



Comparative Evaluation of Vegetarian and Meat Based Dry Pet Food on Palatability, Food Intake and Growth Performance in Growing Nondescript Female Dogs

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ABSTRACT

A study was undertaken to compare and evaluate vegetarian and meat based dry pet food on palatability, food intake and growth response by growing non-descript dogs. Twelve growing non-descript female dogs were randomly divided into two experimental groups of six dogs each, fed with vegetarian and meat based complete dry pet food, respectively for twelve weeks period. Palatability, daily dry matter intake (DMI), daily digestible crude protein (DCP) intake, weekly body weights and weekly body weight changes were recorded during the experimental period. The palatability of meat based pet food was found to be better than vegetarian diet. No significant difference ($P>0.05$) was observed in dry matter intake between the two groups, however, there had a significant difference in digestible crude protein intake as well as feed intake per kg gain. Dogs from meat based group weighed constantly more (6.8%) at the end of experiment than the dogs of vegetarian group. The type of diet had significant ($P\leq 0.05$) effect on average weekly body weights, indicating that meat based group had significantly higher body weight at the end of experiment. At the end of experiment, dogs from meat based group gained about 41.80% more body weight gain as compared to the dogs of vegetarian group. Here, the type of diet had highly significant ($P<0.01$) effect on average weekly gain in weights, indicating that the dogs receiving meat based diet gained significantly higher weights than those receiving vegetarian diet. However, in terms of economics, meat based diet was little costlier than vegetarian diet.

Keywords: Digestible crude protein intake, Meat based dry pet food, Non-descript, Palatability, Vegetarian dry pet food

Food is the most essential element for health and well being of the dogs. A well balanced prepared dog food is excellent for dog's health and growth. It's the utmost responsibility of every dog owner to provide the dog with sufficient amount of nutrition for good growth. Balanced foods can make a dog happy just like in humans. Dogs belong to order carnivore, but domesticated dogs have been well adapted to omnivorous feeding habit with an ability to break down carbohydrate feeds (Mobley *et al.*, 2013). Many dog owners are confused by the variety of dog foods available in the market like vegetarian and non-vegetarian pet food. In fact, pet owners who choose to feed their pets a vegetarian diet is due to the ethical fact that they themselves are vegetarians (Wakefield *et al.*, 2006). It is always become easier for the individual

dog owners to maintain the dogs on the food materials commercially prepared rather than preparing special food in home for dogs. Hence, most of the pet owners enjoy the convenience of the commercial dry pet foods because they are able to buy in large quantities at a time and the food store well because of its low moisture. Unlike cat, dogs are not solely dependent on animal tissues but they can also survive well on plant origin food to meet their nutrient requirement. However, during preparation of companion animal's food we must keep in mind regarding owner's perception, food palatability with all balanced nutrients (Hendriks *et al.*, 2000). Keeping this view, in mind, two types of dry pet foods were evaluated i.e. Vegetarian and meat based dry pet food, containing plant and animal origin food, respectively. Hence, the present study was



undertaken to compare and evaluate vegetarian and meat based dry pet food on palatability, food intake and growth performance in growing nondescript female dogs.

MATERIALS AND METHODS

The experiment was carried out in the Department of Animal Nutrition, Bombay Veterinary College, Mumbai, Parel, Maharashtra, India-400012.

Experimental animal, experimental design and experimental food

Twelve apparently healthy non-descript female dogs were randomly divided into two experimental groups of six dogs each i.e. Group I and Group II which were fed with vegetarian and meat based complete dry pet food, respectively for a twelve weeks period. Soya atta and pork liver was the major source of protein for vegetarian and meat based dry pet food, respectively (Table 1). The foods were got prepared from M/s Vega Industries Ltd., Vasai, Maharashtra and were similar in chemical composition (Table 2).

