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Treats gone wild

Sales are flourishing worldwide and new niches abound

The global pet treats market has gone wild. Not only is sales growth expanding rapidly, so are the number of new niches. The worldwide retail value of dog and cat treats hit US\$4.5 billion in 2005. Dog treats accounted for US\$3.8 billion; cat treats reached US\$620 million (Euromonitor, 2006).

However, there's now more to the treat market than snacks for dogs and cats. Take Vitakraft, for example (p. 20). It is a company that has treats for a variety of species, including: Reptiles, chinchillas, rabbits, guinea pigs, hamsters, parakeets and parrots.

In addition there's a burgeoning business in functional treats for pets. There are snacks that clean teeth; aid in hairball control; acidify urine and supply extra energy for exercise.

There is also big money in the humanization of pet treats. For example, Three Dog Bakery makes luscious-



looking snacks and throws birthday parties for pets. Another example is, Merrick Pet Care's new line of sausage snacks which comes in flavors such as Grammy's Pot Pie; Thanksgiving Day Dinner and Cowboy Cookout.

Multi-national players are subject to the volatile Chinese import policy.

— Tim Phillips



Treat sales vary greatly by country, with the US, Europe and Japan far in the lead. But many other countries have promising pet snack markets. Following are treat market assessments from Euromonitor International.

China's pet treat market

Dog treats are growing rapidly in both value and volume terms in China. This is more evidence of the increased willingness of Chinese owners to please their dogs. With current value growth of around 17% in 2005, sales of dog treats reached US\$11.5 million.

Given the relatively low income levels, brand loyalty is quite low when it comes to dog treats. With the exception of Pedigree, the dog treats market is mostly occupied by domestic brands, which enjoy advantages in terms of lower production costs and wider distribution. Multi-national players are subject to the volatile Chinese import policy. China's domestic companies used to be export-oriented, but as the domestic market boomed, they swiftly adapted with it. Some brands have successfully established brand awareness among consumers, such as Wanpy and I Love Dogs.

Indian dog treats

Dog treat value sales in India almost doubled over the past five years to an

estimated US\$4.4 million in 2005, with growth of 14% over 2004. This can be directly attributed to increased spending on dogs and a greater integration of the dog as a member of the family. Dog treats are expected to be one of the biggest beneficiaries of the ever-improving disposable incomes and growing expenditure of Indian dog owners.

Pet treats in Mexico

The Mexican dog treats market accounted for 5% of the total dog food value in 2004. It rose to about US\$33 million in 2005, a 3% growth over 2004. High prices and lack of awareness limit dog treats' growth potential considerably. Nestlé México set up an informative website where consumers can find complete information on how to care for pets, including information on the importance of treats.

Link to Reports

For more information on Euromonitor's reports, go to www.petfoodindustry.com and click the Euromonitor icon. ➔

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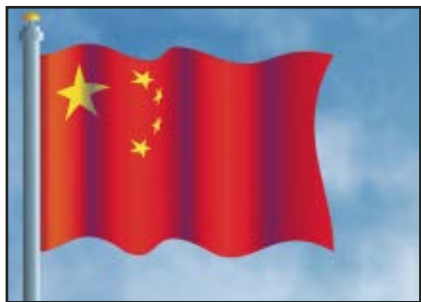
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Industry News

China petfood market brief



According to a recent USDA Foreign Agricultural Service GAIN Report, there were roughly 150 million pet dogs in China in 2005. Research found that the percentage of Chinese owning dogs increased from 5% in 1999 to 7% in 2004. Analysts estimate that sales of dog and cat food in China reached nearly RMB1.6 billion in 2004 (approximately US\$199 million)—up 13% over the previous year. Experts predict annual sales of petfood and necessities might top RMB6 billion (roughly US\$750 million) in 2008.

