Trakia Journal of Sciences, Vol. 5, No. 3-4, pp 51-55, 2007

Available online at:
http://www.uni-sz.bg

ISSN 1312-1723

Mini-review

EVALUATION AND USE OF DOG FOODS

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ABSTRACT

The principal types of commercial dog foods, their advantages and drawbacks are discussed with regard to their use for best nourishment of dogs for maximum health and longevity. The paper also puts an emphasis on how to read a commercial food label. The general-purpose food and the specific foods on the international market are also discussed.

Key words: commercial, dog, food, label, information

GENERAL CONSIDERATION IN USING DOG FOODS FOR ADULT MAINTENANCE

Dogs, like other species, require the same basic nutrients, like energy, protein (amino acids), minerals, vitamins, and water (1, 2)

Commercial pet foods are almost all "total mixed ration" designed to provide all needed nutrients in the correct proportion in a given product (3, 4, 5).

The majority of people who take their pets to the veterinarian ask about feeding. The veterinarian receives more questions on feeding or nutrition, than on any other topic. One of the most common questions asked is, “What and how to feed my pet?” The question may be phrased in a number of ways: “How many times per day should feed? Should I feed free choice? Do I need to supplement? What brand do you recommend? Is brand all right to feed? Are table scraps OK?”

The basis of modern food animal medicine is herd health management where feeding is recognized as an important component. However, proper advice on feeding is also an important part of overall health management of small animal patients. This includes preventive as well as therapeutic nutrition (5). To provide proper feeding advice, the veterinarian must have knowledge of the foods available how to use them, and the nutrients they contain; how to use these foods to best nourish the normal dog for maximum health and longevity. To perform this function properly the following are necessary:

- A diet must contain the proper amount and balance of all nutrients
- The ingredients in the diet must be such that the animal is able to digest, absorb and utilize these nutrients
- The diet must be palatable enough so that the animal will consume an amount sufficient to meet its nutrient requirements.

TYPES OF COMMERCIAL DOG FOODS

Since all of the nutrients are present in the dry matter of the product, canned foods represent a considerable cost, particularly since on an “as is” basis, they are also frequently the most expensive (***Table 1***).

Table 1. *Principal types of commercial dog foods according to moisture content (7)*

Type	***Moisture***	***Dry Matter***
Dry	6 – 10%	90 – 94%
Soft Moist	23 – 70%	60 – 77%
Canned	68 – 78%	22 – 32%

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Dry Foods

Dry foods are available as:

1. Expanded products (almost all), e.g. Purina, Carnation, Science Diet.
2. Kibbles (very few), e.g. Ken'L Ration Biscuit, Triumph.
3. Meals or pelleted meals (almost none).

Dry type dog foods generally have the highest levels of vegetable source protein, are relatively low in fat, and have the lowest caloric density on a dry matter basis. They may be bulk limited when used to feed stressed dogs (6). They represent about 50% of pet foods produced (7).

The major advantages of dry dog foods are:

- They are less expensive.
- They may be fed free-choice.
- They abrasive effect reduces accumulation of dental tartar, which promotes healthier gums and teeth.

Dry dog food has some disadvantages:

- They are less palatable than soft-moist or canned forms for most dogs.
- Another disadvantage of dry foods is that only dry ingredients can be used in their formulation. Harsh drying can reduce the nutrient content and digestibility of some ingredients.
- They are lowest in essential fatty acid content because of the small amount and type of fat (beef tallow) frequently used in their manufacture.

Soft Moist Products

Soft-moist or semi-moist dog foods are very similar to dry foods in nutrient content. The nitrogen-free extract (NFE) of these products, however, is largely in the form of disaccharides such as sucrose and they have lower levels of less soluble carbohydrates such as starches as compared to dry products (5, 7). Proteins in these products generally consist of more animal source ingredients than is found in dry foods. They have a somewhat higher energy density on a dry matter basis than do dry products. Also, stool production of animals fed soft-moist products is generally much less than that of animal fed dry rations but urine production is greater.

The physical form of these products may vary, being in the form of patties, chunks, etc. This is a marketing gimmick and does not affect nutrient content. They are almost all balanced rations. The market percentage of these products is decreasing, currently representing only about 12.5% of total pet food production.

