

PALATABILITY OF A BEEF-BASED CARNIVORE DIET WITH FIBER MIXTURE

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Abstract

Scarcity of product diversity is one of the major roadblocks in providing thoughtfully presented, well-balanced diets to exotic carnivores. At San Diego Zoo Global (SDZG), the palatability of an experimental beef-based carnivore diet with a mixture of fibers from beet pulp (fermentable) and cellulose (non-fermentable) was evaluated (Central Nebraska Packing Inc, North Platte, NE). Two separate trials were conducted. Trial 1 offered experimental diet to polar bears (*Ursus maritimus*; $n = 3$). Trial 2 consisted of a two-bowl preference test ($n = 11$ individuals from 7 species; Table 1) with diet first-approached and first-consumed recorded. There were no reports of changes in dietary intake, fecal quality, and overall health in either trial. No diet preference was observed when data was evaluated across all animals in trial 2. These results indicate that the new beef-based diet with fiber mixture is well accepted across carnivore species and would be an appropriate dietary option.

Introduction

Thoughtfully presented, well-balanced diets are paramount to providing exotic animals opportunities to thrive. For carnivores, this is quite challenging due to the lack of product diversity. Certain species are limited by the types of animal protein that are safe for consumption, for example, polar bears should not be offered horsemeat due to risk of exposure to equine herpesvirus (Flanders *et al.*, 2018). Type of fiber (fermentable vs. non-fermentable fiber) can also impact health: fecal quality of many smaller cats is improved by inclusion of fermentable fibers, while larger cats benefit from inclusion of non-fermentable fibers (Vester *et. al.* 2008, 2010; Kerr *et al.*, 2013a, 2013b). Increasing the diversity of commercially available carnivore diets, by introducing a beef-based diet with a mixture of fermentable and non-fermentable fiber, will improve the ability of zoos to ensure suitable options across species.

Materials & Methods

An experimental beef-based carnivore with a mixture of fibers from beet pulp (fermentable) and cellulose (non-fermentable) was evaluated for palatability at SDZG utilizing two methods. Diet was manufactured by Central Nebraska Packing, Inc (North Platte, NE) and formulated based on nutrient recommendations for felines.

Trial 1

Experimental diet was offered to polar bears (*Ursus maritimus*; $n = 3$). Animals were transitioned from Special Beef Feline Diet (Central Nebraska Packing, Inc.) to the experimental beef-based mixed fiber diet. Dietary intake, fecal quality, and overall animal health were monitored for changes.

Trial 2

A two-bowl preference test was conducted ($n = 11$ individuals from 7 species; Table 1; Griffin, 2003; Iske *et al.*, 2006). Animals were offered two diets (their current diet and the experimental beef-based mixed fiber diet) in alternating positions over 6 non-consecutive days. Animals were offered 160% of the amount listed on their diet sheet as 80% current diet and 80% experimental beef-based mixed fiber diet. The diet first-approached and first-consumed was recorded for each observation.

Results

Trial 1

No changes in intake, fecal quality, or overall animal health were noted.

Trial 2

No changes in fecal quality or overall animal health were noted. All animals consumed 100% of both control and experimental diets offered. No diet preference was observed when data was evaluated across all animals. The experimental beef-based diet with fiber mixture was first approached 38% of the time (SD: 14%) and first consumed 46% of the time (SD: 15%). Individual preferences were seen. Three animals (animals 2, 5, and 6) preferred the experimental diet (experimental diet was first consumed greater than 75% of the time). Four animals (animals 1, 4, 7, and 10) preferred their current diet (experimental diet was first consumed less than 25% of the time; Figure 1).

Conclusion

The results indicate that the new beef-based diet with fiber mixture is well accepted across carnivore species and would be an appropriate dietary option.

Acknowledgements

The authors would like to thank all the keepers at the San Diego Zoo for assisting with animal participation and data collection, the Forage Team in Nutritional Services for facilitating diet distribution, and to all of the animals who volunteered to participate.

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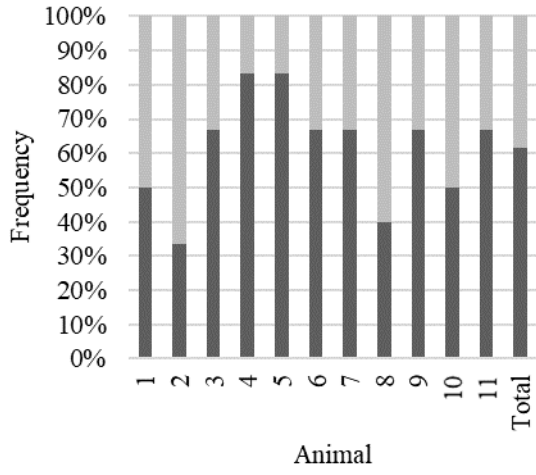
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Table 1. Information for animals utilized in two-bowl preference test between current diet and beef-based carnivore with a mixture of fibers.

Species	Animal	Sex	Age (Yr)	Weight (kg)	Current Diet ¹
<i>Cryptoprocta ferox</i>	1	M	1	6.1	Premium Feline
Fossa	2	M	11	14.0	Premium Feline
	3	M	14	13.6	Premium Feline
<i>Helarctos malayanus</i>	4	M	21	6.4	Premium Canine
Bornean sun bear					
<i>Leopardus pardalis</i>	5	M	14	13.0	Premium Canine
Ocelot					
<i>Leptailurus serval</i>	6	M	10	11.4	Special Beef
Serval					
<i>Mellivora capensis</i>	7	F	10	14.0	Premium Feline
Ratel					
<i>Sarcophilus harrisi</i>	8	F	2	6.3	Premium Feline
Tasmanian devil	9	M	2	7.0	Premium Feline
<i>Tremarctos ornatus</i>	10	F	3	63.5	Premium Canine
Andean bear	11	M	7	138.8	Premium Canine

¹Central Nebraska Packing, Inc (North Platte, NE)

(a) Diet First Approached



(b) Diet First Consumed

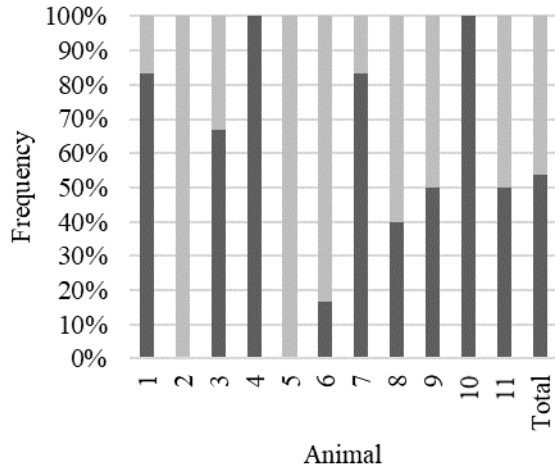


Figure 1. Frequency of (a) diet first approached and (b) diet first consumed by animal in two-bowl preference test. **■** Current Diet **■** Experimental Diet