

GoodGrub for Pets

Professional pet nutritionists agree that it is difficult to ensure a balanced homemade diet. [Dr. Freeman](#), veterinary nutritionist at Tufts University, says “if your pet is eating a home-prepared diet, it is almost guaranteed to be nutritionally unbalanced unless it’s been formulated by a veterinary nutritionist and you are following the recipe exactly.”

GoodGrub™ for Pets was developed to provide nutritional insight to owners who prefer to prepare food at home. GoodGrub was specifically developed to help formulate homemade dog and cat food that meets all the nutritional requirements defined by the Association of American Feed Control Officials (AAFCO). The software is especially useful in answering questions, such as:

- How much of each ingredient should be used?
- What deficiencies exist and which supplements should be added to correct those deficiencies?
- What are the limiting amino acids in a given recipe?

The [AAFCO requirements](#) were developed based on research from the National Research Council (NRC), described in their publication [Nutrient Requirements of Dogs and Cats](#). In generating requirements, the AAFCO also considered recommendations by the European Pet Food Industry Federation. A pdf providing the AAFCO requirements and footnotes can be found online. The NRC publication can be purchased from a bookstore.

AAFCO requirements are applicable to both dog and cat food. This GoodGrub version only supports dog food recipes. Future versions may support cat food recipes.

How to Use GoodGrub - Quick Start

1. Select *Create Recipe* from the left sidebar, then use the sidebar links to search for ingredients or select ingredients for the recipe. Or load an existing recipe from the *Shared Recipes* page.
2. Select the correct *Recipe For* dropdown option corresponding to the AAFCO requirements you desire. Currently the options are for *Adult dogs or Puppies, pregnant and lactating dogs*. Dogs over the age of one are considered adults, except for some large and giant breeds which do not fully mature until they are two. Later versions of GoodGrub may contain options for cats.
3. Select the *Evaluate Recipe* button to compare the protein amino acids, minerals, vitamins, and fats provided in the recipe against those required by the AAFCO. Any deficiencies are highlighted in red, as will any nutrients which exceed AAFCO maximums.
4. If you are signed in, you can load, change, and save your recipes, or choose from a quick pick list of all your previously used recipes ingredients.

Background

The AAFCO sets minimum requirements for crude protein, amino acids, vitamins, minerals, and fats in dog and cat food. It also sets maximums for some nutrients. In the United States, any dog or cat food not meeting these AAFCO nutritional requirements must be labeled a treat – it cannot be labeled food. According to many online sources, treats (all pet food not meeting AAFCO requirements as part of a balanced meal) should not add up to more than 10% of a pet’s daily calories.

The AAFCO generates two separate sets of requirements for dogs:

1. puppies, pregnant and lactating bitches, and
2. adult dogs

The software allows you to select which of these two sets of requirements are used. There are cases where the AAFCO requirements may not be adequate:

- Inactive Dogs. The NRC states: “For dogs with an unusually low energy intake (below the suggested requirement), the nutrient concentrations (Amt/1,000 kcal) may not be adequate.” The NRC requirements are based on a dog described as an active pet dog, consuming a specific number of calories per day per kg of body weight. Inactive dogs may need higher concentrations of nutrients due to consumption being less than assumed in developing the minimum requirements.
- Senior Dogs. There are no separate requirements for senior dogs. The AAFCO sets the minimum crude protein requirements for adult dogs at 18%, or 45 grams per 1000 kcal. This is considered a low-protein diet for dogs. The NRC states that “older dogs appear to require somewhat more crude protein to maintain labile protein (so-called protein reserves), perhaps as much as 50 percent more.”

The AAFCO requirements are provided both as:

- a percentage, based on dry matter, and
- units (g, mg, and IU) per 1000 kcal (commonly referred to as calories).

GoodGrub offers a comparison based on nutrients per kcal. So AAFCO recommended minimums (and in some cases maximums), as specified for each 100 calories of dogfood, are compared to 100 calories of your recipe.

