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Research Article

Effects of Blond Psyllium Husk Powder (Fiberact®) in Dogs and Cats with Slow Digestive Transit through a Pet-owners Survey

Sarah Muller, Bruno Jahier, Christelle Navarro*

MP Labo, 45 Boulevard Marcel Pagnol, 06130 Grasse, France

ABSTRACT

Introduction: Prolonged retention of stools is a common clinical complaint in small animals, and its management should first consist in identifying and eliminating, if possible, the cause, and then implementing medical and/or surgical therapy. Among medical approaches dietary fibers, such as psyllium, are well tolerated and effective. This study aimed to evaluate the effects of blond psyllium husk powder on bowel movement in dogs and cats.

Methods: 50 dogs and 50 cats with slow digestive transit were administered orally with psyllium powder for 7 days at the dose of 1 teaspoon/10 kg/day. Pet-owners were asked to fill in a questionnaire on D0 and D7 that evaluated signs of stool retention (0-10 scale), stool consistency (1-5 scale), intestinal transit, and owner's satisfaction.

Results: 44 dogs and 46 cats completed the study. After 7 days of psyllium administration, a significant decrease in defecation difficulty ($p<0.05$), defecation pain ($p<0.001$), abdominal pain ($p<0.0001$), and traces of blood in the stool ($p<0.05$) was observed. In cats, the presence of hairs in the stool was also significantly reduced ($p<0.01$). The faecal score got significantly better in both species ($p<0.0001$) and transit rapidly improved in more than 80% of the animals. The product was easy to give in 82% of dogs and 70% of cats, and over 75% of owners were satisfied with the results.

Conclusion: Psyllium powder proved to exert beneficial effects on pets with slow digestive transit by significantly improving stool consistency and digestive comfort.

Keywords: Dog; Cat; Bowel movement; Stool consistency; Low transit; Psyllium; Dietary supplement

INTRODUCTION

Constipation has been defined as infrequent emission or difficulty in passing stool [1-4]. In normal pets, faeces can be retained in the colon for several days without suffering from any clinical signs. Prolonged retention of faeces in the colon leads to increased reabsorption of water and electrolytes, resulting in solidified hard stools that become more difficult to pass [5]. The causes of constipation in dogs and cats are numerous and include ingestion of indigestible material (foreign bodies), neoplasia, dehydration, colonic obstruction, electrolyte disturbances, iatrogenic and neuromuscular diseases, and side effects of some drugs [1,3,6,7]. Idiopathic megacolon is characterized by a progressive, irreversible distension of the colon and aperistaltic syndrome from an unknown origin. It is described in both species but is the most common cause of slow transit in cats [5,6]. Difficulties in passing stools may also be consecutive to the routine activity of grooming, especially in long-haired cats living indoors and during moulting (spring and autumn). Aggregated ball of hairs may occasionally accumulate either in the stomach or intestine [8,9]. Obesity and lack of exercise are known as risk factors for prolonged retention of faeces in pets, as well as increasing age, and illness leading to dehydration (e.g. chronic kidney disease) [10,11]. Straining to defecate, tenesmus, and excretion of firm and dry faeces are the typical clinical signs associated with slow transit. The diagnosis can be confirmed by the detection of large volume of retained faecal matter on abdominal palpation and rectal examination. Lethargy, central nervous system depression, lack of appetite, weight loss, emesis (especially in cats), tense abdomen, and occasional watery, mucoid, or bloody diarrhoea, may also be present in severely constipated animals [5,7].

Prolonged retention of stools is a common clinical complaint in small animals, particularly in cats, that can become a recurrent condition, it is therefore important to take it seriously to prevent progression [1,4]. Ideally, the management of difficulties in

Correspondence to: Christelle Navarro, MP Labo, 45 Boulevard Marcel Pagnol, 06130 Grasse, France, E-mail: christelle.navarro1@hotmail.com

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passing stools should first consist in identifying and eliminating, if possible, the cause, and then implementing medical and/or surgical therapy [1,6]. The traditional medical approach includes adequate rehydration and the use of laxatives, enemas, and pro-kinetic agents [1,7]. Interestingly, some authors describe dietary fibers as well tolerated, more effective, and more physiologic, compared to other laxatives [6,12]. Moreover, it was shown that fibers induce vigorous colonic contraction *via* colonic stretching in large-bowel segments capable of effectively contracting [6]. As a consequence, increased intake of dietary fibers is commonly used for the prevention and management of slow transit in humans [13,14].

