NUTRIENT CONTENT

Delivery of the proper amount and balance of nutrients relative to the energy content of the pet food is the foundation of good nutrition. Once the intended purpose of the product and the energy content are determined, the nutrient content can be developed. Both general nutrient category levels (e.g. total fat and protein) and specific nutrient levels (e.g. specific fatty acids and amino acids) must be considered. Some nutrients are considered to be essential, while others are non-essential, but may be considered as appropriate/recommended for the intended use of the food.

Lists of recommended nutrient levels, sometimes called nutrient profiles, are available for dogs and cats in various life stages and can be found in both the AAFCO OP and FEDIAF NG. Each set of nutrient levels have been developed based on a number of assumptions such as minimum nutrient requirements, typical nutrient/product digestibility/bioavailability, nutrient interactions, dry matter energy density and daily energy requirements. It is critical to consider all the assumptions when using one of these lists and to use the appropriate list in its entirety because of the underlying assumptions for the respective guideline.

In addition to complete and balanced petfood, pets may receive treats, snacks, and supplements (also referred to as complementary feeds) alongside the daily ration. The daily ration should be reduced appropriately to compensate for the extra calories provided by the treats, snacks or supplements. Generally, it's considered that treats should not provide more than 10% of the pet's daily calories/energy requirement. These include treats to help train or simply reward cats or dogs. A wide variety of nutrient fortified supplements, dry foods and treats are designed to support specific health needs e.g. oral health, foods for cats prone to fur balls and many other specialised foods, treats and snacks are available for pets. Manufacturers should base their feeding instructions for these products on the intended role of the product as part of the total daily ration of the pet, while also considering the contribution of nutrients relative to the minimum and where appropriate maximum recommended amounts.

While no minimum requirement is usually set for water within existing nutrition guidelines, it is an important nutrient and pets should always have access to fresh drinking water. Water requirements are greatly affected by life stage, climate and exercise. Products with a higher moisture content (> 60%) may have a positive effect on water intake, which can be extremely beneficial in the case of healthy companion animals where strategies are required to encourage drinking, such as for cats.

6. DIGESTIBILITY

Not only must a pet food product be sufficiently palatable to entice pets to eat it, but the nutrients must also be digestible enough so that adequate amounts are available to the pet. The form of certain nutrients (minerals in particular) can influence the availability of the nutrient to the pet. Some nutrient groups, such as various fibres, may not be digested by the pet but are important to be considered in the overall nutritional delivery and functionality of the product. In the case of fibres, although not absorbed, their inclusion may modulate intestinal motility and the gastrointestinal flora, increase satiety, and improve stool quality, depending on fibre composition and level of inclusion.

In general practice, digestibility of every nutrient is not determined. However, methods for determining dry matter and protein digestibility are provided in the AAFCO OP and FEDIAF NG (within the section on energy). These determinations can result in valuable information on the apparent digestibility of a product.

7. NUTRITIONAL ADEQUACY SUBSTANTIATION

An important goal for pet food manufacturers is to produce products that deliver on their claimed 'nutritional adequacy'. 'Nutritional Adequacy' refers to providing a complete and balanced product for the pet. Complete pet food provides the pet with all of their daily nutritional needs.

Methods of substantiating the nutritional adequacy of pet foods are detailed in both the AAFCO OP and the FEDIAF NG. One method is by using calculations or chemical analysis and comparing the established nutrient profiles as discussed in the Nutrient Content section above. For this method, the nutrient levels of the product are determined in one of two ways, either by calculations from the nutrient levels in the ingredients in the formula or via actual chemical analysis of all of the nutrients in the finished product. The nutrient profile of the product is then compared to the established profile for the pet in the life stage as consistent with the intended use of the product. These comparisons may be made on a dry matter basis or on a per calorie basis.

Another method of substantiation is by actually feeding the product to the cat or dog. Several types of feeding studies are available: growth, reproduction, and adult maintenance with a combination of trials to support adequacy for all life stages. Feeding studies measure various criteria and are then evaluated to determine if the product can be considered nutritionally adequate.

