Petfood R&D Showcase: Treats, Toppers, and Inclusions

Greg Aldrich, PhD
KSU – Pet Food Program

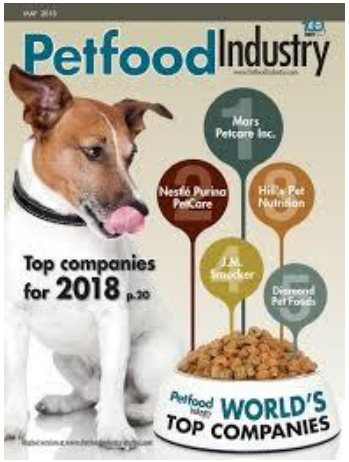
Welcome

- The Partnership
- The Pet Food Program at KSU
- The Topic

The Partnership

KANSAS STATE UNIVERSITY

Petfood Industry .com



PETFOOD R&D SHOWCASE 2018

Pet Food and Kansas

- Animal food industry
  - Supports 18,676 jobs in Kansas with a total economic contribution of over **$8 B**
- Dog and cat food manufacturing industry
  - Supports 2,181 jobs in Kansas with a direct output of **$3.12 B**
  - Indirectly, it supports 11,134 employees and a total economic contribution of **$5.03 B**
- Animal and pet food exports
  - 4.2% ($207 million) of total pet food production
  - 4th most exported item in the state

Estimates from Kansas Department of Agriculture and Implan 2017

Pet Food Program

- Established KSU 2012
- Home: Grain Science & Industry
  - Feed Science & Mgt
- Training: Short courses, Minor, BS, MS, PhD
- Cross-campus Initiative
- ECO-DEVO support

Initiatives: Building Critical Mass

- Awareness building
- Course and curriculum
- Research capabilities – establish and expand
- Funding and support
  - Grants, contracts, fee-for-service projects
  - Sponsors and charitable contributions
- Economic development
  - Kennels, manufacturing facilities, laboratories

Cross-Functional Network

- KSU
  - *Grain Science & Industry*: Sajid Alavi, Greg Aldrich, Gordon Smith, Yonghui Li
  - *Animal Science & Industry*: Scott Beyer, Liz Boyle, Terry Houser, Fadi Aramouni, James Lattimer, Cassie Jones, Randy Phebus, Evan Titgemeyer, Umut Yucel, Valentina Trinetta
  - *Ag Economics*: Deborah Kohl, Aleksan Shanoyan
  - *College of Human Ecology*: Kadri Koppel, Edgar Chambers III, Delores Chambers
  - *K-State Olathe*: Bryan Severns
  - *Engineering - AMI*: Jeff Tucker
  - *Veterinary Medicine*: Sally Olson
- KSU-IC, KBED & KSU-Foundation
  - Rebecca Robinson, Kent Glasscock, Trent Armbrust, Kim Schirer
- KDA
  - Lynne Hinrichsen, Chad Bontrager, Suanne Numrich, Abby Works
- AIB
  - Brian Strouts, Kathy Brower,

What are Treats, Toppers and Inclusions

- Treats
- Toppers
- Inclusions

What do we know about the category?

- Business Development
- Nutrition
- Animal Health
- Product Performance
- Home Use
- Safety
- Transport

68% of Households Own a Pet
84.6 Million Households

Pet	Households (M)	Total (M)
Dog	60.2	89.7
Cat	47.1	94.2
Fish – Fresh	12.5	139.3
Bird	7.9	20.3
Small Animal	6.7	14.0
Reptile	4.7	9.4
Equine	2.6	7.6
Fish – Salt	2.5	18.8