Canned Products

There is more variability in the formulation of canned products than in dry of soft-moist types. They may be balanced or not depending on the circumstances. The types available are:

- Balanced (mainly meat.
- Balanced (other).
- Gourmet (mainly meat).

Good quality balanced canned rations are higher in animal source proteins and in fat but lower in carbohydrate content than dry or soft-moist products and have the highest caloric density of all commercial products on a dry matter basis.

Label information

The table of any commercial pet food product will have a Guaranteed Analysis statement and a list or ingredients as follows (***Table 2***):

- The guaranteed analysis (5, 7) is taken from a proximate analysis of the product. The ingredients should be listed in terms of decreasing fractional content on the product. Be aware, however, that this is on an AS IS, not a DRY MATTER basis.

Table 2. *Exemplary label information about food ingredients*

Guaranteed Analysis (Dry Type Product)	
Crude Protein	Not less than 21%
Crude Fat	Not less than 8%
Crude Fiber	Not more than 5%
Moisture	Not more than 10%
Ash	Not more than 10%

Ingredients

Ground corn, wheat middling, solvent extracted soybean meal, meat and bone meal, animal fat preserved with BAH, wheat red dog, iodised salt, potassium chloride, zinc oxide, US certified food colour, vitamin A_2 supplement, chorine chloride, Riboflavin supplement, cobalt sulphate.

Additionally, as of 1 January 1984 the label of all dog foods in interstate commerce must have a "statement of nutritional adequacy" (8). Dog foods can be proven to be "complete and balanced" by one of two mechanisms:

- The manufacturer can prove by analysis that the product contains the minimum required levels of all essential nutrients as specified by the National Research Council (NRC) for maintenance, growth, etc. In this case a statement similar to that underlined will appear on the label (2, 9, 10, 11).
- The manufacturer can show by feeding trials (as specified by AAFCO) that the product supports maintenance, growth, etc, of dogs. In this case a statement that the product has been shown by experiment to meet requirements for maintenance, etc, will appear on the label.

If the manufacturer has not evaluated the product, then a statement must appear that the product is not 'intended for sole use". An exception to this are "dietary animal foods" which must have a statement that the product should be used only if recommended and supervised by a veterinarian (12, 13).

Thus by reading the label, one can get useful information regarding the product (**Table 3**). However, the label may not specify all the information a user might want to know.

Frequently the manufacturer will provide feeding guidelines for product (how much to feed based on weight of dog). In many cases a calculation of caloric content requirements for a dog of a specified weight is made. The owner is well advised to determine for himself the correct amount to feed. You should recommend that this be done on a weight, not on volume, basis.

Table 3. *Information on dog foods' label.*

Information Available From Label

- Is product complete and balanced?
- Approximate caloric content.
- Level of protein and fat.
- Does the product contain meat (any roughly how much)?

Information Not Available From Label

- Overall digestibility;
- Biological Value (protein);
- Quality;
- Contamination.

SUPPLEMENTATION

Many dog owners supplement the daily ration of their animals even though they are feeding adequate quantities of a complete and balance ration. This is done for several reasons and can be done in several ways.

The causes for supplementation could be (5):

- Lack of confidence in basic ration;
- Increase palatability;
- Meet individual requirements;
- Extra nutrients during stress.

Possible mechanisms of supplementing are:

- Tablets, capsules, etc. (minerals & vitamins);
- Mixing foods (dry and canned];
- Fat (for better skin and hair coat, extra energy);
- Table scraps;
- Other (e.g. dried milk, etc.).

In most cases supplementation is unnecessary and should be discouraged. If a client insists on supplementing, a good recommendation is to supplement a balanced ration with a balanced ration (e.g. balanced canned ration added to a balanced dry ration). In general adding no more than 15% by weight of almost any reasonable supplement to a balanced basic ration is acceptable since a safety factor is used in formulation of commercial rations (14).

SPECIFIC VS GENERAL PURPOSE PRODUCTS

Many commercial products are claimed to be complete and balanced for all phases of the life cycle.

Some products, however, are recommended for specific stage of the life cycle (growth, adult maintenance, older dogs, etc.) (10, 11, 12).

General Purpose Products

Advantages:

- Convenient
- Good results in average dog
- Owner confidence

Disadvantages:

- Multipurpose product
- Designed for growth
- May overfeed maintenance animal if fed ad kg
- May be bulk limited for working dog, etc.

