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Stool Characteristics of Obese Dogs Fed on Therapeutic Diets with Altered Levels of Protein and Fibre

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ABSTRACT: 24 Labrador retriever obese dogs of more than 3 years age were put in four different treatment groups. The percentage of crude protein and crude fibre of T_1, T_2, T_3 and T_4 diet were 15.74 % and 4.09 %; 21.90 % and 11.28 %; 21.73 % and 8.23 %; 15.72 % and 3.99 %, respectively. Including high fibre in the diet affects the stool characeristics. This study aimed to find out the safe level of fibre to promote weight loss without affecting the stool characteristics. The stool score was lowest in dogs in T_2 (2.16 ± 0.16 to 2.83 ± 0.16). The frequency of defecation had no significant difference among the treatments. The frequency of defecation was higher in T_2 with mean frequency of 1.66 ± 0.21 to 1.83 ± 0.16, when compared with other groups. The pH of the stools was significantly different between the treatments. Higher acidic pH was noticed in T_2 (4.91 ± 0.20 to 5.25 ± 0.17) followed by T_3, T_4 and T_1.The present study showed no incidence of diarrhea throughout the trial period in any group.

Keywords: High fibre, Stool score, dogs, defecation frequency, pH, Obesity.

INTRODUCTION

Fibre and Protein are the important macronutrients in the diet that are considered for weight loss in dogs. Canine obesity management mainly focuses on reducing energy consumption and increasing energy expenditure. Reduced energy consumption is mainly achieved through dietary modification of fibre and protein levels. High protein and fibre in a diet decreases the voluntary food intake, improves satiety and promotes weight loss (Weber *et al.,* 2007). Increasing the level of fibre in the diet increases the faecal volume and consistency. Barry *et al.* (2009) reported that including high level of fermentable fibres in the diet will not affect faecal score. Contradictorily, Faber *et al.* (2011) demonstrated the increased faecal score (i.e. looser stool) when dogs were fed with high-fibre diet (4 and 8 % in the diet).

Lopez *et al.* (2021) suggested that the dog fecal microbiota is influenced by protein and fiber composition to different degrees in individual animals.

The present study aims to demonstrate the stool characteristics of obese dogs fed with different levels of protein and fibre in the diet.

MATERIALS AND METHODS

Four different treatment groups *viz.,* Control (T_1) based on AAFCO recommendation of adult dog maintenance (2014), high protein high fibre group (T_2), high protein medium fibre group (T_3) and control group supplemented with choline chloride (T_4), were formed. The crude protein and crude fibre levels of T_1, T_2, T_3 and T_4 group were 15.74% and 4.09 %; 21.90 % and 11.28 %; 21.73 % and 8.23 %; 15.72 % and 3.99 %, respectively.

The observation on stool characteristics namely, subjective ratings, pH and frequency of defecation were recorded biweekly.

Frequency of defecation: The number of lumps voided by individual animal was recorded during morning and evening feeding by removing each times the earlier defecated material.

Stool ratings: On a scale of 1-5, the consistency of faeces voided by the animal was recorded as watery (1), runny with formed faeces (2), soft unformed (3) soft formed (4), and firm (5) as per Lewis *et al.* (1994).

Stool pH: The pH of the stool was recorded every fortnightly using digital pH meter (Eco Testr pH 1).

RESULTS AND DISCUSSION

Bi-weekly Scoring of stools, frequency of defecation and fecal pH of obese dogs fed with different therapeutic diets (Mean ± SE) are presented in Table 1.

Table 1: Scoring of stools, frequency of defecation and fecal pH of obese dogs fed with different therapeutic diets (Mean ± SE).