The efficacy of psyllium-enriched diets for the management of gastrointestinal disorders (including hairballs) in dogs and cats has been reported in previous studies [1,9,15,16]. To our knowledge, the effect of psyllium administered alone with the meal for the management of difficulties in passing stools in both species has however not yet been investigated. The purpose of this study was to evaluate the efficacy of a psyllium seed husk powder administered as a complementary feed in dogs and cats with slow digestive transit and its interest in hairballs elimination in cats.

MATERIALS AND METHODS

Survey Design

In total 100 client-owned animals with a faecal score ≥ 4/5 were recruited, including 50 dogs and 50 cats. Pet-owners were asked to test a complementary feed for 7 days. During the test period, they had to complete a multiple-choice questionnaire. The questions focused on their animal's intestinal transit at D0 before supplementation initiation and after 7 days of psyllium supplementation (at D7). Signs of stool retention-including difficulty in defecation, defecation pain, abdominal pain combined with decreased appetite, and presence of blood in the stools were assessed on D0 and D7 using a 0 (no signs) to 10 (extremely pronounced signs) rating scale (adapted from the constipation scoring system of Agachan, et al. [17]). The presence of hairs in the cat stools was also reported using the same scale. Stool consistency was assessed on D0 and D7 using a 1-to-5 scoring standard scale (1: Liquid stools, 2: Very wet but not liquid stools without any structure, 3: Wet, uncracked stools with a distinct shape, 4: Stools with a clearly defined shape, visible cracks, and a potentially moist surface but still well formed, 5: Hard, dry, crumbly stools, difficult to get out) [18]. At D7, the evolution of the intestinal transit was compared to D0 as Worsened, Unchanged, Improved, or Strongly Improved. The effect of the complementary feed was rated at the end of the 7 days following the period using a scale of 0 to 10 with 0: Very ineffective, 5: Moderately effective, and 10: Very effective. Overall, the owners were also asked if they were satisfied with the results they observed, their global level of satisfaction and their perception of the easiness of administration of the complementary feed on a 0-to-10 scale.

Tested Supplement

Fiberact® (PSY) (MP Labo, France), a powder containing 100% of teguments of blond psyllium (*Plantago ovata*) seeds, was administered orally directly on top of food or mixed with food at the dose of 1 teaspoon (i.e. about 2 g) per 10 kg bodyweight in dogs and cats, once a day for 7 consecutive days.

Data Analysis

Statistical analyses were performed using the Statgraphics® Centurion XVI software. Distribution normality was tested using the Shapiro-Wilk test. Since the distribution of the scores did not follow a normal distribution, the non-parametric Sign test was used to compare the mean scores between D0 and D7. The significant threshold was set at 5%.

RESULT AND DISCUSSION

Results in Dogs

At D7, 44 out of the 50 enrolled dogs completed the study and were therefore included in the statistical analysis. The Table 1

Table 1: Dog baseline characteristics

Dogs' characteristics			
Sex		Body condition score	4.9 (± 1.4)
Females	12 (24%)	Food	Dog
Spayed females	13 (26%)	Kibbles	
Males	12 (24%)	Kibbles+wet food	23 (46%)
Castrated males	13 (26%)	Homemade food	3 (6%)
Age	8.2 (± 3.7)	Lifestyle	
Body weight		Exclusively indoors	13 (26%)
Less than 10 kg	19 (38%)	Mostly indoors	18 (36%)
Between 10 kg and 25 kg	13 (26%)	Outdoors and indoors	16 (32%)
Between 25 kg and 45 kg	13 (26%)	Mostly outdoors	2 (4%)
More than 45 kg	5 (10%)	Exclusively outdoors	1 (2%)
[1]Number (percentage) of dogs in each category;Mean (± standard deviation)			

show the dog baseline characteristics.

