

Digestive tolerance of sorbitol in cats

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Joint Nutrition Symposium (AAVN, ACVN, CNS, ESVCN, ECVCN, EZNRG)
August 21 - 25, 2002 - Antwerp, Belgium

INTRODUCTION

- D-sorbitol is a natural polyol that can also be industrially produced by catalytic hydrogenation of glucose.
- Although sorbitol is commonly used by producers of semi-moist petfood, especially as a humectant in place of **polyethylene glycol**, very few data are available concerning its digestive tolerance in cats.
- It is known that cats cannot digest polyols. Certain polyols could therefore prevent constipation.
- We chose to study the consequences for stool quality of different sorbitol supplements in a commercial cat diet in order to determine a safe dose with regard to diarrhoea.

MATERIALS AND METHODS

Animals

10 queens, all neutered, were randomly divided into two groups A and B of 5 animals each.

The queens were housed in individual cages, with paper in the litter box in order to facilitate faeces collection. The queens had free access to water and received one meal per day at a maintenance amount determined with diet S0.



Diets (table 1)

The queens had already received the basal diet (Hill's Feline Maintenance Adult Original, Hill's Pet Nutrition, Topeka, KS) designed as Diet S0 for several months. The basal diet was ground up and sorbitol added at the following doses: 0 (diet S0), 0.25%, 0.5%, 1% and 2%. Then the diet was extruded and compressed in order to obtain small pellets.

Choice of sorbitol level

In cats, the posology of lactulose (a non-digested carbohydrate) to prevent or treat constipation is around 100 mg/kg/d.

Bearing in mind that sorbitol in humans is 30% absorbed and 70% fermented, the appropriate medical dose for cats would be about 140 mg/kg/d. We decided to test 2 levels below this dose and 1 above. Assuming neutered queen energy requirements of 50 kcalME/kg/d -covered by a food providing around 4 kcalME/g- intake was about 12.5 g /kg/d.

◆ The doses tested in the study were: 0.25%, 0.5 %, 1% et 2%.

Table 1 - Sorbitol doses added to the different diets used in the study:

Diet	S0	S1	S2	S3	S4
Sorbitol (%)	0	0.25	0.5	1	2
Dose (mg/kgBW/d)	0	35	70	140	280

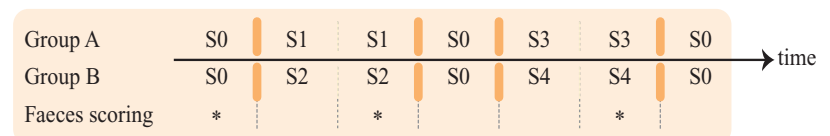
Design (table 2)

The experimental design was the following:

- The palatability of the food was scored (from 1: very palatable, eaten quickly- to 5: very unpalatable, not eaten).
- Faeces were collected every morning before the meal, scored for colour, texture and odour by the same manipulator, weighed and stored at -20°C until analysis.
- Faeces weight was reported daily. Faeces dry matter, nitrogen content and pH were measured for the last 2 days of collection.
- Data are reported as mean ± SEM.
- Statistical analysis consisted in a one-way analysis of variance (GLM procedure, SAS system).

Table 2 - Design of the study

Each cell represents a week. The orange bar between two diets represents a 2-day dietary transition (1/1 w/w).



Methods

- Faecal dry matter: gravimetric method, after drying in a 80°C vacuum oven overnight.
- Faecal nitrogen content: Kjeldahl method.
- Faecal pH: pH meter. Probe placed directly in homogenized faeces.

RESULTS AND DISCUSSION

Palatability of the diet and food intake

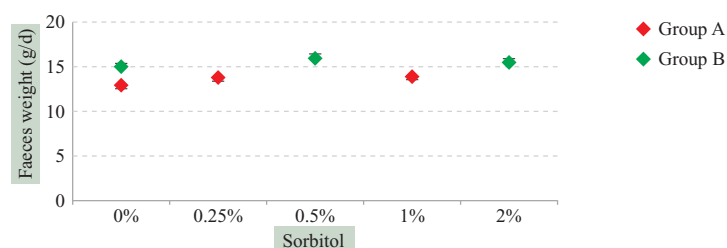
All queens ate their meal for all doses of sorbitol, and received a score of 1 for each day.

◆ Palatability of the food was not modified by sorbitol incorporation at any of the doses used.

Faeces weight

Faeces weight was not significantly different between sorbitol doses despite a slight but progressive increase of the faeces weight with the sorbitol dose (Fig. 1).

Fig 1 - Faeces weight (g/d) for different doses of sorbitol in the food (mean ± SEM)



Faeces quality and digestive tolerance

Despite a slight green coloration of the faeces for doses S2, S3 and S4, and a slight softening of faeces in some queens with doses S2 and S4, no significant change in the colour, odour and texture could be reported, due at least in part to the high individual variation of the results and the low number of animals by group.

◆ No diarrhoea was observed in the whole study at any time, which is therefore indicative of good digestive tolerance for sorbitol at the doses used in this study.

Faeces pH, dry matter and nitrogen content (Fig. 2)

No significant modification of faeces pH, dry matter and nitrogen content could be shown at the doses of sorbitol used in this study.

Fig 2a - Faeces dry matter, measured on the last 2 days of the week of faeces collection (mean ± SEM)

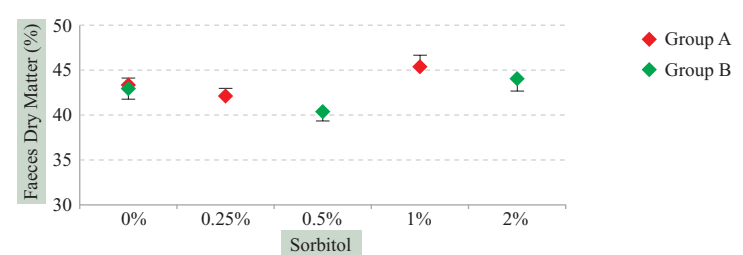


Fig 2b - Faeces nitrogen content, measured on the last 2 days of the week of faeces collection (mean ± SEM)

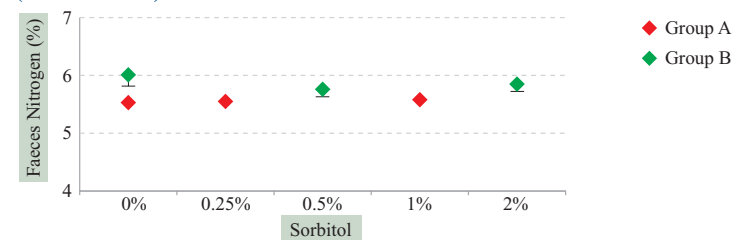
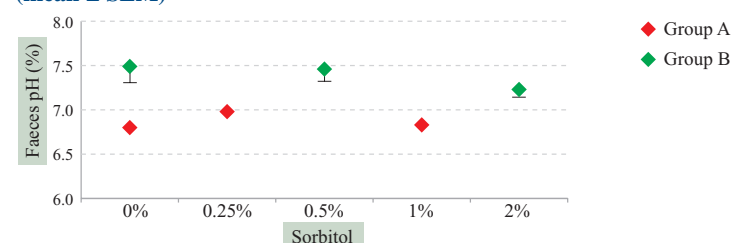


Fig 2c - Faeces pH, measured on the last 2 days of the week of faeces collection (mean ± SEM)



CONCLUSION

- With doses of sorbitol as high as 280mg/kgBW/d, no adverse effect has been observed.
- In conclusion, sorbitol is well tolerated in cats at the doses used in this study.



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