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***The effect of Exceed[®] / MyBeau[®] on
the digestibility of a working dog diet***

Report for:

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EXECUTIVE SUMMARY

Ingredients used to manufacture pet foods vary in their ability to deliver nutrients to the animal. The amount of nutrients available to the animal is estimated by carrying out a digestibility trial, taken over the entire gastrointestinal tract of the animal.

The aim of this experiment was to evaluate the effectiveness of Exceed[®]/MyBeau[®] on the digestibility of nutrients when added to a dog food that has passed a minimum feeding protocol for providing an adult maintenance claim (AAFCO, 2004).

Six female harrier hounds were used in a digestibility trial which was run over a 10-day period, which included 5 days of adjustment and 5 days of collection (the digestibility trial). There were 2 diets: a control (dry dog biscuits), and control + Exceed[®]/MyBeau[®] “vitamin and mineral” supplement. The diets were fed to each dog according to body weight.

Faecal output as a percentage of total dietary intake was significantly ($P<0.05$) lower in the supplemented (Exceed[®]/MyBeau[®]) diet.

The apparent faecal digestibility of dry matter of the supplemented (Exceed[®]/MyBeau[®]) diet was found to be significantly ($P<0.05$) higher compared to the control group. There were no significant differences between dietary treatments in crude protein or energy digestibility.

In conclusion, the addition of Exceed[®]/MyBeau[®] to a dry dog food significantly reduced faecal output and increased dry matter digestibility. However, crude protein and energy digestibility remained unchanged.

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INTRODUCTION

Ingredients used to manufacture pet foods vary in their ability to deliver nutrients to the animal, and the actual amount of nutrients in a pet food does not give an accurate representation of what is actually available to the animal. The amount of nutrients available to the animal is termed the 'digestible content', and can be determined by estimating the 'digestibility' of each nutrient. Traditional digestibility measurements are taken over the entire gastro-intestinal tract of both cats and dogs.

The aim of this study was to evaluate the effectiveness of Exceed[®]/MyBeau[®] on the digestibility of nutrients when added to a dog food that had passed a minimum feeding protocol for providing an adult maintenance claim (AAFCO, 2004).

MATERIALS AND METHODS

Massey University Animal Ethics Committee approval was obtained before the start of the study (Anonymous 2005).

Animals and Housing

Three male and three female harrier hounds (mature dogs, 3-8 years of age) were used in the trial. At the start of the initial acclimatisation period the dogs were weighed, their weights ranging from 21 to 32kg. The dogs were individually housed in custom built dog runs, consisting of a weatherproof indoor area and an open air outside area, in a separate facility constructed at the Canine Unit, Massey University. This facility met both the requirements of the 'Code of Recommendations and Minimum Standards for the Welfare of Dogs (1998)', and the 'Code of Recommendations and Minimum Standards for the Care of Animals in Boarding Establishments (1993)'. During the trial, each dog was exercised daily, consisting of a 20-minute walk. The dog runs were cleaned daily.

Diets and Feeding

In order to evaluate the digestibility of the basal diet with the supplement used in the treadmill trial (Exceed[®]/MyBeau[®]), the guideline of the AAFCO metabolisable energy content without urine collection protocol was followed (AAFCO 2004).

Following an initial five-day acclimatisation period, a four day total faecal collection was carried out. Initial body weights at the start of each period were used to calculate daily meal allowances using the equation ($ME = 132 \times (\text{weight})^{0.75}$, Burger, 1993). The diet was calculated to contain 2.23kcalME/kg. The dogs were fed their diet in two equal meals, one at 0900h and the second at 1600h. The meal ration was placed in a stainless steel dog bowl and made available to each dog for a 15-minute period. During the initial 5-day acclimatisation period the dogs were fed a combination of ground dog food with fresh water being available *ad libitum* throughout the trial.

The diets consisted of a basal diet (commercially available complete and balanced dry dog food), either un-supplemented (control; diet A) or supplemented the test compound (Exceed[®]/MyBeau[®] “vitamin and mineral” supplement) (diet B). The meal allowance for each dog was pre-weighed into individual feed bowls, and the supplement was added just prior to feeding.

Table 1. Diet composition.

Dietary treatment	Main ingredient	Supplement	Inclusion rate^a
Current Study			
Diet A (control)	ground dog food	no	-
Diet B (Exceed [®] /MyBeau [®])	ground dog food	Exceed [®] /MyBeau [®]	1.5ml/kg
Previous Study (2004)			
Diet A (control)	ground dog food	no	-
Diet B (MyBeau [®])	ground dog food	MyBeau [®]	5.8%

^a according to manufacturers specifications.

During the collection period (days 6 to 10), the faeces of each dog was collected separately and stored at -20°C. Samples of the ground dog food, and test supplement were collected for analyses. After the completion of the trial, the faeces of each dog were thawed, freeze-dried, ground and pooled for analyses.

Chemical Analyses

The basal diet sample, a sample of test supplement and the pooled faecal samples for each dog were analysed for dry matter (DM), crude protein (CP), and gross energy. Dry matter and residual dry matter were determined by oven drying for 16 hr at 105°C (AOAC 1995). The nitrogen content of the samples were determined using the Dumas method on a LECO analyser (Dumas, 1831), and crude protein was determined by multiplying nitrogen by 6.25. Gross energy was determined by bomb calorimetry using a Gallenkamp Autobomb (London, UK) according to manufacturers instructions.