Bi-weekly stool characteristics	T_1	T_2	T_3	T_4
Scoring of stools				
First	3.33^{c}±0.21	2.16^{a}±0.16	3.16^{b}±0.16	3.33^{c}±0.21
Second	3.66^{c}±0.21	2.16^{a}±0.16	2.66^{b}±0.33	3.83^{d}±0.16
Third	3.83^{d}±0.16	2.66^{a}±0.21	2.83^{b}±0.16	3.83^{c}±0.21
Fourth	3.66^{c}±0.21	2.66^{a}±0.21	2.66^{a}±0.21	3.36^{b}±0.30
Fifth	3.33±0.21	2.66±0.21	2.83±0.16	3.36±0.30
Sixth	3.50^{d}±0.22	2.66^{a}±0.21	3.16^{b}±0.16	3.33^{c}±0.21
Seventh	3.83^{d}±0.16	2.83^{a}±0.16	3.00^{b}±0.25	3.33^{c}±0.21
Eighth	3.83^{d}±0.16	2.83^{a}±0.16	3.16^{b}±0.16	3.33^{c}±0.21
Frequency of defecation				
First^{NS}	1.33±0.21	1.66±0.21	1.50±0.22	1.33±0.21
Second^{NS}	1.33±0.21	1.66±0.21	1.50±0.22	1.33±0.21
Third^{NS}	1.33±0.21	1.66±0.21	1.50±0.22	1.33±0.21
Fourth^{NS}	1.33±0.21	1.83±0.16	1.50±0.22	1.33±0.21
Fifth^{NS}	1.33±0.21	1.83±0.16	1.33±0.21	1.33±0.21
Sixth^{NS}	1.33±0.21	1.66±0.21	1.33±0.21	1.33±0.21
Seventh^{NS}	1.33±0.21	1.66±0.21	1.50±0.22	1.33±0.21
Eighth^{NS}	1.33±0.21	1.66±0.21	1.50±0.22	1.33±0.21
Stool Ph				
First	6.00^{d}±0.18	5.08^{a}±0.15	5.41^{b}±0.08	5.75^{c}±0.21
Second	6.08^{dd}±0.20	5.16^{a}±0.10	5.41^{b}±0.08	5.83^{c}±0.24
Third	6.00^{d}±0.18	4.91^{a}±0.23	5.33^{b}±0.16	5.83^{c}±0.24
Fourth	6.08^{d}±0.20	4.91^{a}±0.23	5.41^{b}±0.15	5.91^{c}±0.23
Fifth	6.08^{d}±0.20	4.91^{a}±0.20	5.41^{b}±0.15	5.91^{c}±0.23
Sixth	6.00^{c}±0.18	5.00^{a}±0.18	5.41^{b}±0.08	6.08^{d}±0.20
Seventh	6.08^{c}±0.15	5.08^{a}±0.23	5.33^{b}±0.10	6.16^{d}±0.16
Eighth	6.25^{d}±0.17	5.25^{a}±0.17	5.41^{b}±0.08	6.16^{c}±0.16

Each value is a mean of six observations

Mean bearing different superscripts within a row differs significantly ($p<0.05$)

The stool score had no significant difference ($p>0.05$) among T_1 and T_4. Throughout the trial period, the stool score was lowest in dogs fed high protein high fibre diet (2.16 ± 0.16 to 2.83 ± 0.16). The dogs on high protein medium fibre diet had a score of 3.16 ± 0.16 at the completion of trial period, which is higher than T_2. The stool score was low in T_2 followed by T_3 throughout the trial period which could be due to inclusion of high fibre in the diet. These results are in concordance with the scores of 2.44 for low fermentable fibre diet and 2.50 for high fermentable fibre diets reported by Bosch *et al.* (2009) in obese dogs.

The frequency of defecation had no significant difference ($p>0.05$) among the treatments. Though the frequency was non-significant, it was higher in T_2 with mean frequency of 1.66 ± 0.21 to 1.83 ± 0.16, when compared to T_1, T_3 and T_4.These results are in agreement with Madhusudhan (2010) but no incidence of diarrhea was observed in the present study. The increased frequency was probably due to decreased sojourn because of increased intestinal motility in high fibre diet. Loureiro *et al.* (2017) asserted that the fecal output and number of defecations per day increased with increased fibre inclusion in animals.