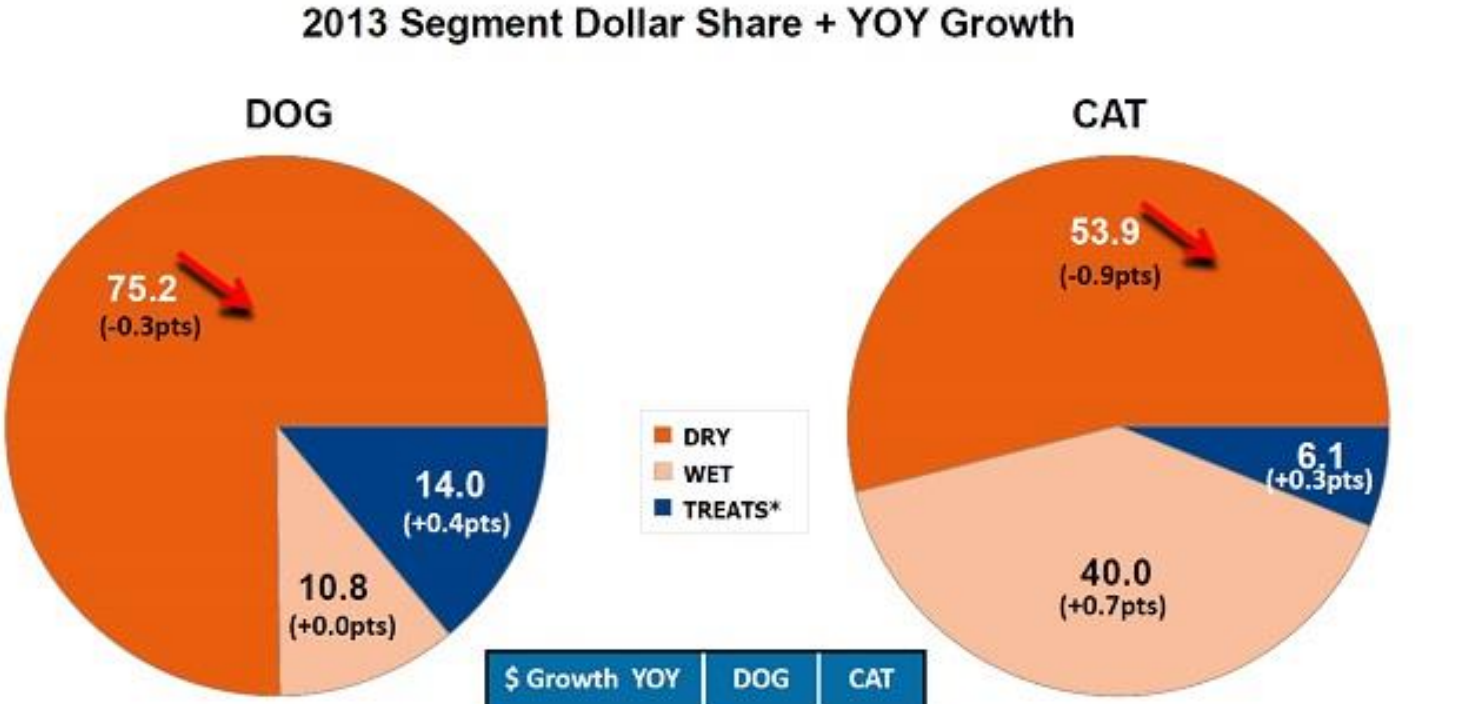
APPMA, 2017

TABLE 2: RELATIVE USAGE RATES BY TYPE OF PET TREAT OR CHEW 2015

Type	Dogs	Cats
Standard treats	75%	78%
Dental chews	48	35
Standard chews	34	23
Pet treats with special nutrition	24	29

Source: Packaged Facts Pet Owner Survey, January 2015

US petfood market shares by product category



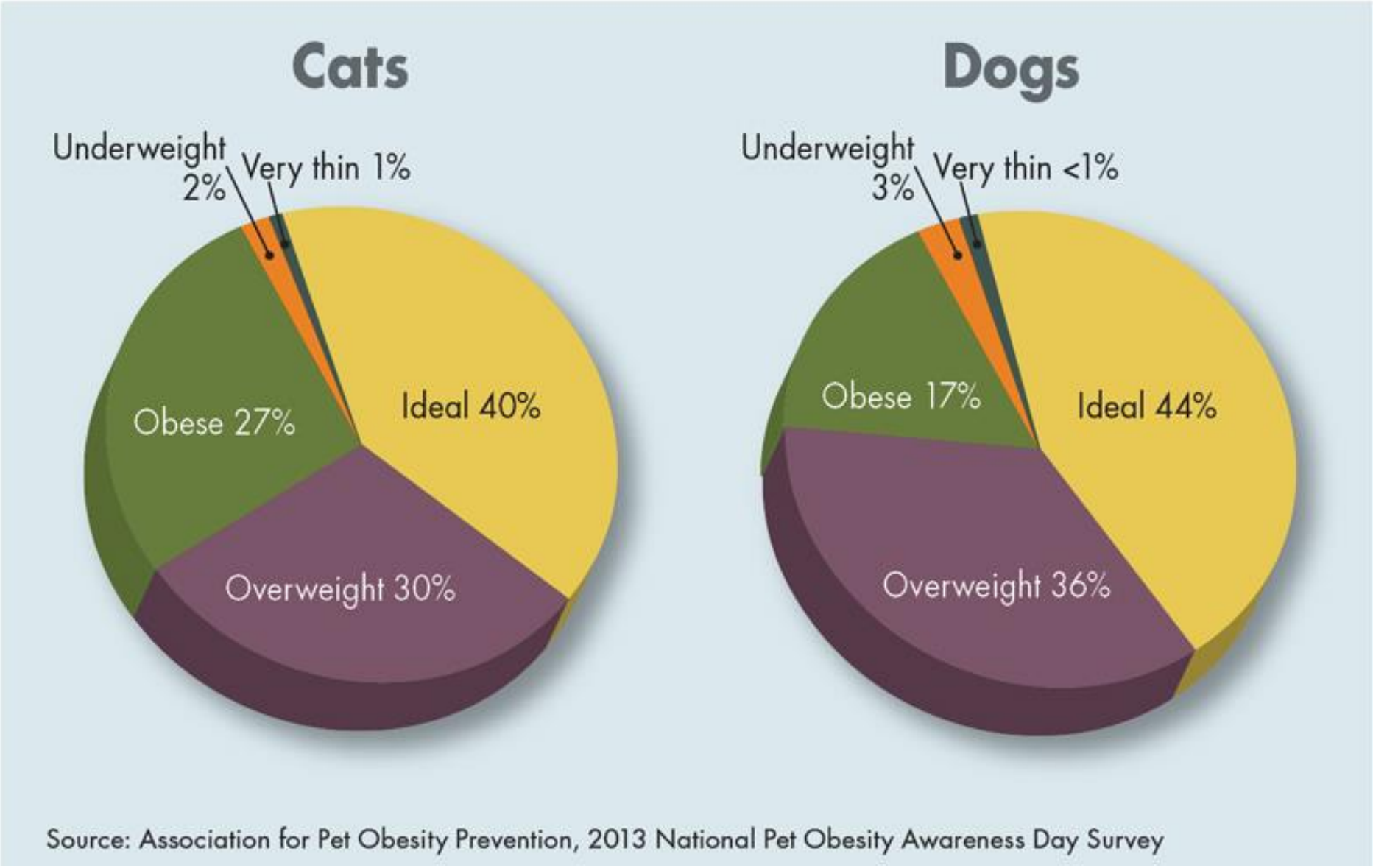
$ Growth YOY	DOG	CAT
TOTAL	7.2%	3.6%
DRY	6.7%	2.0%
WET	7.1%	5.4%
TREATS*	10.3%	7.9%