The dogs were aged between 1 and 15 years. 34% (n=17) of the dogs were crossbred and 66% (n=33) were purebred with a total of 21 different breeds represented including small (such as Pinscher, Yorkshire Terrier, or Chihuahua), medium (such as Colley, Shiba Inu, or Brittany Spaniel), and large (such as Malinois, Tervueren or Golden Retriever) breeds. Males (n=25) and females (n=25) accounted each for 50% of the dog study population. The great majority of dogs (64%, n=32) had long hairs, weighted less than 25 kg, and had a body condition score (BCS) ≥ 5/9. An equivalent number of dogs were fed exclusively with kibbles (48%) or with a mix of dry and wet food (46%). 64% of the dogs were reported as having a digestive sensitivity by their owners. A significant proportion of dogs (62%) lived mostly indoors.

All signs of stool retention were drastically improved over time. Difficulty in defecation was reduced by 39.3% between D0 and D7 which was significant (p=0.0104) (Figure 1).

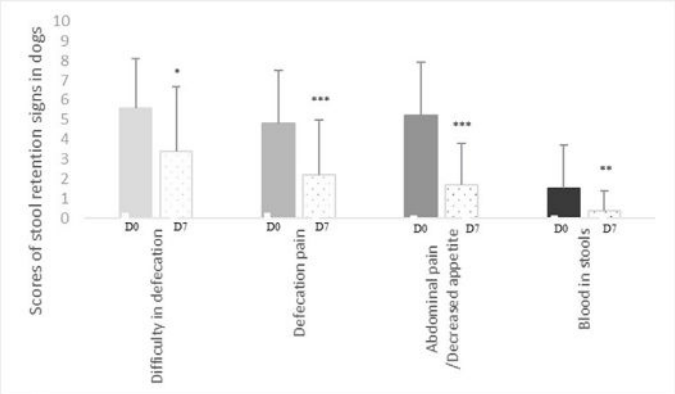

Figure 1. Evolution of the signs of stool retention in dogs between D0 and D7. *p < 0.05, **p < 0.001, ***p < 0.0001.

The percentage decrease of defecation pain at D7 compared to baseline was 54.2% which was highly significant (p=0.00005). The drop of the combination of abdominal pain and decreased appetite was even more significant with a value of 67.3% (p=1.3 × 10-6). The presence of blood in the stools showed the highest percentage decrease (73.3%) at D7 compared to D0 with a high level of significance (p=0.00085). The calculation of the total stool retention score by adding the four individual scores, showed a significant improvement of the clinical signs from D0 to D7 with means of 17.2 (± 7.8) and 7.7 (± 7.3), respectively (p=0.0002). After 7 days of PSY supplementation, 79.5% (35/44) dogs showed clinical improvement (decrease of the total score), and 25% (11/44) experienced a total absence of signs of slow transit (total score=0).

Stool consistency improved on D7 compared to baseline with a very high significance level and a decrease from 4.2 (± 0.4) to 3.5 (± 0.8) (p=7.6 × 10-6). All dogs had a faecal score ≥ 4 at D0 whereas 36.3% of them (n=16) had a score ≤ 3 at D7. According to 82% of the owners, the 7 days PSY supplementation allowed their dog to recover a normal stool consistency. At the end of the study period, 81.8% of the owners (n=36) considered that their animal's intestinal transit had got better compared to prior PSY administration (Figure 2).

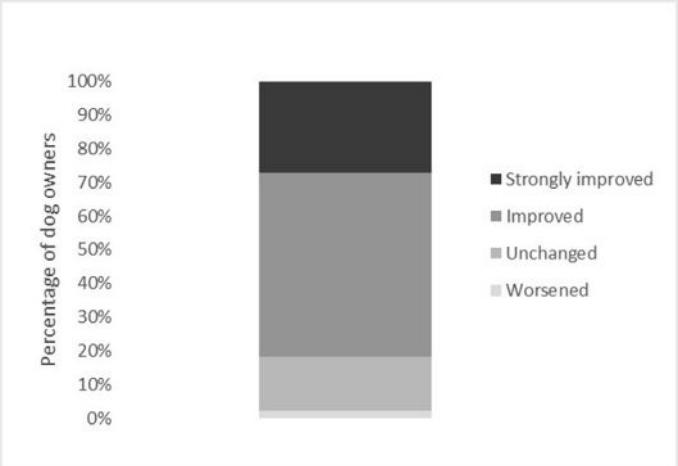

Figure 2. Owner assessment of the evolution of the dog intestinal transit on D7 compared to baseline.