Chinese import figures show steady growth in the import of petfood products from around the world—from about 1,000 tons in 2000 to nearly 3,000 tons in 2005. Chinese petfood manufacturers are also exporting at a rapid pace—about 1,000 tons in 2000 to more than 20,000 tons in 2005. So, while there is a growing domestic market in China for US exporters, Chinese petfood exporters are going to provide great competition for US petfood producers around the world, said the report.

UK petfood data show thriving market

The petfood industry in the UK is thriving, according to the Pet Food Manufacturers Association (PFMA). The British association recently announced key results from its annual market data survey for the cat and dog food sectors showing the total UK market for prepared cat and dog foods to be valued at just over £1.5 billion in 2005. Data

reported by www.ukpets.co.uk noted that the prepared dog food market is valued at £696 million (2005)—up 2% from 2004.

The dog food market is made up of wet food—£291 million (0% growth on 2004); dry complete—£375 million (5% growth on 2004); and mixers—£30 million. The dog treat market witnessed considerable growth, being valued at £163 million—up 10% from 2004. The prepared cat food market was valued at £697 million (2005)—up 2% from 2004. The cat food market consists of wet food—£524 million (2% growth on 2004); and dry complete—£173 million (2% growth on 2004).

Reports indicated that there has been a shift away from multi-serve packs towards single-serve wet cat food. The popularity of the pouch has been a key driver of this trend. A number of launches for cat and dog treats were seen in 2005 which focused on health and dental hygiene. According to Michael Bellingham, chief executive of the PFMA, “with over half of UK households owning a pet, and approximately 90% of pet owners feeding prepared petfood at least once a week, the market for prepared petfoods is significant.” Additional information is available at www.pfma.com.

Del Monte quarterly profit tripled



Recent reports from Del Monte Foods Co. stated that quarterly profit had tripled, beating estimates. Profit for the fourth quarter ended April 30 was US\$57.9 million—up from US\$19.3 million a year ago. The company also raised its long-term sales and earnings targets, even as it said it plans to cut 85 sales and administrative jobs. It also said it will revamp its dry petfood manufacturing in order to lower delivery

costs. In addition to the job cuts and the petfood overhaul, Del Monte said it will upgrade its systems for tracking promotional spending and take steps to get new products to market faster.

“This program continues our progress and strategic commitment towards the goal of transforming Del Monte into a superior US retail-branded food company,” said Del Monte chairman and CEO Richard Wolford. “Streamlining our business and improving our systems and processes will make us more nimble, giving us the flexibility and speed we need to meet the needs of our customers and consumers,” said Wolford. “We also expect to significantly improve our dry petfood manufacturing and distribution infrastructures, improving our margins,” he said.

For fiscal 2007, Del Monte expects sales growth of 14-16% over 2006. Sales growth is expected to be driven primarily by the acquisitions of Meow Mix and Milk-Bone brands—building Del Monte into a billion-dollar-per-year petfood business—as well as from growth of the company’s existing businesses consistent with prior years.

Nestlé to invest US\$20 million in petfood plant in Russia

Nestlé Purina PetCare has reportedly made plans to invest about US\$20 million in the construction of a new petfood plant in Russia, according to Interfax. The Nestlé Purina PetCare Vorsino plant will be located in the Kaluga region’s Borovsky district. The construction of the plant is currently in its initial phase. The new plant in the Kaluga region will apparently become the first local producer of petfood in Russia for Nestlé.

Chomp receives two industry awards

Chomp Inc. was recently named the recipient of two prestigious awards. At

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the recent Food Marketing Institute's (FMI) Annual Show, Chomp received the 2006 Retailers' Choice Award for Product Innovation in the Pet Product Category. Shortly after, Chomp was named one of 15 finalists in the Smaller Business Association of New England (SBANE) 2006 Business Innovation Awards.

SBANE's Innovation Awards have recognized over 100 New England

companies since 1986. This year over 170 companies were nominated, and Chomp was one of 15 finalists selected. Finalists are recognized for not merely being successful, but for success due to innovation and thought leadership.