Treats*; Pill Pocket sales included in Treat Sales

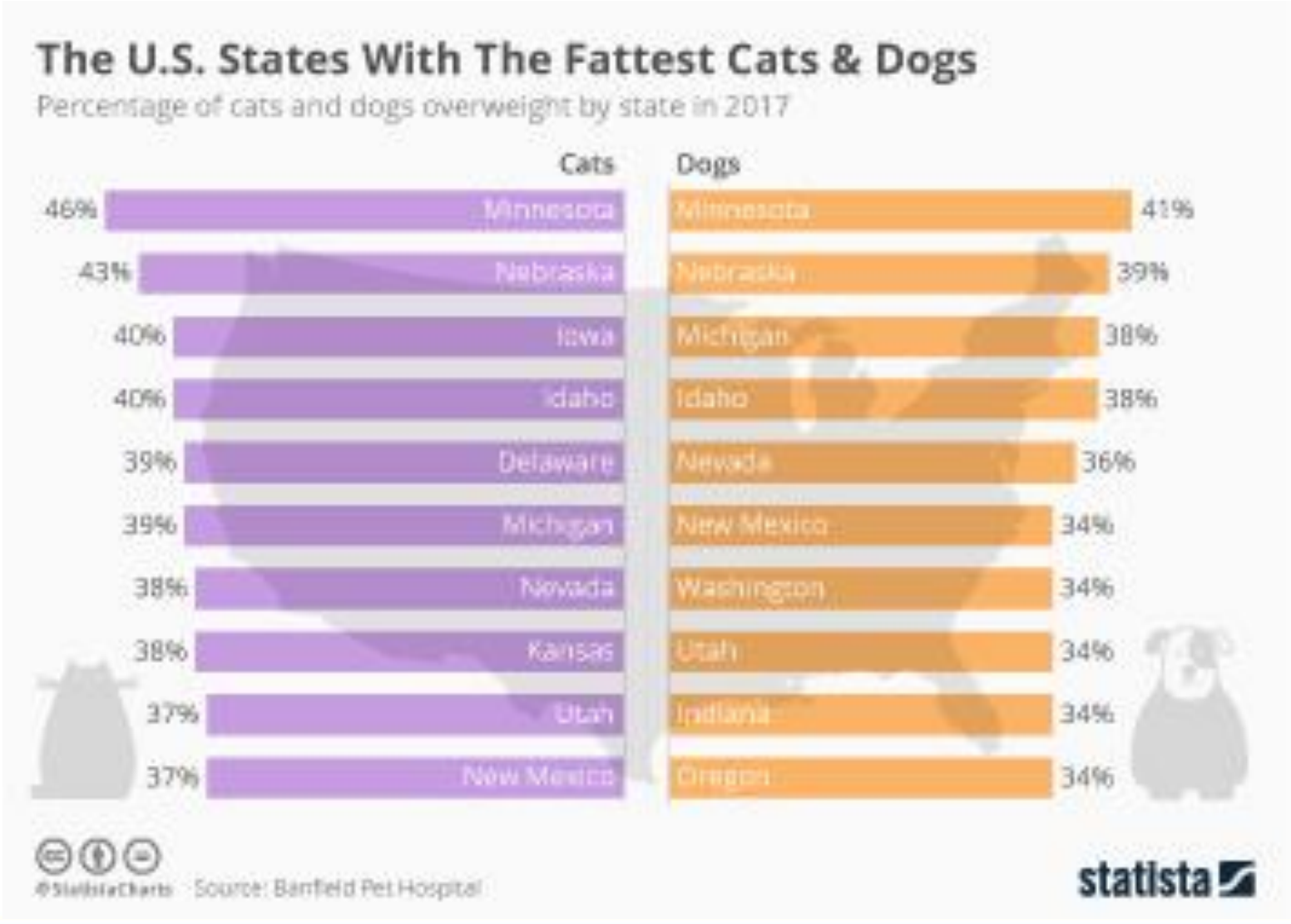
GfK, as presented by Maria Lange at Petfood Forum 2014

http://www.petfoodindustry.com/MarketDataViewContent.aspx?id=51097

FIGURE 1: PET OBESITY IN THE US: CATS AND DOGS



http://www.petfoodindustry.com/MarketDataViewContent.aspx?id=52946


The U.S. States With The Fattest Cats & Dogs
Percentage of cats and dogs overweight by state in 2017
Cats
Dogs
46% Minnesota
43% Nebraska
40% Iowa
40% Idaho
39% Delaware
39% Michigan
38% Nevada
38% Kansas
37% Utah
37% New Mexico
Minnesota 41%
Nebraska 39%
Michigan 38%
Idaho 38%
Nevada 36%
New Mexico 34%
Washington 34%
Utah 34%
Indiana 34%
Oregon 34%
Source: Banfield Pet Hospital
statista

What do we know about the market for TTI?