The pH of the stools were significantly ($p<0.05$) different among the treatments. Higher acidic pH was noticed in T_2 (4.91 ± 0.20 to 5.25 ± 0.17) followed by T_3, choline supplemented diet and control diet (6.00 ± 0.18 to 6.25 ± 0.17). The improvement in pH at the later bi-weeklies indicated that the proliferating microbial population in the gut had become consistent. The low pH of stool was observed in T_2 diet and it could probably be due to the high fibre diet. The high fibre possibly increased gut bacterial activity that produced more short chain fatty acids (SCFA) and would have promoted a more acidic environment in the gut (Zimmer *et al.,* 2012).

CONCLUSION

The stool scores and pH were found to be significantly decreased in T_2 with no incidence of diarrhea with this level of fibre till the end of the trial. This study concludes that fibre level of up to 11.2 % can be safely included in the obese dog's diet without affecting its overall health status.

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Conflict of Interest. None.

REFERENCES

AAFCO (2014). Official publication of the Association of American Feed Control Officials. Inc., Atlanta, GA.

Barry, K.A., Hernot,D.C., Middelbos, I. S., Francis, C., Dunsford, B., Swanson, K. S. and Fahey Jr. G. C. (2009). Low-level fructan supplementation of dogs enhances nutrient digestion and modifies stool metabolite concentrations, but does not alter fecal microbiota populations. *J. Anim. Sci.*, *87*(10): 3244-3252.

Bosch, G., Verbrugghe, A. and Hesta, M. (2009). The effects of diet fibre type on satiety related hormones and voluntary food intake in dogs. *Br. J. Nutr.*, *102*: 318–25.

Faber, T.A., Hopkins, A. C., Middelbos, I. S., Price, N. P. and Fahey, G. C. (2011). Galactoglucomannan oligosaccharide supplementation affects nutrient digestibility, fermentation end-product production, and large bowel microbiota of the dog. *J. Anim. Sci.*, *89*(1): 103-112.

Lewis, L. D., Magerkurth, J. H., Roudebush, P., Morris Jr, M.L., Mitchell E. E. and Teeter, S. M. (1994). Stool characteristics, gastrointestinal transit time and nutrient digestibility in dogs fed different fiber sources. *J. Nutr., 124*: 2716S–2718S.

Loureiro, B.A., Sakomura, N. K., Vasconcellos, R.S., Sembenelli, G., Gomes, M. O. S., Monti, M. Malheiros, E. B., Kawauchi, I. M. and Carciofi, A. C. (2017). Insoluble fibres, satiety and food intake in cats fed kibble diets. *J. Anim. Physiol. Anim. Nutr., 101*(5): 824-834.

Madhusudhan, H. S. (2010). Evaluation of canine diets based on *In vitro* hindgut fermentation and fecal microbiota. Ph.D. thesis submitted to Karnataka Veterinary Animal and Fisheries College, Bidar.

Martínez-López, L. M., Pepper, A., Pilla, R., Woodward, A.P., Suchodolski, J. S. and Mansfield, C. (2021). Effect of sequentially fed high protein, hydrolyzed protein, and high fiber diets on the fecal microbiota of healthy dogs: a cross-over study. *Animal microbiome*, *3*(1):1-12.

Weber, M., Bissot, T., Servet, E., Sergheraert, R., Biourge, V. and German, A. J. (2007). A high-protein, high-fiber diet designed for weight loss improves satiety in dogs. *J. Vet. Intern. Med., 21*(6): 1203–1208.

Zimmer, J., Lange, B. Frick, J. S., Sauer, H., Zimmermann, K., Schwiertz, A., Rusch, K., Klosterhalfen, S. and Enck, P. (2012). A vegan or vegetarian diet substantially alters the human colonic faecal microbiota. *Eur. J. Clin. Nutr., 66*(1): 53.

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