Table 1: Percent ingredient composition of vegetarian and meat based dry pet food

Ingredients	Vegetarian dry pet food	Meat based dry pet food
Wheat flour	51	56
Wheat bran	17.5	21
Soya atta	17.5	—
Pork liver	—	10.5
Sugar	2.4	2.4
Oil	6	1
Lard	—	3.5
Protein hydrolysate	2.6	2.6
Mineral and vitamin mixture	3	3
Total	100	100

Table 2: Average chemical composition (% DMB) of vegetarian and meat based dry pet food

Nutrients	Vegetarian dry pet food	Meat based dry pet food
Crude protein	19.44	19.84
Ether extract	10.55	10.93

Crude fibre	4.24	4.06
Nitrogen free extract	61.35	60.86
Total ash	4.42	4.31
Acid insoluble ash	0.72	0.61
Calcium	0.93	1.02
Phosphorus	0.61	0.73
Salt (NaCl)	0.65	0.65
Calculated ME value (Kcal/kg)	3725	3750

Housing, experimental feeding and measurement

The dogs were housed with proper ventilation and were kept in separate kennels with two dogs in each. Regular deworming and vaccination programme was undertaken before the start of experiment. The dogs were offered *ad libitum* food and fresh drinking water for twelve weeks. Daily dry matter consumption, daily DCP intake, weekly body weight and weekly body weight changes were recorded during the experimental period.

Digestibility trial

At the mid of experiment, a digestibility trial of seven days duration was conducted by total collection method by taking two dogs from each group. The proximate analysis of food and faecal samples was done as per A.O.A.C. (1995). Minerals were estimated as per Talapatra *et al.* (1940).

Statistical analysis

Statistical analysis was carried out by applying student's 't' test as described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Chemical composition of food and palatability

The average chemical composition (% DMB) of vegetarian and meat based dry pet food has been presented in Table 2. During the entire experimental period it has been observed that the growing dogs from the meat based dry pet food group consumed the offered food within 12 minutes of offering whereas the vegetarian dry pet food group took a little longer time (18 minutes in finish their

quota). The present finding is in agreement with those of Joshi *et al.* (2007) who revealed that voluntary feed intake of vegetarian food by the experimental growing dogs was little slower than that of meat based diet. The plausible cause of slower intake of vegetarian diet might be due to strong affinity towards animal protein by the dogs (Levesque, 1999). Our present trial does not agree with that of Felix *et al.* (2012) who found that dogs demonstrated a preference for diets containing soybean meal, rather than diets containing poultry offal meal.

Effect of experimental diets on food intake

The average daily dry matter intake per growing dog was 213.34 and 233.49 g for vegetarian and meat based diet group, respectively (Table 3). However, the statistical analysis suggests that the type of diet had no significant effect ($P>0.05$) on average daily dry matter intake of the experimental growing dogs. The present finding is in agreement with those of Joshi *et al.* (2007) who revealed that protein sources from vegetarian diet may be sufficient enough to keep voluntary feed intake at par with meat based diet.

Effect of experimental diets on DCP intake

The average daily digestible crude protein (DCP) intake per growing dog was 29.29 and 34.75g for vegetarian and meat based diet group, respectively (Table 3). This higher DCP intake was due to higher dry matter consumption as crude protein content was almost similar in both the experimental groups. The statistical analysis also suggests that the type of diet had significant effect ($P<0.05$) on average daily digestible crude protein (DCP) intake of the experimental growing dogs. The present findings are in

agreement with those of Nap *et al.* (1993) who observed significant differences in average body weights of Great Danes puppies due to differences in protein intake. In contrast to present findings, Joshi *et al.* (2007) observed no significant difference in crude protein intake due to the type of experimental diets. Nevertheless, in the present trial, crude protein source from vegetarian diet was sufficient enough to keep protein intake at par the standards of AAFCO (2016).

Effect of experimental diets on body weight changes

Dogs from meat based diet group weighed constantly more (6.8%) at the end of experiment as compared to the dogs receiving vegetarian diet (Table 3). The type of diet had significant effect ($P<0.05$) on average weekly live weights of the dogs, indicating that the dogs from meat based diet group had significantly higher body weights at the end of experiment than the vegetarian group.

