

Evaluation of Nutrient Content and Quality of Commercial Dog Foods

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Abstract

To ensure that your dog eats a diet that is both balanced and nutrient-dense, it is imperative to assess the nutritional value and quality of commercial dog foods. In Ibadan, the most often purchased commercial dry dog foods were examined for their nutritional and calorie content. On the labels of most feeds, no particular nutritional content values are listed. The findings comparison of the feeds' proximal analyses to the denoted levels of essential nutrients in the National dry dog food brand produced in the United States of America (USA). The amount of protein and calories in the dog food was appropriate; however, the levels of the majority of the Iron (Fe), Manganese (Mn), Zinc (Zn), and Selenium (Se), four micronutrients, were noticeably lower, as well as the amounts of fat and fiber. Among the dog food brands examined, there were wide variances in the pieces of several components. The pet food business is being pushed for stricter standards. Still, research on these foods' digestibility and growth will be required to generate baseline data on the nutritional makeup of dog diets sold in the nation.

Keywords: Nigeria, dog nutrition, nutrition, macrominerals, microminerals

Introduction

Dogs need balanced, wholesome food to preserve their health and well-being as a treasured part of the family. To fulfill these nutritional requirements, commercial dog meals are quite important. Evaluation of these commercial dog diets' nutritional content and general quality is essential, given the large range of products on the market. This assessment ensures dog owners may choose the goods they want to feed their beloved friends in an educated manner (1). Various factors, such as the materials used, the nutritional composition, the production procedures, and compliance with regulatory criteria, are evaluated to determine the nutrient content and quality. Knowing these elements makes assessing the nutritional content, safety, and general compatibility of commercial dog diets for various types and stages of life easier (2). The assessment of nutritional content is based on the basic elements required for dogs' best health. Proteins, carbs, lipids, vitamins, minerals, and water are some nutrients. For a dog's development, energy levels, immune system, and general physiological processes to be supported, adequate quantities of each nutrient are essential. Analyzing the nutrient composition ensures that commercial dog food offers a balanced and comprehensive diet that satisfies the unique nutritional needs of dogs (3).

Numerous criteria are taken into account when evaluating the quality of commercial dog diets. A thorough analysis is first conducted to identify the source, purity, and nutritional

value of the substances utilized in the formulation. Premium components, including lean meats, healthy grains, and veggies, influence a superior dietary profile. The examination also considers if there are any artificial additives, preservatives, or potential allergies that might harm a dog's health (4). Other crucial factors are manufacturing procedures and safety precautions. Evaluating the production processes and facilities guarantees that commercial dog meals are made in a clean and regulated environment. The final product's quality and safety must be maintained by handling, processing, and packaging (5).

The article (6) proposed beneficial dry food for adult dogs that is nutritious, with a focus on Three criteria used to assess a dog's food: (i) for its nutritional content and adherence to dietary recommendations; (ii) for its comparability with other dog feeds; (iii) for its microbiological safety. All 36 of the evaluated dry dog food products met the Fédération Européenne de l'Industrie des Aliments pour Animaux Familiales (FEDIAF) minimal requirements for total protein and fat content. The study (7) determined the macronutrient profiles, fatty acid and amino acid profiles, and important mineral content of all vegan dog and cat food products offered on the Brazilian market and compared the findings to guidelines from FEDIAF and Association of American Feed Control Officials (AAFCO). Three dog diets and one cat food that is vegan were evaluated. Descriptively, the comparisons were made. The minimal macronutrient requirements were satisfied by all items. There was no mention of archive acid on any food label. One dog food had low calcium. Another had low potassium and a third had common salt following the FEDIAF standards. The research (8) examined the blood parameters of dogs given diets containing increasing amounts of spray-dried pig plasma (SDP) to assess the food's taste, digestibility, and blood parameters. Additionally, they wanted to determine how well dogs could ingest SDP. In three tests, they utilized 36 dogs. Eight adult Beagles were divided into two groups of four in a double Latin square design for the digestibility experiment. The following diets underwent evaluation: SDP of 0, 4, 8, and 12%. Twenty adult canines were used in the palatability testing. Diets with SDP content of 0% and 4% were contrasted pair-wise. Eight adult Beagles had their blood parameters assessed. The article (9) examined the ingestion, evident nutritional digestibility coefficients, and faecal output of protein sources (chicken offal, soybean, and other meals) in adult dog diets, as reported in published publications. The indexing databases for Science Direct, Publications Medline (PUBMED), Scientific Electronic Library Online (SciELO), and Agricultural Science and Technology (AGRIS) were searched in August 2018 for relevant articles. Digestibility, source protein, and "dog" were used as the major input phrases in the literature search, along with other terms, to widen its coverage. There are established standards for articles' readability, exclusion, and inclusion. The study (10) determined five test diets with equal macronutrient composition were provided to various cohorts of normal-weight dogs for ten days: a chicken-based extruded dry kibble diet, beef, pork, or turkey-based fresh food. Fecal samples were obtained for nutritional analysis, and daily food consumption and fecal features were documented.