Conceptually, the products designed for specific stage of life cycle are preferable. However, the difference in formulation among these products are in most cases small and, in some cases, the basis for the formulation can be questioned, e.g. diets formulated for older dogs.

Premium pet foods

Relatively recent additions to the pet food market are "premium pet foods" represented by such lines as Purina Pro Plan, Iams Eukanuba, ANF, Science Diet and so forth. These products are generally composed of high duality meat source ingredients, have a high digestibility, and generally contain more fat than standard manufactured dry pet foods. They are sold exclusively through non-grocery outlets such as pet supply stores and animal hospitals. Currently, sales of these products are increasing at a rate of about 15% per year even though they carry a price premium compared to standard pet foods.

For most adult maintenance type situation, it is unnecessary to use such products. If a client prefers such a product, calculate the caloric need and recommend an amount to be fed daily. These products do tend to be very palatable, thus the probability for excessive weight gain may be increased if they are fed free choice.

Because of their relatively high fat content they have a good caloric density and can be recommended during physiological stress (6).

Generic pet foods

The other new addition to the line of pet food products is that of the generic pet foods. These would be at the opposite end of the spectrum from the premium products. Virtually all are guaranteed to be complete and balanced for maintenance, but this is validated in all cases only by chemical analysis, not animal feeding experiments.

A few papers have reported that generic foods are inferior to standard products in terms of animal growth rates, nutrient content and so forth. Excessive nutrient content and rapid growth rates of dogs fed a given product should not necessarily be considered as desirable characteristics of a good pet food. The biggest problem with the generic products is palatability. Since they tend to be low in fat and animal source protein, they are not well accepted by many pups. The cost of additives needed to improve palatability could well outweigh the initial economic advantage of purchasing a generic type pet food.

The “best” dog food

Frequently veterinarians are asked for a recommendation as to what is the best dog food. There is no valid answer to the question. There are many good commercial dog foods the choice of which to use depends on many factors including age of dog, size of dog, number of dogs, management conditions (constant vs. restricted food availability, etc.), economic factors and so forth (3, 12). A veterinarian (i.e. you) should be able to make recommendations for individual owners as to reasonable products available in the area based on the above factors and on **Table 4**.

"Natural” dog foods

In the last few years several so-called natural dog foods have appeared on the market. These supposedly contain no artificial ingredients. A basic difference between these and normal products is that many of the "natural" products do not contain a fat preservative (butylated hydroxyanisole or butylated hydroxytoluene). The shelf life of these products will therefore theoretically be reduced since the fat will become rancid in a shorter time period than in products with fat preservatives.

Table 4. *Factors useful in suggesting dog food quality*

		Food Dry Matter %			
Function	*Moisture%*	*Digestibility*	*Ash*	*Fat*	*Protein*
Maintenance	≤ 75	> 75	-	> 8	15 – 23
Growth and reproduction	≤ 75	> 80	-	≥ 17	> 29
Physical Exertion	≤ 75	≥ 82	-	> 23	> 25

These products also often contain special ingredients such as herbs, etc. (5, 7). While proponents of such products feel these "natural" additives are valuable, there is little objective scientific evidence to support a recommendation for their use. In some cases the special ingredients may contain drug activity, or toxic compounds which could result in adverse effects.

Home formulated dog foods

As previously mentioned there are many excellent commercial products available. However, for whatever reasons, some owners insist on the use of home – formulated rations. It is difficult but possible to formulate a balanced ration for the dog using ingredients available at home. Two publications are extremely valuable in this regard, *Nutrient Requirements of Dogs* available from the National Research Council, and *Nutritive Value of American Foods* available from the U.S.D.A (2, 15). The first is needed to ascertain requirements of dogs and the second to provide information on the nutrient content of human foodstuffs.

A chart is very handy to use in formulating a ration and should include, at least, estimates of protein, fat, calories, calcium, phosphorus, salt, vitamin A and thiamine. The assumption would be that if intakes of these nutrients are adequate, it is probable that other essential ingredients are also present in adequate amounts.

Protein sources should be chosen to supply the minimum protein requirements. Then other sources should be added to supply additional calories and other essential nutrients.

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