Effect of experimental diets on daily energy intake

The average daily energy (ME) intake per growing dog was 794.72 and 878.13 kcal, respectively for vegetarian and meat based diet group. However, on statistical analysis, no significant difference ($P>0.05$) was noticed for total ME intake between the two groups. The total ME intake was increasing at a constant rate as the dogs were growing. Similar to the present trial, the same were reported by Reddy (2001) and Joshi *et al.* (2007).

Effect of experimental diets on body weight gain

The average daily gain was about 11.67 and 16.55 g on vegetarian and meat based dry pet food groups, respectively for growing dogs. Dogs receiving meat based

Table 3: Average values of body weight, weight gain, DMI, DCP intake and DMI/Kg body weight

Diet	Initial body wt.	Final body wt.	Avg. DMI/ Day (g).	Avg. ME intake/ Day (kcal)	DMI (kg)/kg gain	Average daily weight gain (g)	Avg. DCP intake/ dog/day (g)
Vegetarian dry pet food	6.23 ± 0.08 kg	7.21 ± 0.12kg	213.34 ± 12.14g	794.72 ± 45.23	18.58 ± 1.23kg	11.67 ± 0.06 g	29.29 ± 1.67g
Meat based dry pet food	6.31 ± 0.09 kg	7.70 ± 0.14 kg	233.49 ± 10.88g	878.13 ± 40.80	14.78 ± 1.21kg	16.55 ± 0.09 g	34.75 ± 1.61g
't' value		2.10*	1.24 NS	1.34 NS	2.24*	4.41**	2.36*

* Significant at 5%; ** Significant at 1%; NS means Non-significant.



food gained about 41.80% more weights as compared to the dogs receiving vegetarian diet (Table 3). Average daily gain in weight of 20 gms and 15gms in medium sized dogs at 2 months and 3 months of age, respectively, was reported by Meyer and Zentek (1989). However, during this trial more or less similar average daily gain in weights in meat based diet group was noticed.

There had a highly significant ($P < 0.01$) effect of treatment on average weekly gain in weights of dogs during the experimental period, indicating that the dogs receiving meat based diet gained significantly higher weights than those receiving vegetarian diet.

Effect of experimental diets on digestibility

A significant higher gain in weights and less dry matter intake/ kg body weight gain, observed in meat based diet group might be due to higher food consumption, ultimately high crude protein, energy intake, better quality protein and better digestibility of nutrients (Table 4). However, Moore *et al.* (1980) and Huber *et al.* (1994) observed no differences in apparent crude protein digestibilities in their experiments of vegetarian and non-vegetarian based diets.

Table 4: Average digestibility coefficients and digestible crude protein (DCP) content (% DMB)

Nutrients	Groups	
	Vegetarian Diet	Meat based Diet
Dry Matter	63.36	68.10
Organic Matter	66.94	71.76
Crude Protein	70.62	75.01
Ether Extract	86.37	89.53
Crude Fibre	21.68	28.42
Nitrogen free extract	67.83	67.46
Crude protein	19.44	19.84
DCP	13.73	14.88

Effect of experimental diets on economics

The cost of per kg vegetarian and meat based diet was ₹ 93.60 and 131.60, respectively. The total cost of feeding per dog during twelve weeks of experimental period was ₹ 1677.20 and ₹ 2580.68, for vegetarian and meat based diet group, respectively. The cost of feeding per kg gain of

body weight was ₹ 1711.56 and ₹ 1856.6 for vegetarian and meat based diet group, respectively. This indicated that the cost of feeding of meat based group was slightly higher than the vegetarian group.

CONCLUSION

A study was conducted to compare and evaluate vegetarian and meat based dry pet food on palatability, food intake and growth performance in growing nondescript female dogs. From the overall results of the study, it may be concluded that, the nutritional adequacy of a dog food diet, whether vegetarian or a non-vegetarian diet, must be based on the ability of the food to fulfill nutritional requirements with a consideration of palatability. The vegetarian diet was capable of keeping the voluntary intake of dogs at par with that of meat based diet. Moreover, the dogs of meat based dry pet food group performed better than the vegetarian group in terms of feed efficiency as well as muscular and skeletal growth. However, in terms of economics of feeding, the meat based diet was little costlier than vegetarian diet.

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