Statistical Analyses

Apparent faecal digestibilities of DM, CP, and energy were calculated as shown below:

$$\text{Faecal digestibility (\%)} = \frac{(\text{Dietary intake} - \text{Faecal output}) \times 100}{\text{Dietary intake}}$$

The metabolisable energy (ME) determination was based on assays of the gross energy consumed, minus the energy in the faeces and the correction for energy lost in the urine. The metabolisable energy was calculated as shown below (AAFCO 2004):

$$\text{ME (kcal/kg)} = \frac{(a \times b) - (c \times d) - [(b \times e/100) - (d \times f/100)] \times g \times 1000}{b}$$

with:

- a: gross energy of diet (kcal/g)
- b: amount of food consumed (g)
- c: gross energy of faeces (kcal/g)
- d: amount of faeces collected (g)
- e: protein in diet (%)
- f: protein in faeces (%)
- g: correction factor (dog) = 1.25 kcal/g

To test the differences between diets, the faecal digestibility data were subject to an analysis of variance, with diet as a fixed effect and dog as a random effect (SAS, 1999). Least Square Differences were used to determine significant differences between treatments at a level of $P < 0.05$.

RESULTS AND DISCUSSION

The nutrient profiles of the 2 dietary treatments are presented in Table 2. All dogs consumed their daily allowance during the trial and no feed refusals were obtained.

Table 2. Nutrient profiles of the 2 dietary treatments and comparison with previous (2004) digestibility study.

Dietary treatment	Dry matter	Ash	Crude protein	Gross energy
Current Study		%		kJ/g
Diet A (control)	91.6	9.1	23.5	20.6
Diet B (Exceed [®] /MyBeau [®])	91.6	8.3	21.1	21.0
Previous Study (2004)				
Diet A (control)	91.8	8.6	21.9	21.9
Diet B (MyBeau [®])	91.9	8.1	20.6	23.0

The calculated food intakes on the 2 different diets are presented in Table 3. Intakes from individual dogs on diet A (control) ranged from 361 to 445g/d and intakes on diet B (Exceed[®]/MyBeau[®]) from 320 to 518g/d depending on the bodyweight of the animals.

The faecal output from each dog over the 4-day collection period was very variable. Daily faecal output from individual dogs ranged from 0 to 499g/d on diet A (control) and 10 to 403g/d on diet B (Exceed[®]/MyBeau[®]).

However, Exceed[®]/MyBeau[®] supplementation of the dry dog food consistently reduced ($P < 0.05$) the average faecal output of dogs in the present study. Faecal output was reduced by 14% on an 'as is' basis (from 68% to 54%) or by 7% on a dry matter basis (from 26% to 19%).

Table 3. Feed Intakes and faecal output for each dietary treatment and comparison with previous (2004) digestibility study. .

Dietary treatment	Intake		Faecal Output
	(g/d)	(g/kg diet)	(g DM/kg DM diet)
Current Study			
Diet A (control)	396	675 ^a	262 ^a
Diet B (Exceed [®] /MyBeau [®])	437	532 ^b	189 ^b
Pooled SE	65	35	14
Previous Study (2004)			
Diet A (control)	338	598 ^a	219 ^a
Diet B (MyBeau [®])	338	561 ^b	212 ^b
Pooled SE	2	30	9

[†] pooled standard error

^{ab} means within columns with different superscripts are significantly different (P<0.05) LSD

The dry matter (DM), energy and crude protein (CP) digestibility data are presented in Table 4.

The digestibility of DM was significantly higher (P<0.05) in diet B (the Exceed[®]/MyBeau[®]-supplemented diet) than in diet A (the control diet without any supplement). This large 7.3% difference indicated that Exceed[®]/MyBeau[®] enhanced the digestibility of DM when added to a dry dog food that had passed a minimum feeding protocol for providing an adult maintenance claim (AAFCO, 2004) in the present study. The digestibility of energy was also increased in diet B compared to diet A, however this increase was smaller (1.7%) and not significantly different (P=0.11). No differences between the two diets were also observed in CP digestibility.

The results from the current study are very similar to a previous study carried out in 2004 (see Table 4), when MyBeau[®] significantly enhanced

(P<0.05) the digestibility of DM and energy when added to another dry dog food.

Table 4. Average digestibilities of various nutrients for each dietary treatment and comparison with previous (2004) digestibility study.

Dietary treatment	Digestibility		
	Dry matter	Crude protein %	Energy
Current Study			
Diet A (control)	73.8 ^a	80.1	84.6
Diet B (Exceed [®] /MyBeau [®])	81.1 ^b	80.4	86.3
Pooled SE ¹	1.4	0.9	0.6
Previous Study (2004)			
Diet A (control)	78.9 ^a	81.5	85.2 ^a
Diet B (MyBeau [®])	81.6 ^b	81.3	86.8 ^b
Pooled SE ¹	0.3	0.4	0.3

¹ pooled standard error

^{ab} means within columns with different superscripts are significantly different (P<0.05) LSD

CONCLUSIONS

The addition of Exceed[®]/MyBeau[®] to a dry dog food that had passed a minimum feeding protocol for providing an adult maintenance claim (AAFCO, 2004) resulted in an increase in the apparent faecal digestibility of dry matter. No changes were observed when Exceed[®]/MyBeau[®] was added to the dog food on crude protein and energy digestibility.

The addition of Exceed[®]/MyBeau[®] to a dry dog food reduced the amount of faeces produced by the dogs.

These results are very similar to, and further support, the findings of a previous digestibility study carried out using MyBeau[®] and another AAFCO approved maintenance dry dog food which demonstrated a significant increase in the apparent faecal digestibility of dry matter and energy.

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Disclaimer

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