The article (11) proposed to analyze the in-vitro nutrient digestibility and quality of dog meals with 2.5% and 15% maize fiber and 15% rice gluten and compare them to commercial dog food for nutritional value and physical quality. After diet standardization, raw diets were treated by boiling and extrusion. Boiling feed reduced diets' ether extract content. In-vitro dog food analysis involved two incubation phases: first, a simulation of gastric digestion at 39 °C for two hours in Hydrochloric (HCl) Acid solution with pepsin and gastric lipase enzyme; second, a simulation of small intestine digestion at 39 °C for four hours in phosphate buffer solution with pancreatic and bile salts. According to statistical research, boiling the food decreased the ether extract's in-vitro digestibility. The research (12) determined that the techniques for adding zinc to complete meals for pets may be developed with information on zinc requirements and indications for zinc status. In addition, it describes how a changing zinc level may cause diseases in dogs and the role that zinc plays in canine health. The article (13) examined the evolution of the Minimum Requirement (MR) and in vitro digestibility of two wet canine diets designed with complete and hydrolyzed protein concerning extruded characteristics and extrusion processes. Lowering the hotness and wetness caused the dog diets to have greater lysine; both total and reactive levels reduce (Minimum Required Performance) MRPs; in contrast to MRPs, comprehensive and reactive lysines are positively affected by increasing screw speed. The presence of MRPs and the differential between reactive and total lysine are more influenced by the raw ingredient mix than by the extrusion of the component mix.

The research (14) proposed replacing synthetic antioxidants, making dog food with natural antioxidants a combination of essential oils and vitamin E), and evaluating the impact on food preservation and animal health. Antioxidants were introduced during the food production oil bath stage, which took place in a commercial plant. Ten adult beagle dogs were used, and they were split into two groups: the control group, which received a diet high in the synthetic antioxidant butylhydroxytoluene, and the test group, which received a diet high in the natural antioxidant blend of clove, rosemary, oregano, and vitamin E. There were no treatment effects for body weight when the dogs were weighed at the start and conclusion of each study period. The study (15) determined utilization over a long period and the presumed relative safety of full canine meals against oxidation. To the best of my knowledge, this is the first presentation that examines the applicability of utilizing the approach; they can assess the oxidative stability of dry dog food. The research (16) proposed that starch source effects were seen in 11 healthy adults Siberian Huskies fed commercial extruded dog diets. Conventional, grain-free, whole-grain, and vegan diets were tested. In a randomized, partially repeated Latin square design, dogs received one serving of each diet, two of glucose control, and one of paracetamol as a Gastro esophageal Reflux (GER) marker. Pre and post-prandial blood samples were taken at 15–480 minutes. GER parameters were determined by fitting serum concentrations into a mathematical model using standard spectrophotometric tests. Time, treatment, and dog were Analysis of Variance (ANOVA's) fixed variables and random effects. Grain-free dogs exhibited higher overall emptying and faster emptying. The study (17) examined precision-fed customized and traditional rooster testing on the amino acid

(AA) digestibility and nitrogen-corrected real metabolizable energy of softly prepared vegan dog food. They put three popular brands to the test. Two were vegetarian/vegan dog meals modified very little for human use (the Bramble Cowbell and Bramble Roost diets, respectively) while the third was an extruded chicken and brown rice recipe diet. All three diets, including the two moderately cooked meals, were pulverized before being used in the rooster tests.

