

ASSESSMENT OF DIGESTIBILITY AND FECAL SCORE OF RAW MEAT-BASED DIET (B.A.R.F.) IN DOG FEEDING

Andrei Radu SZAKACS⁴, Cristina STEFĂNUȚ¹,
Sorana MATEI¹, Beniamin-Ionel BORZ¹, Adrian MACRI¹

e-mail (first author): andrei.szakacs@usamvcluj.ro

Abstract

The aim of this study was to determine digestibility in the B.A.R.F (Biologically Appropriate Raw Food) diet. The study was performed on a number of 5 dogs, from which fecal samples and a sample of their ration were collected over a period of 5 days. Some of the reasons for owners to choose this diet were: longer and healthier life, lack of dental tartar, no smell of the oral cavity, the appearance of fur, solving dermatological problems, lower fecal volume and lower defecation frequency, more energy and less expensive. One of the benefits of the BARF diet is the reduced volume of feces, due to optimal digestion and high absorption. Once one makes the switch to the BARF diet one will notice that their pet will defecate less and its consistency will be compact, dark in color. Exceptions occur when the diet is not properly balanced. Following the determination of the digestibility of the BARF diet in dogs, we obtained high values especially for protein (96.55%) and fat (99%). The value obtained for mineral substances of organic origin was also high (54%). We consider that the high digestibility is due to a very good adaptation of the digestive tract to the natural ingredients used in the diet.

Key words: B.A.R.F. diet, dog, digestibility, fecal, score.

INTRODUCTION

B.A.R.F. (Biologically Appropriate Raw Food) is a diet based on raw foods. We are talking about a diet for dogs and cats that has evolved over a million years of genetic adaptation. The “BARF Program” was first introduced to the world in 1993 through the first book, “Give Your Dog a Bone,” written by Ian Billinghurst, a graduate veterinarian at the University of Sydney, Australia, in 1976. The diet was accepted easily by animal owners but also by kennel breeders. In recent years it has become widespread among users of industrial feed. Owners have become increasingly concerned about the health of their animals, encountering more and more degenerative diseases have become alarmed and have successfully adopted the “program”. And because this diet is based on the nutrition that our animals have had for millions of years, for them it is not a novelty, it is not a radical change. In fact, it is a return to a proper organic food system, abandoned 60-70 years ago, when industrial food grew. Why is the evolutionary diet so “magical”? Simple ... Because as any apparatus that works properly if it is supplied with fuel or spare parts recommended by the manufacturer, so do animals are adapted to specific feedstuff. Therefore they need an “evolutionary” diet because it is the one recommended by the “producer”, ie their digestive

system, their body, their nature, namely that of carnivore. It is a diet able to improving health, longevity and productive capacity. (Billinghurst I, 2001) 10-15% of the dog's diet should consist, according to BARF diet, of entrails or internal organs such as liver, kidneys, heart, brain, tongue and lungs. They must be fresh and raw. It must come from a reliable source and not contain parasites. Raw organs are a valuable source of nutrients, including water, protein, essential fats, vitamins and enzymes. (Reinerth S, 2015). The most important organs are the heart and liver. The liver should not exceed 5% of the total organs (very important) being an organ rich in vitamin A, we can reach a excess of vitamin A. Ex: if a dog eats 600g a day, it should have a meal of fish in the amount of 480g, which will be joined by vegetables in the amount of 120g or sweet potatoes boiled in the same amount. A full 100% meal with fish can be administered once a week. It can be administered whole, but it needs to be frozen before, at least 96 hours, to kill most parasites, the most common being the ones from *Genus Anysakis* (Billinghurst, 2017; Mihaiu, 2015).

Transition to the B.A.R.F. starts with a day of fasting before introducing the new diet, to give

⁴ University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

the body time to eliminate the toxins accumulated from the previous diet. Another reason for opting for fasting day would be to speed up the increase in stomach acidity, acidity that helps digest raw foods. A protein test is performed (a single protein for 2-3 days), in the first days, to detect possible intolerances to a certain protein; intolerance that we will notice through diarrhea or vomiting. In this case, we will eliminate the protein from the diet. Once the proteins have been tested, small amounts of fleshy, soft bones are introduced initially. If the animal reacts well, only then will we be able to integrate the organs (for a week), to which the belly will be added later (the next week) and finally the vegetables or fruits one type each.