In the majority of the cases (69.4%, n=25), digestive transit was improved within 3 days or 4 days after initiation of PSY administration. In 25.0% of the dogs (n=9), this improvement occurred within 2 days.

The mean score of efficacy assessed by the dog owners was 8.0 (± 2.2) at D7. After a 1-week PSY administration, 77.3% of the owners (n=34) declared to be satisfied with the results they observed in their dog, with a global level of satisfaction of 7.3 (± 2.5). The product was easy to give for 82% of dog owners with a mean score of 7.5 (± 2.9).

No adverse effects were reported.

Results in Cats

At D7, 46 out of the 50 selected cats completed the study and were therefore considered in the statistical analysis. The Table 2 show the cat baseline characteristics.

The cat age was comprised between 1 and 16 years old. Most cats (82%, n=41) were crossbred, otherwise 6 pure breeds were represented in the study including Maine Coon, Oriental, Persian, Ragdoll, and Birman cats. Female cats (n=33) and cats with long hairs (n=26) represented 66% and 52% of the cat study population, respectively. Most cats had a BCS ≥ 5/9 (70%). 66% (n=33) of the animals were declared by their owners as having a digestive sensitivity.

As in dogs, all stool retention signs were consistently improved at D7 compared to D0. Difficulty in passing stools was very significantly reduced by 34.3% over the 7 days study period (p=0.00019) (Figure 3).

Table 2: Cat baseline characteristics

Cats' characteristics			
Sex[1]		Food[1]	
Females	2 (4%)	Kibbles	11 (22%)
Spayed females	31 (62%)	Kibbles+wet food	39 (78%)
Castrated males	17 (34%)		
Age2	7.0 (±3.7)	Lifestyle	
		Exclusively indoors	23 (46%)
Body condition score2	5.1 (± 1.9)	Mostly indoors	12 (24%)
		Outdoors and indoors	15 (30%)
[1]Number (percentage) of cats in each category; [2]Mean (± standard deviation).			

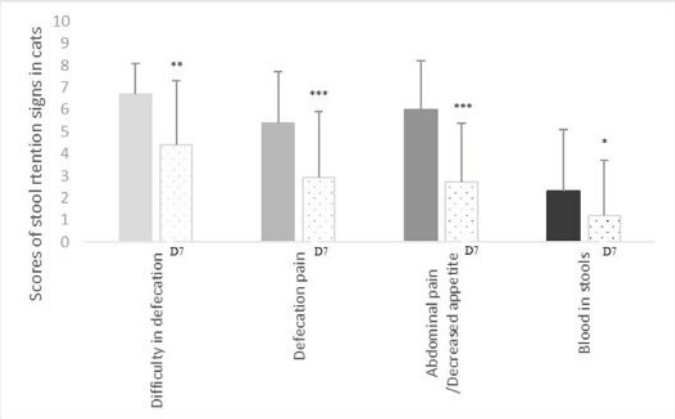

Figure 3. Evolution of the signs of stool retention in cats between D0 and D7.*p < 0.05, **p< 0.001, ***p < 0.0001

Painful defecation was less marked at D7 compared to baseline with 46.3% reduction and a very high significance level (p=0.00003). The cats showed a highly significant reduction of 55.0% in the combo abdominal pain and diminished appetite between D0 and D7 (p=0.00003). The presence of blood in the stools was significantly less observed on D7 than on D0 with a decrease of 47.8% (p=0.0123). The total stool retention score significantly decreased from 20.4 (± 6.2) to 11.2 (± 9.2) (p=0.000003). At D7, 82.6% (38/46) of the cats showed clinical improvement (decrease of the total score).