The article (18) proposed to assess the nutritional and sanitary quality of German Raw Meaty Bone Diet (RMBD). RMBDs were evaluated for crude nutrients in contrast to stated levels. The MR for planned types and phases of life was compared to chosen minerals in full RMBDs. Aerobic colony count (ACC), as well as Enterobacteriaceae, to evaluate commercial RMBDs' cleanliness, whereas goods were tested for Salmonella. The paper (19) examined a description of Commercial dry feed (CDF's) aflatoxins (AF), fungus, and typical manufacturing supplies. Clinical signs, macroscopic and microscopic lesions, and the processes and pathogenic effects of AF in dogs are detailed. Alternatives for diagnosing, treating, and managing AF in CDF include biomarkers of effect, blood coagulation improvement; AF elimination rate, secondary infection control, gastric mucosa protection, oxidative stress reduction, maximum allowable levels, biocontrol, grain-free CDF, sequestrants, and chemoprotection are some of the options. The research (20) determined a result of The effects of various wet and dry types of premium class (PC) and economy class (EC) business dog feeds being kept at different temps (+4 °C, +21 °C, +40 °C) and storage periods on the fatty acid profile and oxidation parameters. Dry Foods showed lower levels of Photovoltaic (PV) and Mean Difference Analysis (MDA) at the time of purchase compared to wet foods (p.001). European Commission (EC) wet foods had greater MDA concentrations at purchase than damp PC dog feeds. At the time of sale, dog food had higher levels of oleic acid and docosahexaenoic (DHA) than EC dog food. In Ibadan, the most often purchased commercial dry dog foods were examined for their nutritional and calorie content. On the labels of most feeds, no particular nutritional content values are listed.

Materials and Methods

Ibadan, located in Nigeria, is where the purchase of six different kinds of dry dog food was made. These businesses were responsible for the majority of the sales of dog food in the region. The amount of food was purchased three times to decrease the risk of obtaining an amount not indicative of the whole. They were each given a set of code letters to identify themselves with to conceal the manufacturer's identity. Most dog food manufacturers did not expressly state on the packaging whether or not the level of nutrients was sufficient in Figure (1).

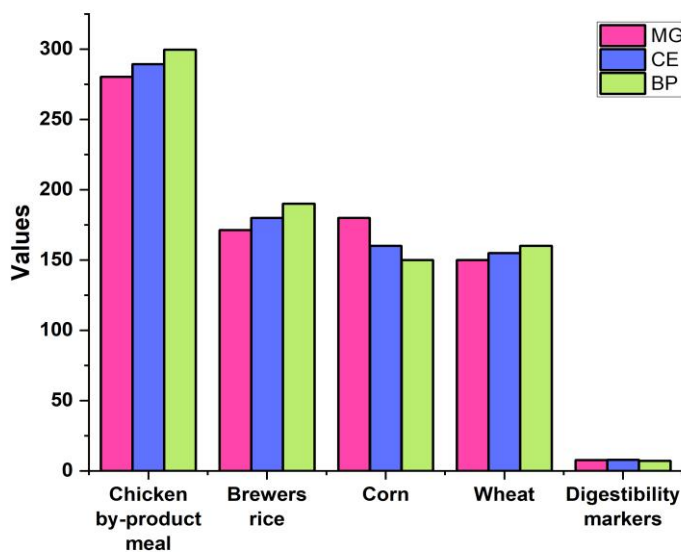


Figure (1): Nutrient Content

Table (1): Nutrient Composition

Diet	Milligram (MG)	Crude Extract (CE)	biological value of protein (BP)
Chicken by-product meal	280.3	289.3	299.6
Brewers rice	171.2	180	190
Corn	180	160	150
Wheat	150	155	160
Digestibility markers	7.6	7.9	7.2

Table (1) shows the term "nutrient composition" describes the quantitative and qualitative examination of the different nutrients included in a given food or dietary supplement. Aliquots (about 50 grams) from each bag were mixed in separate sample vials so that a proximate analysis and a determination of the concentration of both macro- and micro-minerals could be performed. The following were computed: gross energy, crude protein, crude fat, crude fiber, ash, moisture, and nitrogen-free extract. Microminerals such as iron, copper, manganese, zinc, and selenium, and macrominerals such as calcium, phosphorus, potassium, sodium, and magnesium had their concentrations determined. Two separate judgments were made in the examinations of the diets that were conducted relatively recently. After calculating the mean and standard deviation of the data from the proximate analyses, we utilized the Student's t-test to determine whether or not there were statistically significant differences between the different brands at a threshold of $p < 0.05$. Because there are no

national baseline statistics in the country, the results of chemical testing were also compared to the basic nutritional values of the American National brand.

