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Short Communication

Nutritional Composition and Label Evaluation of Some Commercial Dry Dog Foods in Ibadan, Nigeria

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ABSTRACT: The nutrient and energy content of commercial dry dog feeds most commonly patronized in the city of Ibadan were analyzed. Most of the feeds carry no specific values of nutrient composition on their labels. The results of proximate analysis of the feeds were compared with mean values of nutrients in the National brand of dry dog food of the USA. Although, the dog feeds were found to be adequate in protein and energy content, they, however, showed appreciably lower values for fat and fiber contents, as well as the levels of most of the micronutrients (Fe, Mn, Zn and Se). Extensive variations were observed in the concentrations of several nutrients among the dog food brands analyzed. While tighter regulations are being advocated for the pet food industry, it will be necessary to perform digestibility and growth studies of these foods in order to establish baseline data on nutritional composition of dog foods marketed in the country.

Keywords: nutrition, dog, nutrients, Nigeria.

INTRODUCTION

Nutrient composition of diet is of crucial importance for health and well-being of animals. A dog's nutritional health depends on receiving the correct amounts and proportions of nutrients. In recent times, there have been undocumented reports of suspected food-related gastro-intestinal and skeletal disorders at the Veterinary Teaching Hospital, University of Ibadan and referrals from many private clinicians within and outside Ibadan. These disorders are thought to have their origins from the use of compounded dry dog feeds.

Dry dog foods are so described because they have low moisture content (usually about 10 to 12 percent). They commonly contain whole or dehulled cereal grains (e.g., corn, wheat, oats, barley), cereal by-

products (e.g., wheat middlings, wheat germ meal, corn gluten meal), soybean products (e.g., soybean meal, soy grits), animal products (e.g., meat meal, meat and bone meal, meat by-products, poultry by-products, fish meal), milk products (e.g., dried skimmed milk, dried whey), fats and oils (e.g., animal fat), groundnut cake, mineral and vitamin supplements.

The majority of dry dog foods sold in Nigeria are low-priced brands which claim to have optimum nutritional quality and are often sold in pet shops, through veterinarians or sold locally directly from the producer. Some dog breeders, veterinarians and pet owners also compound their dog feed. In Nigeria, the responsibility of regulation of products emanating from industries is vested in agencies such as the National Agency for Food and Drug Administration and Control (NAFDAC) and the Standards Organization of Nigeria (SON). However, the lack of National recommended baseline data would obviously hamper the efficiency of regulation of products, including pet food products. Elsewhere, the nutritional adequacy of dog food products is ascertained from recommendations by the National Research Council (NRC) and The American Association of Feed Control Officials (AAFCO), both of the United States. There are two means of substantiating the nutritional adequacy of a pet food.

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The first method requires the product to be formulated so that essential nutrient levels fall within the ranges as set in the AAFCO Nutrient Profiles. The second method requires a pet food manufacturer to conduct animal feeding trials in accordance with AAFCO protocols (AAFCO, 1992, 1993).

The relative lack of regulation on pet food production in Nigeria has led to the proliferation of firms producing these foods, especially as there is virtually a non-availability of a qualitative criterion which can guide purchasing decisions by consumers. Again, many of the manufacturers of these dog food brands actually fail to declare specific values of individual nutrients on the labels. Due to lack of regulations, it is quite easy for manufacturers to put misleading information on the outside of a dog food bag and simply call it nutritious. It would, thus, seem that quality control measures and animal feeding tests are imperative for assurance of the production of food with adequate nutrient concentration and availability, as advocated elsewhere (Huber et al, 1986).

The ever-increasing dependence on dogs for security and companion is believed to be responsible for the tremendous growth being experienced in the pet industry, with its corresponding increase in demand for pet food by pet owners and dog breeders. To the best of our knowledge, information on label claims of nutritional adequacy by pet food industries in Nigeria has not been substantiated.

This study was aimed at determining the nutritional composition and, thus, evaluating the information declared on the label of dry food for adult dogs of different manufacturers.

MATERIALS AND METHODS

Six brands of dry dog foods were purchased in pet shops in the City of Ibadan, Nigeria. These brands represented the majority of dog food marketed in the city. Purchases were made on three different occasions in order to minimize the possibility of obtaining a non-representative lot of food. They were identified by code letters to preserve the privacy of the manufacturer. Most of the dog food brands had no specific label statement of nutritional composition adequacy.

Aliquots (about 50g) from each bag were pooled in separate sample bottles for subsequent proximate analysis and evaluation of concentration of macro- and micro-minerals. Crude protein, Crude fat, Crude Fiber, Ash, moisture, Nitrogen-free extract and Gross energy were determined. The levels of minerals including macro-elements (Ca, P, K, Na and Mg) and micro-minerals (Fe, Cu, Mn, Zn and Se) were also

determined. Two separate determinations were carried out in the proximate analyses of the diets. The mean and standard deviations of the values obtained in proximate analyses were computed and the statistical level of significant differences across the different brands, at $p < 0.05$, were determined with the Student's t-Test. The results of chemical analyses were also compared with minimum nutritional values of the National brand of the United States; as such baseline National data are not available in the country.

RESULTS

The values (mean \pm standard deviation) of the nutritional composition of diets analyzed and mean values for the United States' National brand are presented in Table 1. The different nutrient parameters have been expressed on a dry matter basis for comparison with the values of the National brand. Extensive variations (significant differences at $p < 0.05$ not indicated) were observed in the concentration of virtually all the nutrients across the six brands evaluated.