Each dog has its own requirements based on age, activity, weight and other personal factors (Case, 2010). For a healthy dog, with a normal physical activity, which has reached maturity, 3% of its ideal weight will be calculated; that is, to the maximum shape. No organs are given to a beginner dog in BARF (if the diet started only a few days ago) because they have a slightly laxative effect. The belly in the BARF diet has a probiotic role, being rich in bacteria and enzymes that help digestion. It is given in the amount of 10% of the total daily food of the dog. You can give a belly of lamb, beef or sheep. If there is no green belly, its amount will be replaced with lean meat, and the role will be assumed by kefir (one tablespoon for every 10 kg of dog weight).

MATERIAL AND METHOD

The study had the following objectives: determining the digestibility of dogs fed the B.A.R.F diet and assessing the fecal score. The biological material was represented by 5 dogs, 3 males and 2 females, aged between 1 and 6 years. BARF diets, administered to the dogs studied over a 5 day collection period (control), consisted of a wide range of foods (*table 1*). The raw chemical composition of the diets was determined using the Weende methodology. The apparent digestibility coefficient (ADC) for dry matter, crude protein, crude fat, crude ash and nitrogen free extract (NFE) were calculated (Macri, 2014).

$$\text{ADC \%} = \frac{\text{intake-excretion}}{\text{intake}} \times 100$$

The coproparasitological examination was performed to monitor the presence of oocysts, protozoan cysts, oncospheres and trematode eggs. The method used for parasitological examination was flotation. After examining the preparations under a microscope, they came out negative, digestibility trial not being affected by parasitic

influence. The fecal score was also determined, observing: feces with undigested bone fragments, feces too hard, cementitious or crumbly, feces too soft, gelatinous feces (with mucus). Fecal score was assessed according to Purina ProPlan® Veterinary Diets diagram of the fecal score and characteristics of the nutritional management of GI Canine Health. (www.proplanveterinarydiets.ca). Assessment of dog appearance and behavior: fur, breath smell, teeth, alertness was done using a questionnaire that the owners fill at the end of our study.

RESULTS AND DISCUSSIONS

The analysis of the BARF diet administration, we mention that the owners observed a positive effect on their health. In this context, we mention the improvement of the appearance of the fur, the disappearance of bad breath and a cleaner appearance of the teeth. It was also observed a reduction in the amount of feces, which can be correlated with increased levels of digestibility. Effects on the nervous system were observed, manifested by increased alertness and agility. The results of the fecal score and some characteristics for each dog are presented in table 2. In Table 3, the apparent digestibility coefficient (ADC) is presented, observing higher values of in protein and fat, compared to commercial food. In our study for dogs that followed the BARF diet feedstuffs presented values between 90.6% - 98.51% for crude protein and 98.63% - 99, 61 % for crude fat (*table 3*). ADC for dry matter was between 85.68 % - 91.18%. Daumas studied the digestibility of different commercial diets in dogs. For apparent digestibility, the range of crude protein and crude fat values was 66.9 % - 84.4% DM 70.4 % - 82.5% crude protein and approximately 95% for crude fat. In another study, Hagen-Plantinga et al. (2014) determined the apparent digestibility of 89 % crude protein and 94-97 % crude fat and in dog that were given commercial diet 76% -89% crude protein and 94%-97% crude fat. The average values obtained for the apparent digestibility of dry matter, crude fat, and nitrogen are 77%, 94% and 78%. Meyer et al (1999) presented similar results for digestibility of commercial diets. Apparent digestibility of the organic matter was 88.9 % FOR dry diet, without detectable breed differences. Up to 88.2% was the crude protein digestibility and (84.9–89.4%) for the canned food. Though a high digestibility has shown the crude fat (93.8 and 96.4%) similar in all studied breeds. It should be noted that the study was limited. Dogs differ in breed, age, weight. Both the breed and the difference between environmental conditions (type

of diet, daily effort, his habits, and the owner) play a significant role in the results. According to literature, the collection of feces is done over period of five days, obtaining a representative sample. A shorter collection period will not be significant. The mean frequency of defecation ranged between 1,2 and 1.4 during our study which can be considered normal. Every animal had a minimum of 1 stool per day so no constipation was reported. In the Meyer et al (1999) investigation the frequency of defecation was between 1 and even 2.7 for canned diets.

