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Phytase Effect on Feed Digestibility in the Domestic Cat (*Felis silvestris catus*)

[1]R. González-Sánchez, [1]L. Mora-Anaya, [2]J.R. Orozco Hernández and [2]I.J. Ruíz-García
[1]Department Agroveterinario, Pisa Agropecuaria S.A. de C.V.,
[2]Department de Ciencias Biológicas, Centro Universitario de Los Altos, Universidad de Guadalajara,
P.O. Box 58, Tepatitlán de Morelos, Jalisco, 47600, México

Abstract: Adding exogenous fibre degrading enzymes to the feed for monogastric species has improved structural components usage, however, no published reports were found in the use of the enzymes in the domestic cat (*Felis silvestris catus*) feed. Nine mongrel male cats (2.4 kg, average body weight) were use a trial to assess; control feed (no phytase added) and two levels of the enzyme (250, 500 U kg^{-1} dry matter of feed) according to a latin square design. The dry matter intake tended to be increased with the phytase addition to the feed ($p>0.05$). Nevertheless, digestibility of nutrients was reduced ($p<0.05$) with the enzyme. In conclusion, adding exogenous fibrolitic enzyme to domestic cat feed affects negatively the digestibility of nutrients.

Key words: Phytase, domestic cat, fibre digestibility, nutrients, exogenous

INTRODUCTION

In the human habitat the domestic cat (*Felis silvestris catus*) is the favorite animal companion, which demand in return to be sheltered and fed with a apropiate food. Most of the commercial feed for pets are prepared using vegetable feedstuffs (Bednar *et al*., 2001; Buddington *et al*., 1999; Bueno *et al*., 2000; Gray *et al*., 2004), increasing its fibre content and with this action to reduce energy content and to limit intake of nutrients (Bueno *et al*., 2000; Earle *et al*., 1998; Fekete *et al*., 2001; 2004; Morris *et al*., 2006; Prola *et al*., 2006) and alter *in vivo* digestibility (Buddington *et al*., 1999; Fekete *et al*., 2004; Gray *et al*., 2004; Kienzle *et al*., 2006; Morris *et al*., 2006). On the other hand, fibre degrading enzymes, such as phytase, are normally used in the productive monogastric like poultry and swine with promising results (Augspurger and Baker, 2004; Jendza *et al*., 2005; Omogbenigun *et al*., 2004). Furthermore, Hernández-Anaya *et al*., (2006) using phytase in dog feeding reported an increase in digestibility of nutrients. But in the literature review no published articles were found related to the effect of microbial phytase addition to the feed and the digestibility of nutrients in domestic cat.

MATERIALS AND METHODS

Nine six month old domestic cats (*Felis silvestris catus*) were individually caged in plastic crates provided with feeder. Feed were daily offered and clean water was always available. The feed was commercially prepared and was based on flaked corn and soybean meal to fill the nutrient requirement of the age of the cats according to the National Research Council recommendation, 1986. Three microbial phytase (Natuphos BASF) levels (0.250 and 500 phytase units kg^{-1} of dry matter) were used. The enzyme was dissolved in waters and sprayed prior offering the feed.

Cats were randomly assigned to treatments and a latin square model was used in the trial. Feed intake and fecal production were daily recorded for the last 5 days of the 21 days period. Feed and feces Dry Matter was determined at 70°C to constant weight (DM), Neutral Detergent Fibre (NDF) according to the Van Soest method *et al*. (1991) and Gross Energy (GE) was measured using a Parr adiabatic oxygen calorimeter. The obtained data were used to estimate the digestibility of nutrients and the variance of the data was assessed using the SAS General Linear Model procedure establishing a 0.05 alpha to declare statistical differences among treatment and when they exist means were separated using the Duncan procedure (SAS, 1985).

RESULTS AND DISCUSION

The measured DM intake was increased with the phytase addition to the feed (Table 1; $p<0.05$), but the digestibility was reduced with the use of the enzyme

Corresponding Author: J.R. Orozco Hernández, Department de Ciencias Biológicas, Centro Universitario de Los Altos, Universidad de Guadalajara, P.O. Box 58, Tepatitlán de Morelos, Jalisco, 47600, México

Table 1: Effect of phytase level in the feed on the intake and digestibility of the cat

	Phytase level (Unit kg^{-1} dry matter)			
	0	250	500	p<
Dry matter				
Intake, g day^{-1}	71.62b	87.76a	87.16a	0.010
Digestibility, %	44.66a	28.61b	36.88b	0.001
Neutral Detergent Fiber (NDF)				
Intake, g day^{-1}	8.16a	10.00b	10.46b	0.002
Digestibility, %	44.18a	38.07b	37.15b	0.003
Gross energy				
Intake, Calories day^{-1}	293.63a	359.82b	357.37b	0.010
Digestibility, %	64.35a	70.21b	34.06a	0.010

a-b, different letter means statistical difference ($p<0.05$)

compared to the control ($p<0.05$). The observation was contrary to the results reported by Hernández Anaya *et al.* (2006) in dog and with Jendza *et al.* (2005) in pigs when the phytase was used.

The NDF ingestion was also augmented, with 250 U phytase the increase was 10 g per day and with 500 U was 10.46 g, with the control the intake was only 8.16 g (Table 1; $p<0.05$). The previous observation might be a simple reflection of the ingredient content of the diet and the phytase effect was on the soluble and digestible part of the fibre of the feed. Hernández Anaya *et al.* (2006) using phytase in dog diet reported an increase on fiber ingestion and digestibility.

On the other hand, the NDF apparent digestibility in the whole tract of the cat averaged 37.61%, which was 38.07% with 250 phytase units and 44.18% with the control (Table 1; $p<0.05$). Such difference could be related to a faster passage rate of the feed through the gastrointestinal tract diminishing the enzyme action.

The gross energy consumption was 359.8 calories per day with 250 phytase units ($p<0.05$) and was reduced to 357.4 with the use of 500 units of the enzyme, but with control the value was 293.6 calories (Table 1; $p<0.05$). Then average *in vivo* energy digestibility was 64.4% and increased 10% (70.2%) with 250 phytase unit.

CONCLUSION

The results of the present study suggest that the use of phytase in the cat's feed reduces the digestibility of the measured nutrients probably by increasing the passage rate which may softens the stool.

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