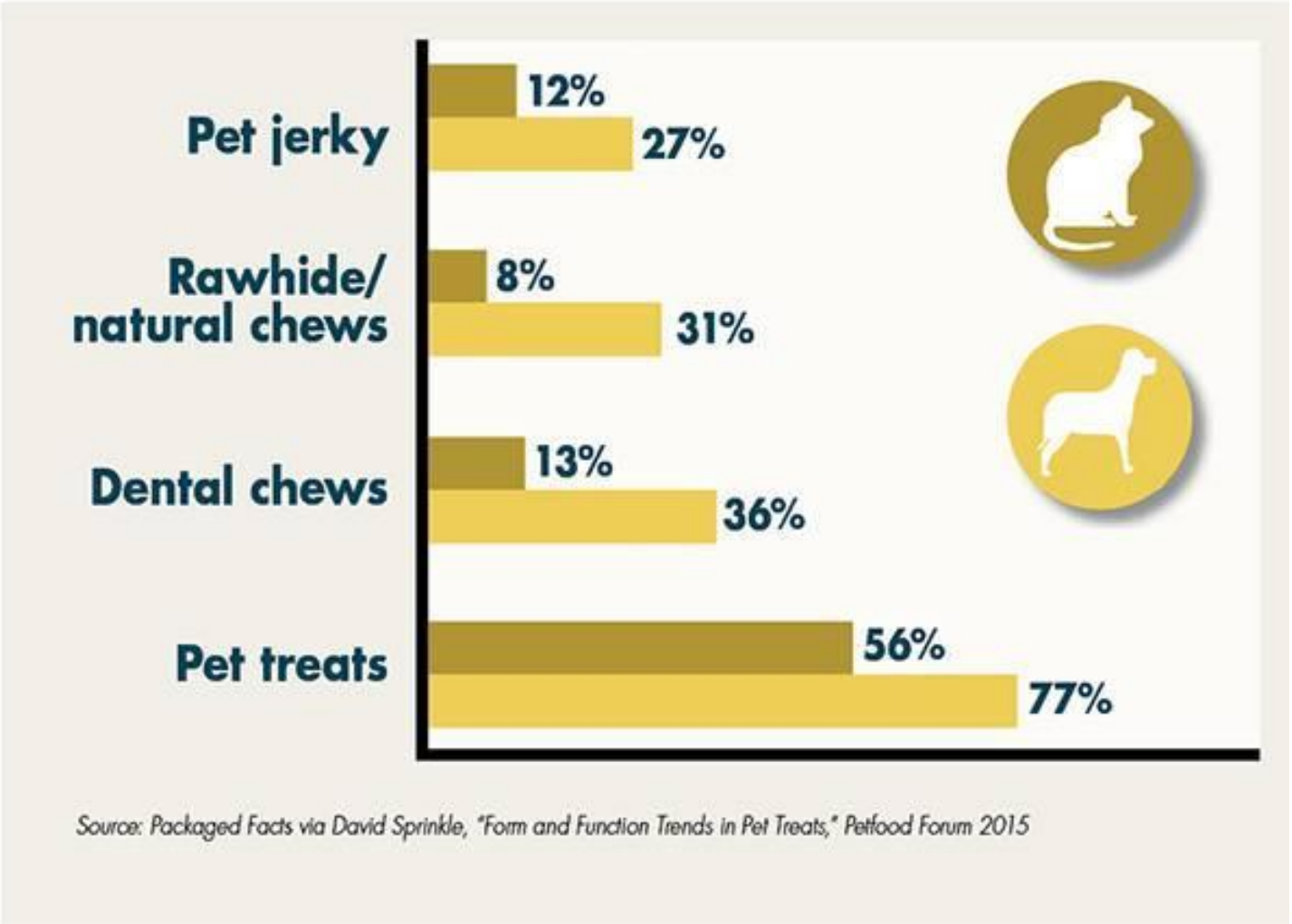
- 16% of the market (Packaged Facts, 2015)
- $6 billion market (Packaged Facts, 2016)
- Growth of 29% between 2012-2017 (Mintel 2017)
- 9% of pet owners feed a “Topper” (Mintel, 2017)
- 24% give a treat for health benefits (Mintel, 2017)

TABLE 1: DOG VS. CAT PET TREAT PURCHASING TRENDS 2004-2014

	2004	2006	2008	2010	2012	2014
Dogs	77.2%	79.1%	79.3%	79.5%	78.6%	78.1%
Cats	40.2	39.6	44.3	47.0	48.6	46.5