Results

The findings (mean and standard deviation) for the nutritional makeup of the analyzed diets are shown in Table (2) and Figure (2), respectively. Also included are the mean values for the National brand of the United States. The different nutritional metrics have been given on a dry matter basis so that they may be compared to the values associated with the National brand.

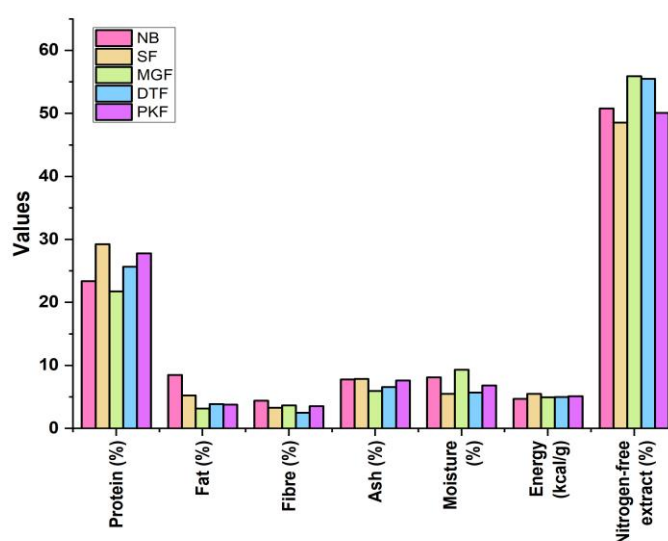


Figure (2): Dry ingredients

Table (2): Ingredients as dry matter basis

	NB	SF	MGF	DTF	PKF
Protein (%)	23.41	29.24	21.78	25.67	27.8
Fat (%)	8.49	5.26	3.16	3.86	3.79
Fibre (%)	4.41	3.29	3.68	2.51	3.54
Ash (%)	7.79	7.88	5.94	6.59	7.64
Moisture (%)	8.12	5.51	9.31	5.69	6.84
Energy (kcal/g)	4.72	5.508	4.966	5.007	5.138
Nitrogen-free extract (%)	50.81	48.56	55.94	55.51	50.11

The six different brands that were analyzed showed vast disparities in the amounts of practically every nutrient despite the fact that there were no statistically significant differences at the p 0.05 level. The average amounts of protein and total calories in all of the items were much greater than those found in the National Brand. However, in contrast to the

National brand, these products included a lower amount of fat and fiber. The National brand had higher moisture content levels than the other three brands (PKF, DTF, and SF), which had lower moisture content levels. Only two of the products, PKF and SF, had ash contents comparable to those found in the National brand; the other products had lower levels. Except for one of the products, the rest of the items had a concentration of nitrogen-free extractives that was on par with that of the National brand. The only city with somewhat higher scores was San Francisco. The calcium and magnesium levels in the products were about the same as those found in the national brand. Two of the items, namely DTF and MGF, exhibited lower amounts of phosphorus when contrasted with the national brand's offering. Compared to the National brand, the potassium content of the other three brands (DTF, MGF, and NB) in Table (3) and Figure (3) was only slightly lower than the quantity found in the National brand.

