

THE LIMITS OF A VEGETARIAN DIET FOR DOGS AND CATS

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RESEARCH ARTICLE

Abstract

Health and environmental concerns, and a growing compassion for livestock animals are some of the primary factors behind the increasing number of people choosing to shift their diets to restrict (veganism) or completely avoid (ovo-lacto vegetarianism and vegetarianism) foods derived from animals. Many pet owners face the challenge of providing their dogs and cats with meals that include meat and other animal products, in accordance with their lifestyle choices. From this point of view, we have evaluated 3 brands of vegan dry food for dogs and cats from the analytical composition aspect. Following the results obtained we can conclude that a vegan diet for our pets is not a nutritionally balanced diet. The most important aspect of a vegan ration for a dog is to carefully calculate all the nutritional contributions of a daily ration in relation to the animal's needs, while selecting a high quality protein source. Cats, on the other hand, cannot be fed a meat-free diet because of their metabolic idiosyncrasies.

Keywords: vegan food, pets, nutrition, analytical composition

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INTRODUCTION

Concern for the health and welfare of pets has grown in recent decades due to the relationship that exists between humans and pets (González-Ramírez and Landero-Hernández, 2021). Animal morphology, behavior, and physiology are all significantly influenced by the characteristics of their diet (Yoshimura et al, 2021). Dogs and cats are strict carnivores by nature, which means they have evolved to feed exclusively on meat and animal products. However, plant-based alternatives to animal protein can be used to replace some or all of the animal protein in their diet (Aspinall, 2014; Butowski et al, 2; Domínguez-Oliva et al, 2023).

Vegetarianism and veganism have gained popularity as ecological and ethical eating practices at the same time, have become major trends in many countries in recent years, with more and more people adopting or considering a vegetarian or even vegan lifestyle. In response to the owners' request, the pet food business quickly filled this new market niche by offering

full and balanced plant-based meals for both dogs and cats (Fontinatri et al, 2020). People who choose this lifestyle also adopt it for their pets, offering them a vegetarian or vegan diet (Brown et al, 2009; Leahy, 2010). Vegetarian diets for cats and dogs are a controversial topic that generates heated debate in the veterinary community (Dodd et al, 2019). Although vegetarian diets are considered beneficial for human health and the environment, it is important to consider whether this dietary approach is also suitable for our animal friends. Balanced consumption of protein and amino acids is a crucial factor for cats and dogs alike (Kanakubo et al, 2015).

The safety of giving vegan diets to dogs and cats has generated debate in the scientific literature as well as in the popular press and online media (Domínguez-Oliva et al, 2023). The links between degenerative health diseases, concerns regarding farm animal welfare, degradation of the environment, fertilizers and pesticides, climate change, and causal factors are worrying companion animal owners more and more. As a result, a growing number of owners are interested in feeding their pets and themselves vegetarian diets (Knight and

Leitsberger, 2016). The main focus of the study was the nutritional evaluation of commercially available vegetarian pet foods for dogs and cats.

MATERIAL AND METHOD

Three brands of commercial vegan dog and cat food (S1, S2, 23) were analyzed and their chemical composition in terms of dry matter, crude protein, crude fat, ash, fiber and carbohydrates were analyzed according to the AOAC official method. The carbohydrate content of the treats was calculated by difference (100 minus crude protein, crude fiber, crude fat, ash, and moisture). In our study we used calories as the unit of measurement (Castrillo C. et al, 2009), and the energy value per 100 g produced was calculated according to the equation (NRC, 2006) for dogs and cats.

RESULTS AND DISCUSSIONS

As for the ingredients of the 2 vegan diets for dogs they were: the first sample (S1- dog) of vegan food was composed of potato protein, red lentils, sunflower oil, beet pulp, apple fiber, vegetable protein, hydrolyzed yeast, mineral substances; the second sample of vegan food (S 2 -dog) was composed of potato flakes, peas, potato protein, sweet potatoes, sunflower oil, flax seeds, beet pulp, minerals, yeast, carrot, spinach. The third sample of vegan food (S 3 - cat) but intended for cats had as ingredients: corn gluten, corn, corn oil, yeast, potato protein, minerals, peas, hydrolyzed vegetable protein, cellulose, rice protein, flaxseed.