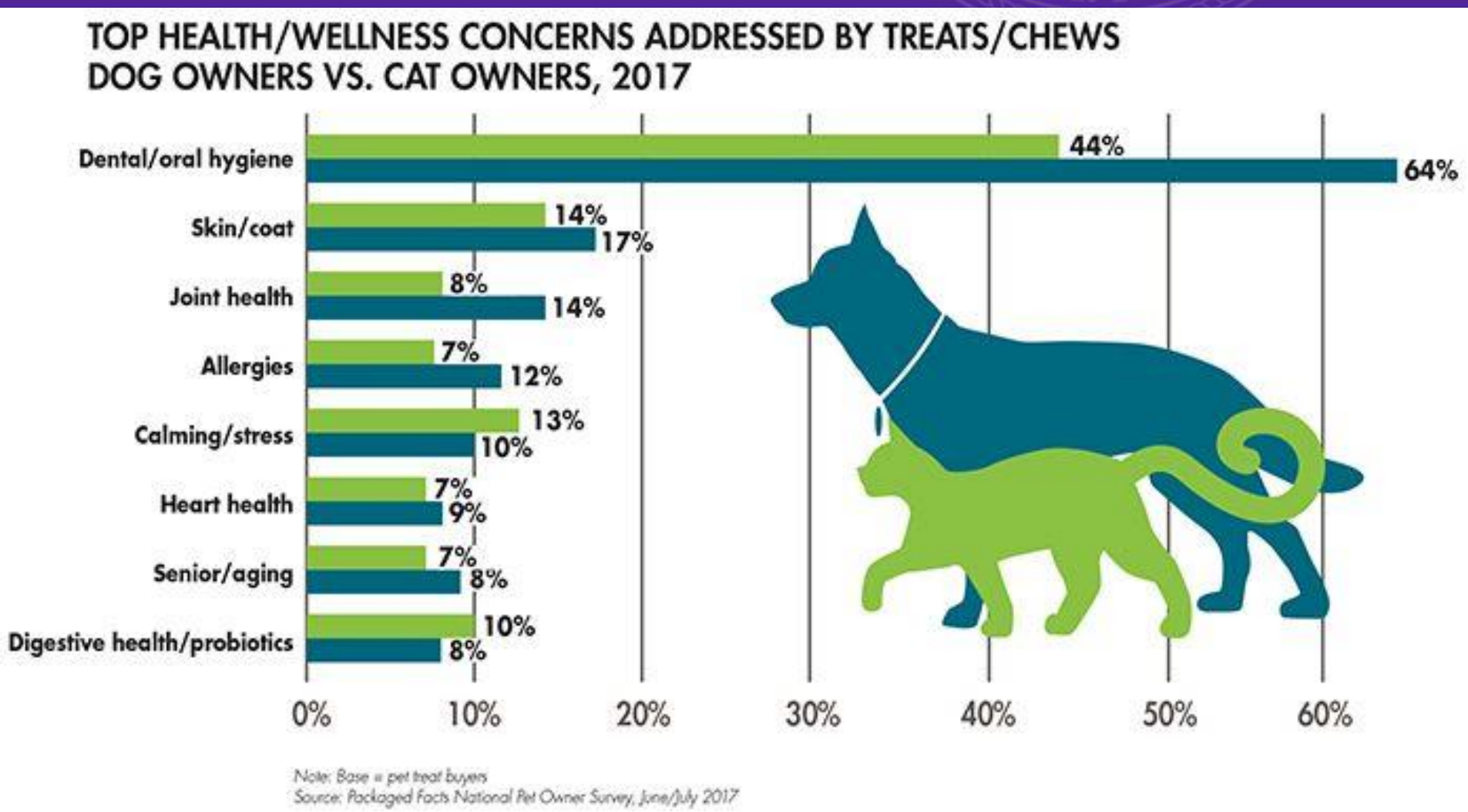
Source: Simmons Data via David Sprinkle, "Form and Function Trends in Pet Treats," Petfood Forum 2015

FIGURE 3: US PET TREAT PURCHASING BY TYPE 2015



Source: Packaged Facts via David Sprinkle, "Form and Function Trends in Pet Treats," Petfood Forum 2015

https://www.petfoodindustry.com/articles/5232-trends-in-pet-treats



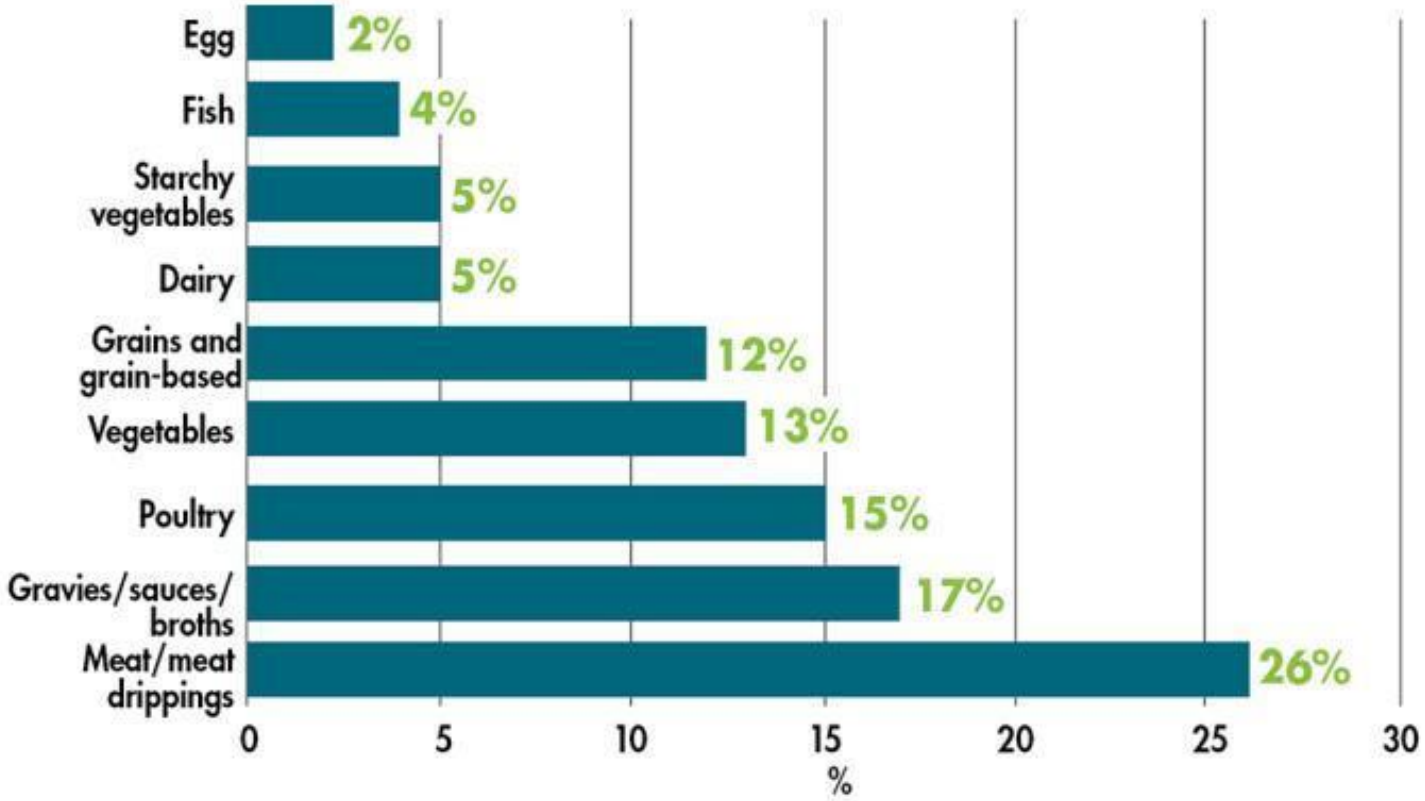
Dental and oral hygiene are the top health and wellness concerns dog and cat owners look for when choosing pet treats and chews by a significant margin. | Dog and cat icon courtesy of Michele Paccione.Fotolia.com