Similarly, the presence of hairs in the cat stools was significantly less frequently reported on D7 compared to baseline with a decrease of 26.0% (p=0.0058). The change in stool consistency between D0 and D7 was statistically highly significant from 4.5 (± 0.5) to 3.5 (± 1.0) (p<0.0001). The initial faecal score ≥ 4 became ≤ 3 in 45.6% of the cats (n=21) at D7. According to 80% of the owners, their cat stool consistency came back to normal after the 7 days of PSY supplementation, and most owners (80.4%, n=37) considered that the intestinal transit was improved (Figure 4).

These observations were made 3 days or 4 days after D0 in 67.6% of the cases (n=25), and within 2 days following initiation of the PSY supplementation in 24.3% of the cases (n=9).

The mean efficacy score evaluated by the owners at D7 was 7.3 (± 2.6). After the 1-week supplementation period, 78.3% of the owners (n=36) reported to be satisfied with the results observed in their cat with a satisfaction level of 6.8 (± 2.5). The product was easy to give for 70% of cat owners with a mean score of 6.6 (± 2.9).

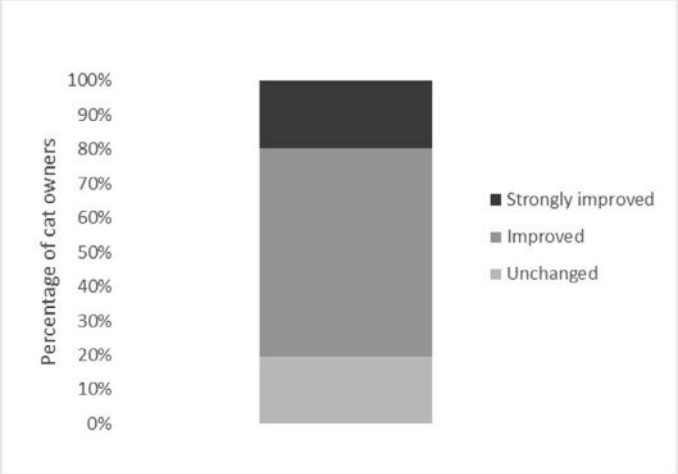

Figure 4. Owner assessment of the evolution of the cat intestinal transit on D7 compared to baseline.

No adverse effects were reported.

DISCUSSION

The results of the present study demonstrate the efficiency of blond psyllium husk powder administered at the dose of 0.2 g/kg bodyweight in dogs and cats, once a day for 7 consecutive days in animals with slow digestive transit. After a 7 days period of PSY supplementation, the total stool retention score was significantly decreased by 55% in the dogs and 45% in the cats, the clinical signs of stool retention had improved in more than 80% of the pets, and the absence of signs was even reported in 16% of animals. The mean stool consistency scores also significantly improved on the same period from 4.2 to 3.5 in dogs and from 4.5 to 3.5 in cats.

Two previous published data have supported the efficacy of a psyllium-enriched diets in the management of feline slow transit [1,9]. In the first study, 67% (10/15) of the owners observed improvement in clinical signs of recurrent constipation within 7

days after diet change [1], which is similar to our own observations (82.6% (38/46) of cat owners observed improvement in clinical signs). Median faecal score improved significantly from 5 at study initiation to 4 and then 3.5 after 1 and 2 months, respectively, in the study conducted by Freiche, et al. These data are close to those observed in our study (from 4.5 on D0 to 3.5 on D7) since a similar consistency score was used in both studies. The second study demonstrated that psyllium added to two different diets for 14 days increased hair faecal excretion in long-haired domestic cats by 81% and 113%, respectively, compared to a control diet [9]. These observations were not confirmed by our findings where the number of hairs in the stools had significantly decreased on D7 compared to baseline. These differences may be due to the facts that those parameters are highly influenced by the shedding season and the duration of the study. Furthermore, as psyllium was used alone in our study and in higher concentrations, the hypothesis of an onset of hair faecal excretion occurring in less than 7 days of PSY supplementation, cannot be completely ruled out. Nevertheless, the design of the previous studies does not allow characterizing the specific action of psyllium since the diets fed in those studies contained other fiber sources which may have also played a role.