Following the determination of the analytical composition of the first sample of vegan dog food, the percentage of crude protein was lower than that listed on the label, with a difference of 2.3%. Crude fat analyzed had a higher percentage than that on the label, with a difference of 1.75%; crude fiber also had a higher percentage than described on the kibble packaging (4.09% to 2.2%), with a difference of 1.89%. And in the case of the last determination i.e. crude ash the percentage was also higher than that indicated on the product label the difference being 1.29%. For sample 2, the percentage of Protein obtained from the analysis was lower than described on the label, with a slight difference of 0.63%. The crude fat analyzed was much lower than that on the label with a difference of 5.2%, which is clearly questionable. The crude fiber content in the analysis was also much lower than that

described on the kibble packet (1.84% compared to 4.1%) with a difference of 2.26% and the ash percentage also lower than that on the label, resulting a difference of 1.52%. In the case of the last analysis on sample 3, the vegan cat food sample, the percentage of crude protein identified after analysis was slightly lower than described on the label, with a small difference of 0.27%. In the case of crude fat the difference was 5.39%, which is clearly debatable. And for fiber and ash the values were approximately equal to those shown on the package label (Table 1). Firstly, it is important to remember that when it comes to the protein provided in the diet of dogs and cats, the most important thing is the ratio of essential AA provided, and then the quantity. The quality of the protein source fed should also be taken into account, as each different protein source will provide a different ratio of essential AA for the animals. As can be seen in Figure 1, according to the NRC 2006, the essential AA intake of different food groups is averaged in relation to the number of times covered by the nutrient intake for dogs and cats. When it comes to the fats in pet food, it is important to note the essential FAs they provide. The most important of these are omega 6 and 3. In terms of the crude protein present in the first sample of kibbles (S 1 - dog), the protein source comes from potatoes. From Figure 1, we can see that, in terms of AA essential for dogs, potatoes will mainly lack methionine, cysteine, leucine, threonine and phenylalanine. According to the label on the packaging, taurine is added. Furthermore, after analyzing the kibbles, we observed a negative difference of 2.3% in terms of crude protein. The major risk in this case is a protein deficiency in the dog if not properly supplemented. Half of the essential AA will not be adequately supplied.

In animals, proteins are used for muscles, organs, bones and immunity. They also make up skin and hair. The first consequence of a potential protein deficiency is a bad coat and skin. The dog will also have a bad general condition, with digestive problems, chronic apathy, muscle atrophy etc. (Laflamme et al, 2014; www.unegamelleautop.fr). We know there is no point in having a large amount of crude protein in a packet of kibble. What is important is its quality and the essential AAs it contains. In this case, potatoes are not a good source of protein for our carnivorous friends. the fat source is sunflower oil, sunflower oil

provides no omega. The most important essential fatty acids are omega 3 and 6.

Table 1

Chemical composition (100 g food) and energy value (kcal/kg food) based on analysis of vegan dog and cat food

	S1 - dog	S2 - dog	S3 - cat	S1 - dog	S2 - dog	S3 - cat
	chemical composition results			label chemical composition		
Kcal/kg food	3410	3458	3473	-	3463	3760
DM (%)	90.55	91.98	95.42	-	-	-
CP (%)	19.70	20.37	32.73	22.00	21.00	33.00
CF (%)	10.75	5.30	7.61	9.00	10.50	13.00
Fiber (%)	4.09	1.84	3.49	2.20	4.10	3.50
Ash (%)	7.09	5.08	6.71	5.80	6.60	5.90
Carbs (%)	48.92	59.39	44.88	-	-	-

DM - dry matter; CP - crude protein; CF - crude fat; Carbs – carbohydrates; S – food sample

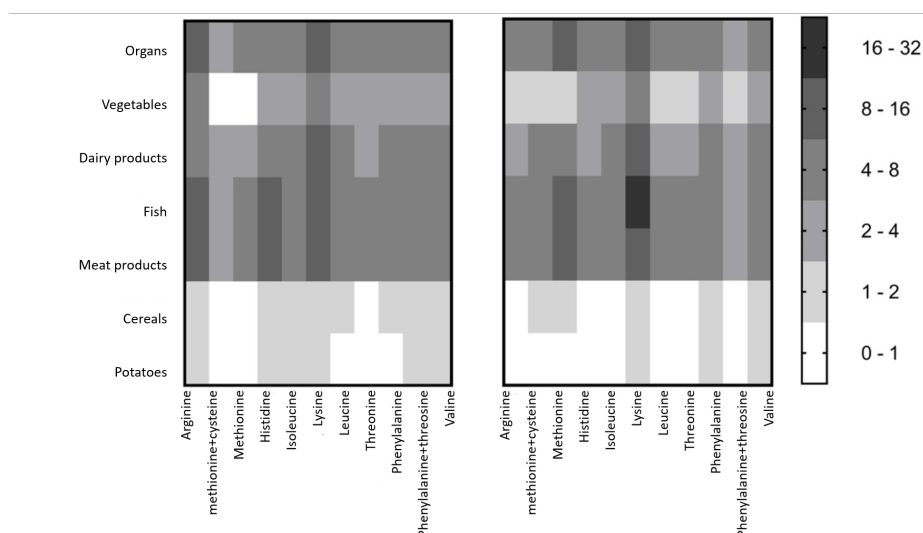


Figure 1 **Averages of essential AA intakes from different food families, in terms of the number of times the requirement is covered, for dogs and cats** (Lefebvre, 2019) (National Research Council, 2006)