Simmons Pet Food recalls canned dog foods

Simmons Pet Food, Inc. recently voluntarily recovered its 22-oz. canned

wet dog food manufactured with "use by" dates between March 16, 2008 and June 6, 2008. Simmons discovered an issue regarding random flaking of the inside coating of the can. This coating was approved for direct contact with food under USFDA 21 CFR 175.300 in 1971, and since 1971 it has worked well on billions of cans for many manufacturers of various types of human and petfood. Even though the incidence of failure of the inside coating was less than 0.1%, Simmons felt it was in the best interest of its customers to voluntarily recover this product from the marketplace. The company undertook the action in cooperation with the US Food and Drug Administration.

P&G executive goes to Pinnacle Foods

Jeff Ansell, president of Procter & Gamble's Iams petfood unit, recently announced his departure from P&G to become CEO of Pinnacle Foods Group Inc. Ansell is a 25-year P&G veteran. He started his new position on July 5.

Ontario Teachers' completes sale of Doane Pet Care

Teachers' Private Capital, the private investment arm of the Ontario Teachers' Pension Plan, completed the sale of Doane Pet Care to Mars, Inc. recently. The acquisition by Mars of the Brentwood, Tennessee, USA-based manufacturer of private label petfood was announced in April 2006. Details of the transaction were not disclosed. Teachers' Private Capital purchased Doane Pet Care in 2005 for US\$840 million.

ZuPreem receives 5th Superior AIB rating

ZuPreem, a leading manufacturer of premium exotic animal diets, recently announced that the company has recently received a "Superior" audit rating from the American Institute of Baking (AIB) for the cleanliness and efficiency of its warehouse facilities. It is the company's fifth consecutive Superior rating.

"We're very proud of this accomplishment," said David R. Morris, president of ZuPreem. "It was exciting to

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SPF opens US headquarters

Reports from a South Carolina news branch, WYFF News 4, indicated that French palatability company SPF has chosen Greenwood, South Carolina, USA as its United States headquarters. County officials said the company will invest more than US\$10 million to start off and bring 54 new jobs to the area.

Masterfoods returns to Mars roots

Mars, Inc. is reportedly attempting to leverage the company’s US\$18 billion in disparate businesses under a single umbrella brand. Five years ago, Mars changed its corporate name to Masterfoods North America and began centralizing its three top divisions. It’s now dropping the Masterfoods name and once again decentralizing its divisions.

The name change is the final step in the decentralization that began last October of Mars’ top three US divisions—snacks, food and petfood—and a return to the better-known Mars family name.

In 2000, the plan was to unite several distinct divisions called M&M/Mars, Uncle Ben’s and Mars Pet Food. Mars decided to return decision-making power to its business unit presidents last fall. The move from Masterfoods isn’t expected to be noticed by the consumer.

Natural Life inks Wal-Mart deal

Natural Life Nutritional Pet Products recently signed a major deal with Wal-Mart that could boost domestic sales of its dog and cat food line by at least 25%. Kaleb Terlip, a company representative said, “Wal-Mart is upgrading its merchandise in every area. It’s a company initiative. They wanted to offer a petfood line that is much better quality.”

Talks with Wal-Mart began last fall. Natural Life Nutritional Pet Products, based in Girard, Kansas, USA, competed with some of the biggest

players in the industry to get the Wal-Mart contract. “We were the smallest and the only family-owned company to be considered,” Terlip said. “They wanted a premium-grade product at an affordable price.”

The company, owned by Chris and Kristy Terlip, recently acquired about 75,000 square feet of warehouse space to coordinate the massive delivery of products to 1,100 Wal-Mart stores

across the nation. To help make the deal happen, the company has hired about a half dozen people.

Natural Life petfood, both dry and canned, was previously available only through pet specialty stores, natural food stores and veterinary clinics. Kaleb Terlip said the company primarily distributes petfood to the East and West coasts. About a third of the company’s business is overseas. ➔



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New on the Shelves

Editor's note: This is our first installment of the department "New on the shelves." It will describe products new to the retail shelves and keep you up-to-date with the R&D and marketing efforts of the global petfood industry. Submissions and feedback are welcome, contact: Tim Phillips, Watt Publishing Co., Tel: +1.815.734.5644, Fax: +1.815.734.5649, E-mail: phillips@wattmm.com.