USE OF PET FOOD TOPPERS, MIX-INS OR GRAVIES/SAUCES

Source: Packaged Facts National Pet Owner Survey, December 2016

https://www.petfoodindustry.com/articles/6221-pet-food-mix-ins-adding-fresh-foods-to-dog-cat-food

DOG OWNER USE OF PET FOOD TOPPERS, MIX-INS OR GRAVIES/SAUCES



Source: Packaged Facts National Pet Owner Survey, December 2016

Preventive Veterinary Medicine 132 (2016) 14–19

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

"Who's been a good dog?" – Owner perceptions and motivations for treat giving

G.A. White[a,*], L. Ward[a], C. Pink[a], J. Craigon[a], K.M. Millar[b]

[a] School of Biosciences, Sutton Bonington Campus, University of Nottingham, Loughborough, Leicestershire, LE12 5RD, UK
[b] Centre for Applied Bioethics, School of Biosciences and School of Veterinary Medicine and Science, University of Nottingham, Loughborough, Leicestershire, LE12 5RD, UK

"The majority (96%) of owners interviewed reported feeding treats to their dog, with 69% feeding shop-bought treats on a daily basis."

Emotional feedback for who – dog or owner?

- Emotional response to feeding using infrared thermography (Travain et al., 2016)
- Dog eye temperature and heart rate increased during “positive stimulation” (aka food).
- Behavior “positive emotional state”

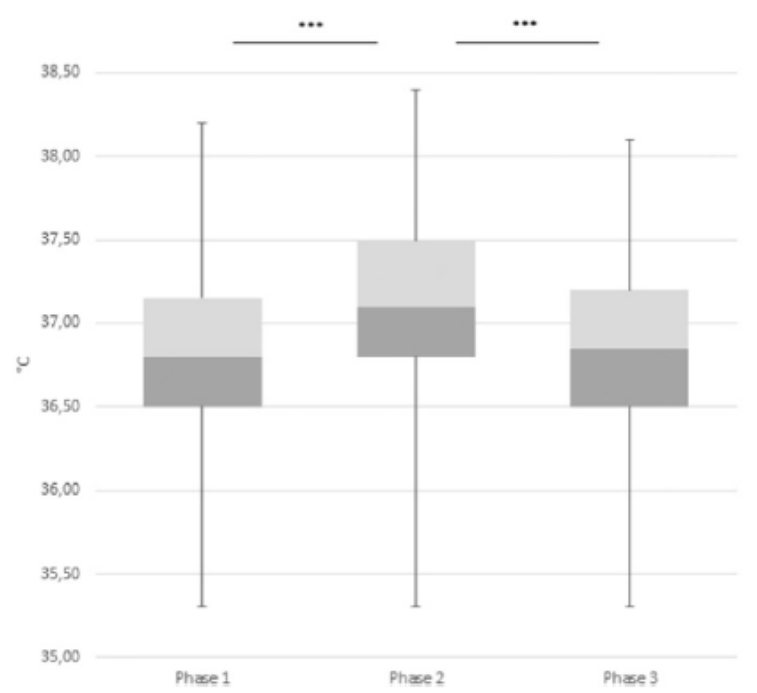


Fig. 2. Boxplot representing eye temperature (°C) exhibited by the dogs during the three phases of the experiment (1. Baseline, 2. Feeding, 3. Post-feeding). Pair-wise comparisons: ***P = 0.001.