Before a product is placed on the market, it should have undergone the necessary procedures to ensure its adequacy. While some nutrients are considered to be essential and conditionally essential in the daily diet (e.g., depending on life stage), others that are not essential are also important. The following nutrients should be taken into consideration for evaluation of nutritional adequacy:

Major nutrients:	Protein, Fat
Fatty acids:	Linoleic acid (LA), Arachidonic acid (cats) (AA), Alpha-linolenic acid (ALA), Eicosapentaenoic acid (EPA), Docosahexaenoic acid (DHA)
Amino acids:	Arginine, Histidine, Isoleucine, Cystine, Tyrosine, Lysine, Phenylalanine, Threonine, Tryptophan, Leucine, Methionine, Valine, Taurine (cats)
Minerals:	Calcium, Phosphorus, Potassium, Sodium, Copper, Iron, Chloride, Magnesium, Iodine, Manganese, Zinc, Selenium
Vitamins:	Vitamin A, Vitamin D, Vitamin E, Thiamine, Riboflavin, Pantothenic acid, Niacin, Vitamin B6 (Pyridoxine), Biotin, Cobalamin (B12), Folic acid, Vitamin K, Choline

Once a product has been confirmed to meet the referenced nutritional profile and the formula remains essentially unchanged, it is recommended that regular nutrient assessments are conducted to make sure that the product still meets the appropriate nutritional standards and / or truly scientifically satisfies its claim. The frequency of testing is the responsibility of the manufacturer. If the manufacturer makes a major change in the formulation or to the processing, complete re-analysis is recommended.

8. NUTRITIONAL ADEQUACY VERIFICATION TO END OF SHELF LIFE

It is imperative that products continue to deliver adequate nutrition throughout the entire shelf life of a product. Possible environmental factors, nutrient interactions and product stability can impact nutritional delivery over time.

In order to ensure that a pet food product is nutritionally complete to the end of its shelf life, a shelf life assessment is important. The accuracy of shelf life studies and potential methods used must be considered, and validation of nutritional adequacy until end of shelf life should be conducted, with proper adjustments to ensure validity, while considering all impact factors that can impact nutritional delivery over time. Such factors include environmental factors, nutrient interactions and product stability.

The shelf life is especially relevant for the vitamins which are most susceptible to degradation through processing and oxidation, such as vitamin A, B Group vitamins and others.

With regards to the assessment of pet food safety, shelf life studies should be conducted using appropriately substantiated methods proven to be accurate for all pet food matrices. Appropriate validation for nutritional adequacy throughout the guaranteed shelf life of the product should be conducted. Environmental factors, nutrient interactions, nutrient degradation, and nutritional changes that can occur during manufacturing and storage represent risks to nutritional adequacy, product shelf life, and ultimately safety. Vitamins are of particular concern as certain ones are prone to oxidative instability, but protein and fat may also be at risk for nutritional changes during or after production.

9. ADDITIONAL CONSIDERATIONS

Many other considerations need to be taken into account when developing products that deliver the proper nutrition to pets. Some of these considerations are given in the NRC-NRDC, the AAFCO OP and the FEDIAF NG, appearing in the text or as footnotes to the nutrient tables. Again, it is important to read the text and the footnotes of nutritional guidelines.

Some additional considerations include:

- Type of processing: some processes, e.g., heat treatment, might reduce nutrient content or availability
- Stability of vitamins: vitamin potency can decline during storage as a premix, in the product during processing and throughout the entire shelf life of the product; stability should be managed, and also sufficient overage planned to allow for losses
- Nutrient interactions: nutrients can interact and have a negative effect on other nutrient levels (degradation) and on the bioavailability of the nutrients
- Oxidative stability of products: the reduction in oxidative protection of a product may reduce the nutrient availability
- Presence in the product of anti-nutritional factors for example, raw fish containing thiaminases. Inclusion of raw fish can significantly reduce thiamin levels when thiaminases contact thiamin prior to their inactivation by heat processing
- Preservatives, such as sulfur dioxide/sodium/potassium sulfites may negatively impact thiamine levels

10. SUMMARY

- The goal of this guidance document is to provide general nutritional principles for pet food manufacturer associations in selecting a set of recommended nutrition guidelines
- Two guidelines, AAFCO OP and FEDIAF NG, are fully developed, established, and functional in outlining practical nutritional guidelines for dogs and cats.
- When adopting one of these guidelines it should be adopted in its entirety given the specific assumptions made within the guideline.
- AAFCO OP and FEDIAF NG refer to the amount of each nutrient that must be present at the end of the product's stated shelf life regardless of the method used for establishing nutritional adequacy.
- Regardless of the nutritional guideline, the common nutritional factors/principles in developing complete pet foods are: intended purpose; energy; nutrient content; digestibility; nutritional adequacy substantiation; and other considerations for targeted species (e.g., processing and ingredients).