« Sniffers101 for training

Chomp Inc. is introducing Sniffers101®, "the first all-natural, semi-moist training bits with a proprietary herbal formula to help dogs relax and focus during training." Chomp's goal in the development of Sniffers101 was to create the ultimate training product. A blend of the herbs chamomile, lavender and lemon balm is used to help with "calming and focus."

www.chompinc.com

Animal Snackers »»

American Health Kennels brings another dog treat to the market with their fun-shaped Animal Snackers, reminiscent of childhood boxes of circus-styled Animal Crackers. The natural treats are shaped like animals and come in a peanut butter flavor. There are no animal by-products, artificial flavors, added salt, food colors or chemical preservatives.

www.animalhealthkennels.com



« White Bites' oral care

Recently released under the White Bites brand is Dog Chews Oral Care Dog Treat. The treat offers three benefits: Clean teeth, fresh breath and long lasting effects. As humans have become more interested in whitening their own teeth, the same option is available for dogs in this product. Its abrasive consistency scrapes plaque and tartar to clean and whiten teeth, allowing for extended oral hygiene. The treats are infused with baking soda to freshen breath. Dog Chews are safe and easily digestible with quick breakdown due to added milk proteins.

www.jakkspacific.com



Beneful's Prepared Meals »»

Beneful®, a premium dog food brand, has recently announced the introduction of Beneful Prepared Meals™. This food is packaged in a clear, ready-to-serve, resealable container. The product is available in eight varieties made with beef, chicken, turkey, pork and lamb along with such ingredients as wild rice, barley and pasta and vegetables like spinach, carrots, peas and green beans. According to the company, it is the most extensively-tested new product in Nestlé Purina's history. "We are the first petfood manufacturer to put a clear container on the shelf that enables pet owners to actually see the quality of the product," asserts Steve Crimmins, vice president of dog food marketing.

www.purina.com



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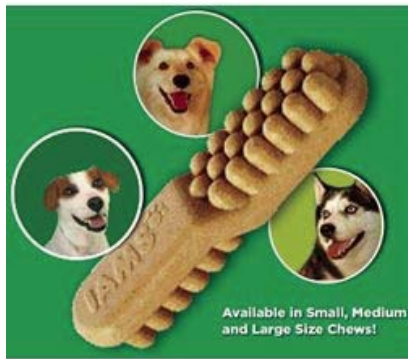


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« Iams Tartar Treats

The Iams Company has launched Iams® Tartar Treats™ for dogs—“a delicious edible hard chew that also assists in providing tartar reduction for improved dental health.” Each treat contains 38 “tartar scrubbers” on a patent-pending, double-sided design that looks like a scrub brush. Both the design and the formulation of the treat contribute to plaque and tartar reduction, according to the company. The product is available in small, medium and large sizes to fit any breed or chewing preference. According to reports from Iams, Tartar Treats were found to be up to three times more digestible than the hard chew category leader. www.iams.com

Nutro’s small kibbles »

Nutro Products Inc. has broadened its Natural Choice® line with new Small Bites Lite and Small Bites Senior formulas for dogs. Nutro’s research shows over half of the Small Bites purchases are made for medium and large breeds—showing that dogs of all sizes sometimes prefer a small kibble size. The addition of these two new formulas extends the Small Bites line of Natural Choice products, which already includes Small Bites for adult dogs and Natural Choice Chicken, Rice & Oatmeal Puppy small bites formulas. According to the company, Nutro’s Small Bites Adult formula grew by more than twice the rate of the Small Bites category in 2005. Natural Choice Small Bites Senior, created for dogs over the age of seven, provides dogs with Nutro’s new Senior Support System for healthy aging. www.nutroproducts.com