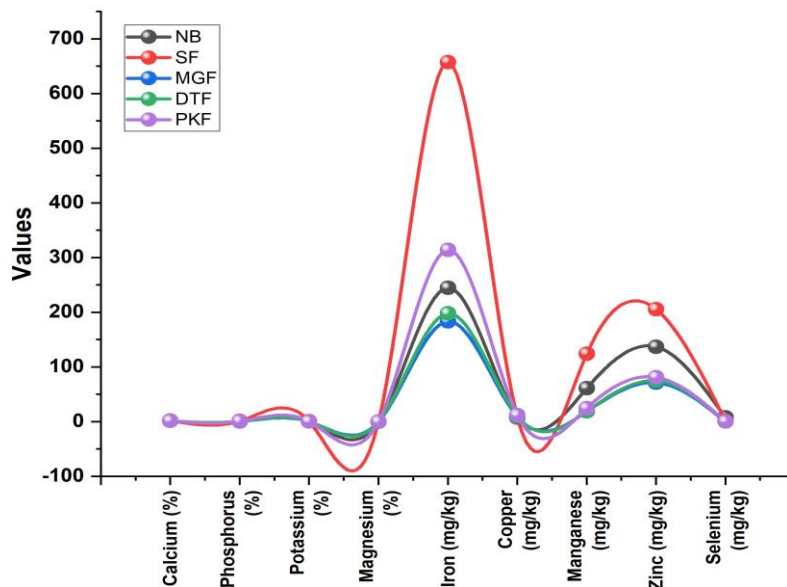


Figure (3): Different dog food nutrients

Table (3): Different dog foods in Nutrient Composition

	NB	SF	MGF	DTF	PKF
Calcium (%)	1.32	2.06	1.3	1.24	1.49
Phosphorus (%)	0.82	1.26	0.56	0.8	0.94
Potassium (%)	0.51	0.76	0.33	0.43	0.56
Magnesium (%)	0.18	0.31	0.11	0.18	0.25
Iron (mg/kg)	245	657.55	183.52	198.21	314.3
Copper (mg/kg)	8.6	7.28	8.62	10.116	11.96
Manganese (mg/kg)	61.42	124.28	18.84	19.14	24.74

Zinc (mg/kg)	137	205.54	71.44	74.84	81.54
Selenium (mg/kg)	7.68	0.94	0.23	0.23	0.46

All of the dog feeds examined, with the exception of one SF, had considerably lower levels of the micronutrients (Fe, Mn, and Zn) than those for the National brand. These micronutrient values in SF were unusually greater than in the other brands and the National brand. All of the items evaluated had greater copper content than the National brand. Only SF revealed a significantly lower copper concentration. Any of the items did not meet the National brand requirement for selenium content.

Discussion

The data collected demonstrates that although producers of dog food appear to pay some attention to adding sources of protein and energy that could meet the required standard, they seem to place very little importance on the concentration of micronutrients, as indicated by the extremely low levels of Fe, Mn, Zn, and Se. This is the case despite the fact that producers of dog food appear to pay some attention to adding sources of protein and energy that could meet the required standard. The decreased fat contents were likely detected due to the samples not having been acid-hydrolyzed before extraction. A person who analyzed several dog food brands sold in the United States using the same methods also came to the same conclusion. On a dry matter basis, dog food should have no less than five percent of its total calories from fat. When formulating these diets, the manufacturers of the investigated dog food brands did not stick to specific values. This is supported by the fact that there was a large variation in the mean amounts of the various nutrients found in each of the brands. Because many of the products lack label definitions of their nutritional profiles, it was unable to compare the findings from the examination of the labels with the numbers obtained from the analysis conducted in the study. As a result, the relevant authorities must guarantee that the pet food industry is appropriately controlled to ensure that manufactured dog meals are risk-free. Both Akinrine and Akinrinmade give comprehensive details on the nutrients included in their products to protect the best interests of the people who purchase them.

Conclusions

It is essential to keep in mind that even if there may not be conclusive proof that a certain diet can provide all of the necessary nutrients for all animals in all situations, To ensure that this condition is never encountered, it is the consumer's responsibility to purchase pet food products with a nutritional sufficiency that, for the most part, is in line with the recommended levels. In addition, the use of nutrient profiles to support nutritional claims about pet food may not be as trustworthy as the results of feeding tests. Dietary profiles cannot assess the acceptability of nutrition, its digestibility, its palatability, or any other factors as efficiently as feeding tests can. In order to more accurately evaluate the nutritional sufficiency of the products that have been chosen, it is recommended that more research, including trials of digestibility and growth, be carried out.

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