Essential fatty acids play a role in the skin and coat, so a deficiency of these can lead to poor skin and coat condition. They also play an important role in inflammation. Omega 3 have anti-inflammatory properties, so a lack of them can contribute to inflammatory diseases in the dog's body (such as arthritis). They are also important for cognitive function and the immune system (Sagols and Priymenko, 2010). In this case, we had a positive difference of 1.75% in crude fat. But given that the dog's intake of omega-3 with sunflower oil will not be covered, there is a risk of deficiency. Sample 2 - dog - the protein source also comes from potatoes. As previously mentioned, in relation to figure 1, we have noted the lack of essential AA with potatoes (methionine, cysteine, leucine,

threonine and phenylalanine). Furthermore, after analyzing the kibbles, we noticed a negative difference of 0.63% in crude protein, which is not very significant. The major risk here, once again, is protein deficiency in the dog if he's not properly supplemented. This is because half of the essential AA will not be properly supplied. For this sample of vegan food (S 2 - dog), the fat source is, as for the previous one, sunflower oil. In this case, we also had a negative difference of 5.2% in crude fat after analysis, so the fat intake is even less respected for the dog.

We know that cats need a higher protein intake than dogs, especially arginine and taurine, which must be supplemented in their food ration. In this range of vegetarian cat food, the protein source also comes from potatoes.

According to figure 1, for cats, potatoes provide no arginine, methionine, cysteine, histidine, isoleucine, leucine, threonine, phenylalanine or tyrosine - in other words, virtually none of the AA essential for cats. According to the package label, taurine is also added. Cats on this diet run a high risk of protein deficiency. This can lead to severe weight loss, muscle wasting, apathy and general weakness. If a growing cat is fed this type of kibble, it can lead to stunted growth, developmental problems and a weakened immune system. And, as with dogs, skin and coat issues. In cats, protein deficiency is more dramatic than in dogs. This is because the cat will use its own proteins to produce energy and glucose - in other words, it will self-digest. (www.unegamelleautop.fr).

After analyzing these vegan dry cat kibbles, we noticed a negative difference of 0.27% in crude protein, which is not significant. But, knowing that most essential AA will not be covered, we can deduce a potential deficiency over time for a cat fed this range of kibbles.

Calculating the protein-calorie ratio (PCR): for this vegan food sample (S 3) we have 32.73% (laboratory analysis) crude protein, and an energy density of 376 kcal/100g (according to the pack label), which gives us PCR = 87.04 g/Mcal. According to FEDIAF 2019, a cat needs a minimum of 62.5 g/Mcal of protein. For this pack of kibbles, the fat source is corn oil. This oil is very rich in omega 3, but much less rich in omega 6.

As with omega 3, a deficiency in omega 6 will potentially lead to skin and coat problems, increased inflammation, reduced immune function and growth and development problems. But also reproductive problems, more specifically on fertility, fetal development and the health of newborn kittens. In this case, we also had a negative difference of 5.39% in crude fat after analysis, so the fat intake is even less respected. Once again, the quantity is respected but the potato still won't provide the animal what it needs. And above all, the excess AA will be eliminated, increasing urea excretion in the urine (so we have to watch out for the kidneys, especially in cats).

CONCLUSIONS

In conclusion, the three different ranges of dog and cat kibbles have essentially the same problems: the protein source and the fat source. These two nutritional aspects don't necessarily

provide adequate nutrition for the animal, and could lead to deficiencies if the animal is fed these type of vegan food alone. Protein deficiencies are more serious in cats than in dogs, but for both they remain important for the animal's general state of health. As for oils, their lack of omega 3 or 6 can also have repercussions on the systems of our pets, but to a lesser extent than for proteins. We can conclude that this vegetarian alternative for our dogs and cats is not ideal. The most important aspect of a vegetarian ration for a dog is to carefully calculate all the nutrients in a household ration in relation to the animal that will receive it, while at the same time selecting a high-quality protein source. For cats, on the other hand, it's not possible to give them a meat-free diet, due to their metabolic idiosyncrasies.

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