« Eatables for dogs

Natural Balance has just introduced “Eatables for Dogs.” It is reportedly the first made in a “people food” plant, with 100% USDA ingredients. This would mean that it’s edible for humans. Flavors include Spaghetti & Meatballs, Southern Style Dumplin’s, Hobo Chili, Irish Stew and Chinese Take-out. www.naturalbalanceinc.com

Nathan’s for pets »

Under a licensing agreement with Nathan’s Famous Systems, Inc., Taste of Nature, Inc. is launching a line of Nathan’s all-beef, human-quality treats in pet stores nationwide. Nathan’s Famous Pet Treats are all beef and will launch in a 4-oz. resealable bag, as well as single-serve packages. The single-serve packages will be available in three flavors—smoked, cheddar cheese and bacon. www.candyasap.com



« Lobster snacks

Blue Seal Feeds Inc. has launched the newest addition to its dog biscuit line—Blue Seal Lobster “Bisque-its”—based on a concept devised by the Lobster Institute at the University of Maine and its commercialization partner, Saltwater Marketing LLC. According to Blue Seal, these unique dog biscuits are baked with real lobster meal, which is a source of natural flavor and protein. www.blueseal.com

Kaytee for rabbits and guinea pigs »

No longer just for the birds, Kaytee is introducing two new super-sized Grande! Garden Blend treat bars, made especially for pet rabbits and guinea pigs. The introduction of Kaytee Grande! for small animals, follows the launch of Grande! treat bars for parrots in 2005. www.kaytee.com



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Portion control fights obesity

Increasing the quality and length of dogs' lives

BY TIM PHILLIPS, DVM

Petfood portion control is vital. Why? Because there is good evidence that portion sizes that are too large insidiously lead to obesity and its many negative consequences. Research spanning over 60 years has shown dietary restriction to be the only nutritional intervention that consistently extends the life span of animals.

A recent study of 48 Labrador Retrievers concluded that a 25% restriction in food intake increased median life span from 11.2 to 13 years (Kealy, *et al.*, 2002, *JAVMA* 220:1315–1320). Compared with control dogs, food-restricted dogs weighed less and had a lower body fat content. In addition, the “aging markers” of food-

restricted dogs were more positive: Lower serum triglycerides, insulin and glucose concentrations.

Portion control also delayed the onset of signs of chronic disease in these dogs. The chronic diseases diagnosed most commonly in the 48 Labradors were osteoarthritis (43 dogs); malignant mammary gland neoplasia (21 tumors in 17 dogs); benign neoplasia of the mammary glands (35 tumors in 12 dogs); recurring skin disease (19 dogs); and hepatic disease (11 dogs).

Ways you can help

Sean Delaney, DVM, DACVN is the principal consultant for Davis Veterinary Medical Consulting which specializes in nutritional consultancy for the petfood industry (www.dvmconsulting.com).

He believes that there are ways petfood manufacturers can facilitate portion control, including:

- Put a body condition scoring (BCS) chart with instructions on the package labeling.
- Provide feeding guidelines that explain how to adjust food intake by focusing on the dog's BCS. Emphasize on product labeling that recommended feeding amounts are only starting points and will likely need to be adjusted.
- Supply in-bag measuring cups and gradations on cans and pouches.
- Recommend adding water to dry food and/or decrease the kilocalories per unit volume of dry food (increasing air content).
- Provide caloric data on labels and supporting websites.

- Recommend regular exercise and provide clear feeding procedures for treats—including the recommendation to decrease regular meal amounts.

Body condition scoring

The Body Condition System was developed at the Nestle Purina Pet Care Center and has been validated as documented in several publications. Start by figuring out where the pet falls on the body condition chart. In order to do this, conduct three checks of the pet:

- Rib check:** Place both thumbs on the pet's backbone and spread both hands across the rib cage. One should be able to feel the ribs. Actually feeling the pet is important, as the coat of many pets will make a visual check difficult.
- Profile check:** Examine the pet's profile—it's best if you are level with the pet. Look for the abdomen to be tucked up behind the rib cage.
- Overhead check:** Looking at the pet from overhead, one should see a waist behind the ribs. Most pets at a healthy weight have an hourglass figure.