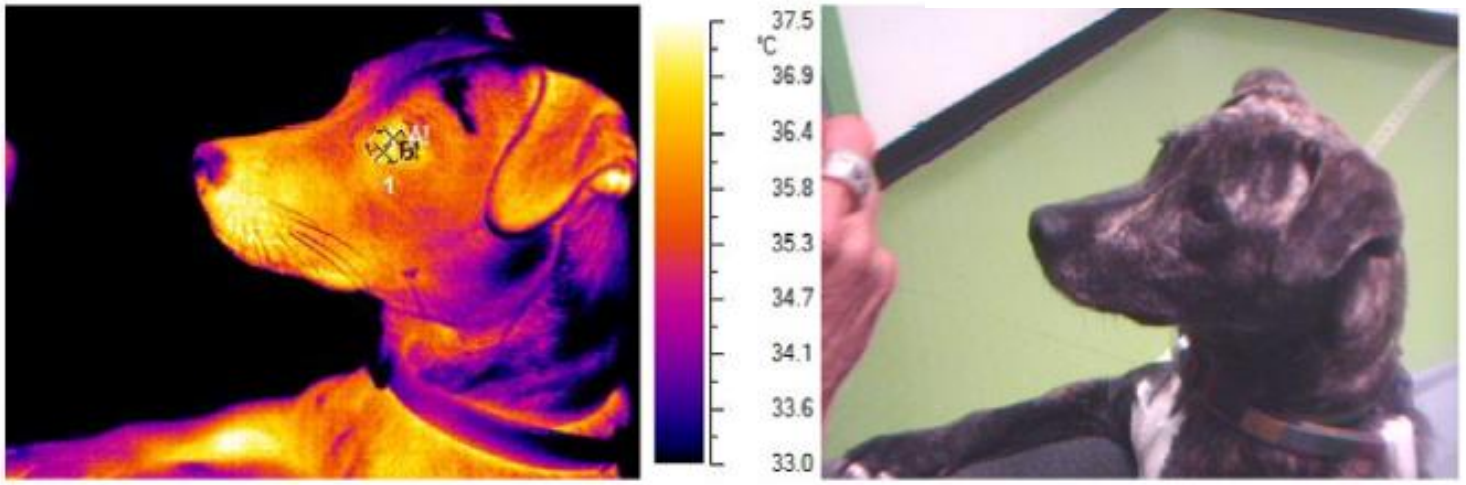


Photo 1 Photo 2

Fig. 1. Thermographic image (photo 1) and corresponding picture (photo 2) of Easy, Staffordshire bullterrier mix, during Phase 2 (Feeding). A! is the lacrimal caruncle and the hottest spot on the eye. B! is the second hottest spot on the eye and it is highlighted for control purposes. 1 is the marker for the oval area traced around the eye.

ORIGINAL ARTICLE

The Occurrence and Anti-microbial Susceptibility of *Salmonellae* Isolated from Commercially Available Pig Ear Pet Treats

R. Finley[1,3], R. Reid-Smith[2,3], C. Ribble[3], M. Popa[3], M. Vandermeer[3] and J. Aramini[1,3]

[1] Center for Food-borne, Environ
[2] Laboratory for Foodborne Zoon
[3] Department of Population Med

Impacts

- Animal derived pet tre among dog owners.
- Animal-derived pet tre carry bacteria that can
- People can get sick fro are not washed proper

FOOD SAFETY INVITED ARTICLE

Frederick J. Angulo, Section Editor

Human Health Implications of *Salmonella*-Contaminated Natural Pet Treats and Raw Pet Food

Rita Finley,[1] Richard Reid-Smith,[2,3] and J. Scott

[1]Foodborne, Waterborne, and Zoonotic Infections Division
Medicine and [2]Clinical Studies, Ontario Veterinary College,

Human salmonellosis occurs mainly as a res
of cases being related to other, less well-de
The increasing popularity of raw food diets
organisms; however, no confirmed cases of
contaminated pet treats and raw food diet
making them a possible hidden source of
Salmonella organisms by not feeding natur
cases of salmonellosis or interpret surveilla

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MMWR Weekly

June 30, 2006 / 55(25);702-705

Human Salmonellosis Associated with Animal-Derived Pet Treats --- United States and Canada, 2005

During 2004--2005, contact with *Salmonella*-contaminated pet treats of beef and seafood origin resulted in nine culture-confirmed human *Salmonella* Thompson infections in western Canada and the state of Washington. This is the third published report (*1*,*2*) of an outbreak of human illness associated with pet treats in North America and the first to describe such an outbreak in the United States. This report highlights the investigation of the outbreak by U.S. and Canadian public health officials and provides recommendations for reducing the risk that *Salmonella*-contaminated pet treats pose to humans. Public health practitioners should consider pet treats a potential source for *Salmonella* transmission.

Case Reports

Case 1. In February 2005, a man aged 26 years in Alberta, Canada, sought medical care because of diarrheal illness. Stool culture yielded *S.* Thompson. The patient reportedly had fed his dog beef pet treats a few days before the onset of his illness. The dog was asymptomatic. A package of the same brand of pet treats fed to the dog was purchased and submitted for testing. The treats yielded *S.* Thompson, *S.* Cerro, and *S.* Meleagridis. The *S.* Thompson isolates from the patient and the treats were indistinguishable (i.e., defined as the outbreak strain) by pulsed-field gel electrophoresis (PFGE) using *Xba*1. The treats were packaged and distributed by a British Columbia (BC) manufacturing plant, but plant records were inadequate to determine where the treats had been produced.