Amino Acids and Protein. The quality of protein depends on its digestibility and how well the body can utilize it. A complete protein has all of the essential amino acids present in the right amounts. Protein sources can be combined to improve the ratio of amino acids, making the protein more complete and thereby more usable. The AAFCO has minimum recommendations for each essential amino acid. High quality proteins (or combinations of proteins) will match these amino acid profiles. In generating their requirements, the AAFCO assumed an overall digestibility for crude protein of 80% for growth and reproductive stages (puppies, and pregnant or lactating bitches), and 78% for adult maintenance stages.

Fats. The AAFCO provides minimum requirements for linoleic acid (LA) requirements for all dogs. LA is an omega-6 fatty acid. The AAFCO also specifies alpha-linolenic acid (ALA) and eicosapentaenoic + docosahexaenoic acid (EPA + DHA) requirements for dog growth stages (puppies and pregnant and lactating dogs). ALA, EPA, and DHA are omega-3 fatty acids. GoodGrub currently offers a comparison between your recipe’s total fat and the AAFCO total fat requirement. However, GoodGrub does not yet compute omega 6 and omega 3 values for the recipe, so only the AAFCO fatty acid requirements are listed.

Minerals. Iodine and chloride both have minimum recommendations in the AAFCO. However, these nutrients are not found in the database¹ and so are not listed on the *Evaluate Recipe* page.

How to Interpret the Evaluate Recipe Page

The AAFCO minimum and maximum requirements are printed out on the evaluate recipe page, along with a percentage representing the ratio of the amount of each nutrient in the recipe compared to the AAFCO requirement. If any nutrient totals in the proposed recipe fall below the minimums, the percentage is shown in red. For example, the following recipe is low in the amino acid methionine.

	A) Recipe	B) AAFCO Minimums	Percent ((A/B)*100)	AAFCO Maximums
Protein/Amino Acids				
Total/Crude Protein:	6.6 g	4.5 g	146%	
Tryptophan:	61.2 mg	40.0 mg	153%	
Threonine:	253.1 mg	120.0 mg	211%	
Isoleucine:	295.1 mg	95.0 mg	311%	
Leucine:	492.3 mg	170.0 mg	290%	
Lysine:	470.8 mg	158.0 mg	298%	
Methionine:	76.2 mg	83.0 mg	92%	
Methionine-Cystine:	167.2 mg	163.0 mg	103%	
Phenylalanine:	333.3 mg	113.0 mg	295%	
Phenylalanine-Tyrosine:	511.8 mg	185.0 mg	277%	
Valine:	340.2 mg	123.0 mg	277%	

Ratios. There are several ratios specified by the AAFCO which are included on the recipe evaluation page:

1. The calcium to phosphorus ratio is specified by the AAFCO to be at least 1:1 and not more than 2:1. The GoodGrub percentage shows the ratio of the mg of calcium found in the recipe divided by the mg of phosphorus found in the recipe (times 100). If the ratio of these two nutrients falls below 1:1 (below 100%) or above 2:1 (above 200%), then the percentage is printed in red.
2. The AAFCO specifies 30:1 as the maximum recommended ratio of omega-6 to omega-3 fatty acids². The AAFCO does not provide a minimum omega-6 to omega-3 ratio requirement, and the software does not yet compute a ratio for the recipe, so only the maximum ratio is given. The recipe is not checked to verify it is below this maximum.
3. The vitamin E to polyunsaturated fatty acids (PUFAs) ratio is given as a recommendation in the footnotes of the AAFCO requirements tables. The units specified in the recommendation are IU of vitamin E to grams of PUFAs. The recipe's total vitamin E as listed on the *Evaluate Recipe* page is reported in mg, so the amount of vitamin E reported in the ratio will be different. The recipe's total PUFAs are calculated and displayed in the Fats section, although no minimum or maximum are given.

¹ The search feature uses the U.S. Department of Agriculture FoodData Central database, found online at: fdc.nal.usda.gov.

² The ratio is specified as "(Linoleic+Arachidonic):(alpha-Linolenic+Eicosapentaenoic+Docosahexaenoic) acid Ratio"

Warnings. Some recipe ingredients do not have complete nutritional information (e.g. one or more nutrients are missing from the database). At the bottom of the recipe comparison page, a *Warnings* section lists the nutrients that are unknown for the foods used in the recipe. In most cases, these nutrients can be assumed to be minimal.