All foods exceeded the mean values of the National Brand for protein and gross energy content. They, however, had lower levels of fat and fiber compared to the National brand. Three of the brands (PKF, DTF, SF) had moisture levels less than that of the National brand. Only two of the foods (PKF, SF) had ash contents comparable with that of the National brand while others had lower values. The concentration of Nitrogen-free extractives in all but one (SF) of the foods, were similar to that of the National brand.

Levels of Calcium and Magnesium in the foods were similar to those of the national brand; only SF recorded slightly higher values. Phosphorus contents were lower in two of the foods (DTF, MGF) when compared with the national brand. Potassium concentrations were only slightly lower in three brands (DTF, MGF, and TF) when compared with the National brand.

All the dog foods analyzed, but one (SF), had much lower values of the micronutrients (Fe, Mn, Zn) compared with values of these nutrients for the National brand. Values of these micronutrients were abnormally higher in SF compared with the other brands and the National brand. Levels of copper in all the foods sampled were higher than that of the National brand. Only SF showed a slightly lesser content of copper. All the foods failed to meet the National brand standard for selenium concentration.

Table 1:
Nutritional composition of sampled dog foods

	MCF	PKF	DTF	MGF	TF	SF	NB
Ingredients as dry matter basis							
Protein (%)	26.83±0.06	27.91±0.11	25.72±0.05	21.84±0.06	25.05±0.11	29.32±0.08	23.40
Fat (%)	3.27±0.01	3.80±0.01	3.88±0.02	3.18±0.02	3.38±0.02	5.27±0.01	8.50
Fibre (%)	2.69±0.03	3.55±0.01	2.52±0.01	3.70±0.02	3.51±0.03	3.30±0.01	4.40
Ash (%)	6.27±0.01	7.66±0.02	6.60±0.01	5.96±0.02	6.16±0.03	7.91±0.03	7.80
Moisture (%)	8.72±0.04	6.90±0.06	5.71±0.02	9.34±0.03	8.41±0.05	5.57±0.06	8.10
Energy (kcal/g)	4.97±0.002	5.14±0.002	5.08±0.003	4.97±0.004	4.99±0.005	5.51±0.002	4.70
Nitrogen-free extract (%)	52.23±0.05	50.20±0.09	55.59±0.08	56.00±0.06	53.50±0.14	48.64±0.08	50.80
Calcium (%)	1.38±0.01	1.5±0.01	1.3±0.06	1.14±0.03	1.35±0.05	2.08±0.02	1.30
Phosphorus (%)	0.87±0.01	0.93±0.01	0.77±0.03	0.57±0.01	0.84±0.02	1.27±0.01	0.80
Potassium (%)	0.48±0.01	0.55±0.01	0.42±0.01	0.36±0.03	0.42±0.01	0.78±0.02	0.50
Magnesium (%)	0.15±0.01	0.23±0.02	0.18±0.0	0.12±0.01	0.18±0.02	0.33±0.02	0.20
Iron (mg/kg)	202.5±0.14	214.3±0.0	198.7±0.14	185.85±2.33	221.5±0.14	657.35±0.21	246.0
Copper (mg/kg)	9.50±0.28	11.75±0.21	10.95±0.21	8.90±0.28	10.35±0.21	7.40±0.28	8.00
Manganese (mg/kg)	19.30±0.14	24.60±0.14	19.00±0.14	18.70±0.14	20.70±0.14	124.40±0.28	61.40
Zinc (mg/kg)	76.55±0.21	81.40±0.14	74.70±0.14	71.30±0.14	79.85±0.50	207.8±2.26	138.0
Selenium (mg/kg)	0.35±0.01	0.45±0.01	0.30±0.02	0.22±0.01	0.43±0.02	0.95±0.01	7.70

NB – National Brand

MCF, PKF, DTF, MGF, TF and SF – Commercial dry foods of different manufacturers.

DISCUSSION

The data obtained clearly indicates that while manufacturers of dog foods seem to pay some attention to fortifying dog foods with sources of protein and energy that could meet the prescribed standard, they seem to place very little importance on the concentration of micro-nutrients as indicated by the severely low levels of Fe, Mn, Zn and Se.

The lower fat values found may be due to not subjecting samples to acid hydrolysis before extraction. This observation was also reported by Huber et al, 1986, who carried out a similar evaluation in dog food

brands in the USA. It is recommended that a dog food contain at least 5 percent fat on a dry basis.

The extensive variations in the mean values of the various nutrients across the different brands studied confirms the observation that the manufacturers of these dog food brands lack specific recommended values they adhere to in formulating the diets. As many of them lack label specifications of nutrient profiles of the foods, it was not possible to make comparisons between label analysis values and values obtained from analysis in this study. It is therefore imperative that appropriate authorities ensure proper regulation of the pet food industry such that manufactured dog foods

carry full details of the nutrient composition in order to protect the consumers of the products

In conclusion, it is important to mention that although, unequivocal proof of a product's nutritional adequacy for all animals under all conditions may never be achieved, it is necessary that the consumer is assured of pet food products that possess nutritional adequacy that conforms in the most part to recommended values.

Further, substantiation of the nutritional adequacy of a pet food based on the nutrient profiles may be less reliable than the results of feeding trials. For example, the nutrient profiles cannot assess the acceptability, digestibility, palatability and other factors of a product as well as the feeding trials will do. It is recommended that further studies including digestibility and growth

studies be carried out to further evaluate the nutritional adequacy of the products sampled.

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