Case 2. In February 2005, a woman aged 37 years in BC sought medical care because of diarrheal illness. Stool culture yielded *S.* Thompson. The patient reportedly had fed her dog salmon pet treats a few days before the onset of her illness. The dog also had a diarrheal illness, but specimens were not collected. The remaining pet treats were collected from the patient's house for testing. The treats yielded *S.* Thompson. Isolates of *S.* Thompson from the patient and treats were indistinguishable from each other and from the outbreak strain by PFGE. The salmon treats originated from a Washington manufacturing plant. The treats were imported into Canada, labeled, and distributed for sale in BC and Alberta by the same BC manufacturing plant identified in case 1.

Case 3. In March 2005, a woman aged 81 years in Washington sought medical care because of diarrheal illness, fever, and vomiting. The patient was hospitalized

KANSAS STATE UNIVERSITY | Department of Grain and Industry

Australian
VETERINARY JOURNAL
THE JOURNAL OF THE AUSTRALIAN VETERINARY ASSOCIATION LTD

Acquired proximal renal tubulopathy in dogs exposed to a common dried chicken treat: retrospective study of 108 cases (2007–2009)

MF Thompson,[a*] LM Fleeman,[a] AE Kessell,[b] LA Steenhard[c] and SF Foster[d]

Background Proximal renal tubulopathy was reported in Australian dogs with markedly increased frequency from September 2007.

Methods Two veterinarian-completed surveys were launched in response to an increased incidence of acquired proximal renal tubulopathy in dogs. The selection criterion for inclusion was glucosuria with blood glucose <10 mmol/L. Data collected included signalment, presenting signs, history of feeding treats, results of urinalysis and blood tests, treatment and time to resolution of clinical signs.

or amoxicillin.[4] Acquired proximal renal tubulopathy has also been reported in dogs with primary hypoparathyroidism,[5] hepatic copper toxicoses,[6,7] hereditary renal disease,[8,9] leptospirosis[10] and more recently, chicken jerky treats.[11] Glucosuria in the absence of hyperglycaemia is a distinct feature of proximal renal tubulopathy, so the condition is readily identified by urine and blood tests.

Proximal renal tubulopathy in Australian dogs was being reported with increased frequency from September 2007. All dogs had been fed KraMar Supa Naturals Chicken Breast Strips, made in China, intro-

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DOI: 10.1111/joss.12307

ORIGINAL ARTICLE

WILEY Journal of Sensory Studies

Preference ranking procedure proposal for dogs: A preliminary study

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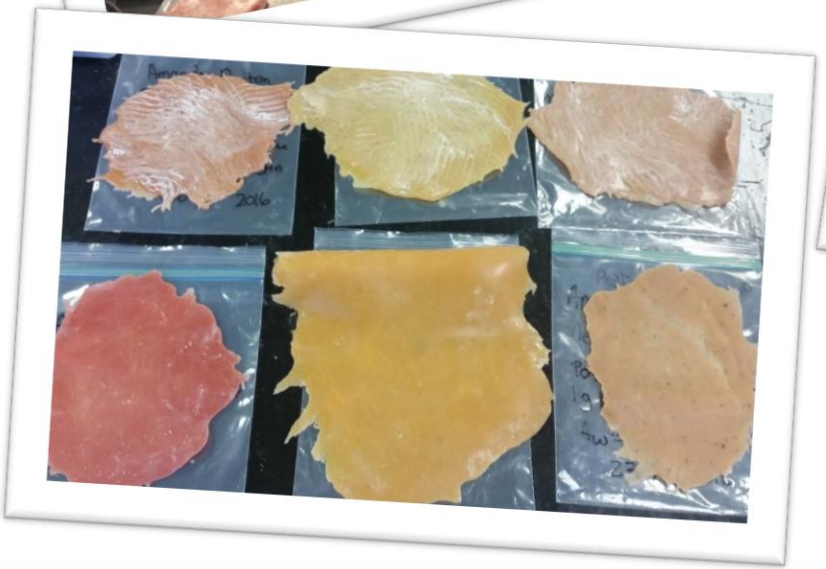
Abstract

In the pet food industry, single-bowl or two-bowl methods traditionally are used to determine food acceptance or preference by pets. To increase efficiency of preference testing, and to provide more options for preference testing, a preference ranking procedure is proposed. The ranking procedure includes simultaneous presentation of five samples of edible treats. This increases the efficiency and reduces the time of preference testing. A preliminary test of the procedure with 12 beagle dogs was conducted. Each animal was presented with five treats, in an identical, coded rubber puzzle toy, or "Kong." Five phases were included in the test, each lasted 5 days. Phase 1 included training with commercial treats. Phases 2–4 used lab-baked treats with five different ingredients in each category (fats, starches, and proteins, respectively) of a base recipe. Phase 5 included testing with commercial foods. The order and time of treat selection by dogs was recorded. Results showed this small sample of animals generally ranked 1–2 flavors above others, indicating that this procedure could be a more efficient method to determine preference than traditional test methods since more samples can be evaluated simultaneously. More research is needed to verify the method.

What work have we done at KSU


Hamilton Beach



Injection Molded Treats

Events & Short Courses

- 2019
  - *January 14-18* Pet Food Formulation for Commercial Production – KSU (IGP; GRSC 750)
  - *April 29* Pet Food Innovation Workshop: Clean Label Technology – KSU-Olathe
  - *April 30- May 1 P*etfood Forum – Kansas City
  - *August 12 KSU Pet Food Workshop*
  - *August 13-16 Extrusion Workshop*
  - *October tbd* Pet Food R&D Showcase

What Next?