Dietary fibers are polysaccharides which are not hydrolysed by the endogenous enzymes in the small intestine of monogastric animals [14,19]. Fibers have been classified according to their properties, such as solubility in water, viscosity, and fermentability. Soluble, such as viscous or fermentable fibers (including pectin, fructo-oligosaccharides (FOS), and inulin) are fermented by microorganisms in the colon, and insoluble fibers (such as hemicelluloses, cellulose lignin) may be fermented to a limited extent [14,19,20]. Consequently, the interest of dietary fibers in the management of constipation varies greatly depending on fiber types [21,22]. More precisely, insoluble fibers increase the stool volume and stimulate colonic transit *via* mechanical stimulation/irritation of the colonic mucosa leading to increasing secretion and peristalsis [12,20,23,24]. Soluble fibers fermented by bacteria in the large intestine, increase the faecal bulk by increasing the biomass by fermentation by-products, such as gas and short-chain fatty acids (SCFA) [12,20,23,24]. Those fibers also induce a water draft.

The mucilage accounts for about 30% of the composition of *Plantago ovata* husks [25] and is itself composed for 85% of a polysaccharide fraction that is water-soluble and relatively resistant to fermentation [26,27], and that comprises 65% D-xylose, 20% L-arabinose, 6% rhamnose and 9% D-galacturonic acid [28]. Blond psyllium husk can absorb up to 40 times its own weight in water [28]. The consequent increase of stool water content has been shown to have three effects:

i) The augmentation of the faecal volume leading to the increase of bowel wall tension and of the rate of propagating intestinal contractions,

ii) The decrease of the intraluminal pressure resulting in an increased colon transit and frequency of defecation,

iii) The decrease of stool viscosity facilitating the normality of the intestinal transit [25,28].

Psyllium laxative properties have also been explained by its low fermentability leading to the formation of a hydrophilic mucilaginous gel imparting a gel-like consistency to the excreta [29,30]. Laxative effects may also result from degradation products of dietary fibers issued from bacterial action in the colon [28]. At last, psyllium metabolism results in increased faecal concentration and excretion of SCFA [28] that have been shown to stimulate feline longitudinal colonic smooth muscle contractions *in vitro* [31]. As a conclusion, the laxative role of *Plantago ovata* seed husks has been well-established [28].

The stool retention scoring system used in our study is based on a detailed questionnaire that includes several slow transit-related signs inspired by previous works in human patients [17]. The evaluation of stool consistency is inspired by the score used by Freiche, et al. in a previous study [1]. However, the assessments made by the owners in our study were not confirmed by clinicians and/or by objective findings, such as physiology tests including gastrointestinal transit times. Other limitations of this study include the lack of a group control, blinding procedures and information on the cat toileting and defecation habits (outdoor faecal excretion may have not been noticed by the owners). Furthermore, as in previous works, the interpretation of the results of the present investigation remains limited since the pets were fed with their usual diet during the study period and may have received various sources and amounts of other dietary fibers than psyllium from D0 to D7. At last, the study follow-up was short and does not allow predicting the long-term psyllium effects in pets. Nevertheless, this preliminary study is the first evaluation of the efficacy of psyllium administered alone as a dietary supplement in the management of low digestive transit in dogs and cats.

CONCLUSION

This owner survey has provided the first evidence that blond psyllium seed husk powder may be beneficial in the management of slow transit in dogs and cats independently of the fiber content of the animals' diet. Over the 7 days supplementation period, significant improvements were observed in defecation difficulties, abdominal pain, and stool consistency. Notably, more than 80% of the animals showed clinical improvement, with a considerable proportion experiencing a total absence of signs associated with slow transit. Furthermore, the ease of administration, reported by the majority of owners, highlights the practicality of incorporating psyllium into pets' daily routines. Further research, including randomised placebo-controlled double-blind clinical trials, is warranted to validate these findings and establish psyllium's role as a standard option for managing

slow digestive transit in companion animals.

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None.

COMPETING INTERESTS

The authors are employees of MP Labo, the manufacturer of Fiberact.

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