Feces score was appreciated to be between 1 and 2, with an average of 1.2.

Fecal score evaluated by Felix et al. (2010) in a 1 to 5 scale as: 1 = very soft feces to 5 = shaped, dry, and hard feces according to SÁ-FORTES (2005) was higher for dogs fed a diet supplemented with *Bacillus subtilis* (C-3102) (3.4 vs. 3.0) than dogs fed with the control diet.

CONCLUSIONS

The BARF diet showed a high digestibility due to the better adaptation of the digestive tract to this type of food. Average fecal score was 1.2.

REFERENCES

- Billinghurst I., 1993** - *Give Your Dog a Bone: The Practical commonsense way to feed dogs for a glong healthy life.* Warrigal Publishing, Aaustralia
- Billinghurst I., 2001** - *The BARF Diet: Raw Feeding for Dogs and Cats Using Evolutionary Principles, Paperback* - Warrigal Publishing, Aaustralia
- Billinghurst, 2017**, *Parasites in Raw Meat;* Veterinara, Editia a 10-a, Editura Medicala Callisto;
- Case L. P., Leighann D., M.G. Hayek, M. F. Raasch, 2010** - *Canine and Feline Nutrition*, 3th Edition, Editura Mosby Elsevier;
- Daumas C., B-M. Paragon, C. Thorin, L. Martin, H. Dumon, S. Ninet, and P. Nguyen 2014** - *Evaluation of eight commercial dog diets.* J Nutr Sci. 2014; 3: e63
- Félix A. P.; M V.T. Netto; F. Y. Murakami; C. B. Marcon de Brito; S. Gisele de Oliveira; A. Maiorka, 2010** - *Digestibility and fecal characteristics of dogs fed with Bacillus subtilis in diet.* Animal Production • Cienc. Rural 40 (10)
- Hagen-Plantinga E.A. , G. Bosch and W. H. Hendriks, 2014** - *Practical approach to determine apparent digestibility of canine diets.* Journal of Nutritional Science, vol. 3, e31, page 1-4
- Macri A.M., Szakacs A.R., 2014.** *Animal nutrition handbook of practical activity,* AcademicPres, Cluj-Napoca;
- Meyer H., J.Z. Entek, H.H. Bernoll and I. Maskell, 1999** - *Digestibility and compatibility of mixed diets and faecal consistency in different breeds of dog.* J. Vet. Med. A 46, 155–165
- Mihaiu M., 2015**, *Inspectia si controlul alimentelor de origine animal.* Risoprint, Cluj-Napoca;
- Reinerth S, 2015**, *Natural dog food, Raw Feeding for Dogs: A comprehensive guide to healthy dog nutrition,* Editura BoD;
- SÁ-FORTES, C.M.L. 2005** - *Valor nutricional de ingredientes energéticos e protéicos para cães.* 82f. Tese (Doutorado em Zootecnia) - Universidade Estadual Paulista, Jaboticabal, SP
www. proplanveterinarydiets.ca/wp-content/uploads /2016 /04/PPPVD-Fecal-Scoring-Chart-EN-FINAL.pdf

Table 1

Combinations of feedtufts used during the study

		Dog 1 – 600g	Dog 2 – 690g	Dog 3 – 540g	Dog 4 – 510g	Dog 5– 540g
Day 1	Meat with bone- 270g	Turkey	Chicken	Duck	Rabbit	Chicken
	Meat without bone - 150g	Rabbit	Cattle	Zucchini	Chicken	Turkey and duck
	Legumes / Fruits – 60g	Apple	Carrot	Zucchini	Zucchini	Apple, carrot and zucchini
	Organs – 60g	Cattle and duck	Rabbit	Cattle and duck	Cattle and duck	Cattle and lamb
	Stomach – 60g	Cattle stomach	Cattle stomach	-	-	Shrimp
Day 2	Meat with bone - 270g	Rabbit	Duck	Turkey	Salmon	Chicken
	Meat without bone - 150g	Duck	Chicken	Cattle	Duck	Turkey and duck
	Legumes / Fruits – 60g	Carrot and cucumber	Cucumber	Pear	Carrot	Spinach and parsnip
	Organs – 60g	Cattle and turkey	Cattle and chicken	Cattle and chicken	Cattle and chicken	Chicken and lamb
	Stomach – 60g	Cattle stomach	Cattle stomach	-	-	-
Day 3	Meat with bone - 270g	Chicken	Rabbit	Baby Herring	Duck	Chicken
	Meat without bone - 150g	Sheep	Sheep		Cattle	Chicken
	Legumes / Fruits – 60g	Pear	Apple		Kiwi and pear	Pear
	Organs– 60g	Rabbit	Cattel and turkey		Cattle and duck	Cattle and lamb
	Stomach – 60g	Cattle stomach	Cattle stomach		-	-
Day 4	Meat with bone - 270g	Salmon	Hake fish	Chicken	Chicken	Duck
	Meat without bone - 150g	Turkey		Duck	Turkey	Duck and chicken
	Legumes / Fruits – 60g	Spinach and zucchini		Apple	Cucumber	Arugula, cucumber and parsley
	Organs – 60g	Cattle and sheep		Cattle and turkey	Cattle and duck	Chicken and lamb
	Stomach – 60g	Cattle stomach		-	-	-
Day 5	Meat with bone - 270g	Duck	Turkey	Rabbit	Chicken	Duck
	Meat without bone - 150g	Cattle	Cattle	Cattle	Cattle	Chicken
	Legumes / Fruits – 60g	Banana and kiwi	Spinach and cucumber	Zucchini	Apple	Beet and zucchini
	Organs – 60g	Cattle and chicken	Cattle and duck	Cattle and chicken	Cattle and chicken	Cattle and lamb
	Stomach – 60g	Cattle stomach	Cattle stomach	-	-	-

Table 2

The results of the fecal score and some characteristics for each dog

Dog 1 (male)	Day1	Day 2	Day3	Day 4	Day 5
Fecal score	1	1	2	1	1
Fecal volume	Small	Small	Small	Small	Small
FOD	1 / day	1 / day	2 / day	2 / day	1 / day
Dog 2 (female)	Day1	Day 2	Day3	Day 4	Day 5
Fecal score	1	1	1	1	1
Fecal volume	Small	Small	Small	Small	Small
FOD	1 / day	2 / day	1 / day	2 / day	1 / day
Dog 3 (female)	Day1	Day 2	Day3	Day 4	Day 5
Fecal score	1	1	1	2	1
Fecal volume	Small	Small	Small	Small	Small
FOD	1 / day	1 / day	1 / day	1 / day	2 / day
Dog 4 (female)	Day1	Day 2	Day3	Day 4	Day 5
Fecal score	2	2	1	1	1
Fecal volume	Small	Small	Small	Small	Small
FOD	1 / day	1 / day	1 / day	2 / day	1 / day
Dog 5 (male)	Day1	Day 2	Day3	Day 4	Day 5
Fecal score	1	1	2	1	1
Fecal volume	Small	Small	Small	Small	Small
FOD	1 / day	1 / day	2 / day	2 / day	1 / day

FOD= frequency of defecation

Table 3

Apparent digestive coefficients in the BARF diet

Dog	Dry matter	Crude protein	Crude fat	Crude ash	NFE
1	85,68	90,60	99,61	49,01	69,36
2	89,42	97,80	99,14	63,01	52,29
3	88,73	98,12	98,63	68,06	48,87
4	86,35	97,74	99,51	48,88	41,70
5	91,18	98,51	98,98	66,97	58,19