Based on these three checks, determine the pet's body condition score. For dogs, use the following guide.

→1. Ribs, lumbar vertebrae, pelvic



bones and all bony prominences evident from a distance. No discernible body fat. Obvious loss of muscle mass.

→2. Ribs palpable without excess



fat covering. Waist observed behind ribs when viewed from above. Abdomen tucked up when viewed from side.

→3. Massive fat deposits over thorax,



spine and base of tail. Waist and abdominal tuck absent. Fat deposits on neck and limbs. Obvious abdominal distention.

Anywhere, anytime, by anyone

One way to make portion control easier is with a product called SmartPak. It is a service that provides pre-measured dog food along with medications and supplements. Customized packs are shipped directly to dog owners every 28 days. Becky Minard, founder of SmartPak, notes that the service costs about US\$1.48 per day to feed a 20-pound dog. Popular additions to SmartPaks, that add cost, include fatty acid supplements, vitamin-mineral supplements and Cosequin (glucosamine chondroitin sulfate).

SmartPaks encourage dog owners to feed a consistent amount over a period of time. Minard points out that it is important for owners to know exactly what they are feeding before they can make appropriate modifications to the portion that their dog is getting. The company sends owners an E-mail every month before shipping the next order. By responding to the E-mail, owners can adjust the portion size up or down. At present, SmartPaks are available for dogs and soon will be for cats (www.smartpak.com).

Electronic portion control

Another way to assist in portion control is an electronic dry food dispenser. An example is the Le Bistro product from Petmate (www.Petmate.com). It can be programmed to dispense portions from ¼ cup to 2 cups at three selected times per day. The food hopper holds approximately four pounds of dry food and handles a range of dry food sizes, shapes & types, up to ¾ inch diameter. The cost is US\$50-60.

True for people

In October 2004, the journal *Obesity Research*, published an article on the results of a 24-month obesity study in people. According to the lead researcher Everett Logue, PhD, the greatest weight loss in the study was related to portion control. "Although we saw similar patterns of weight



SmartPaks provide pre-measured dog food along with medications and supplements.

loss related to reduced dietary fat consumption, increased fruit and vegetable consumption, increased physical activity and increased planned exercise, the target behavior that induced the greatest weight loss was portion control."

You must remember this

The most common cause of obesity in dogs is overfeeding coupled with inactivity. It is important for petfood manufacturers to provide clear feeding guidelines that encourage owners to adjust food intake by focusing on their dog's body condition score. The BCS system defines the ideal condition as one in which the dog's ribs are easily felt and the waist and tuck-up (the belly area between ribcage and rear end) are discernible.

It is true: An ounce of prevention is worth a pound of cure. Preventing excess weight gain is the best approach to weight control in dogs (and people). It is much more difficult to take the weight off once it has been gained. Portion control and regular exercise are the keys to the prevention and management of obesity. →

Dr. Phillips is the editor of Petfood Industry magazine. He can be reached at Watt Publishing Co., Tel: +1.815.734.5644, Fax: +1.815.734.5649, E-mail: phillips@wattmm.com, Website: www.petfoodindustry.com.

Feed Back

One of our companies, Protein Solutions, LLC, had an issue arise during a visit from USDA. Even though we had full consent from our USDA supply plant on a particular item, our District USDA Office was

unfamiliar with the specifics in the case and needed further clarification. We were in quite a crunch to meet time lines for a national launch. Time was absolutely not on our side for dealing with a major interruption. Paul Kahlich, our regulator affairs director,

quickly went to work with our District USDA Office and the District USDA Office of our supply plant. We explained the need for wholesome, high-quality ingredients for premium petfoods and treats. However, the lack of clear regulatory guidelines for this situation was obvious.

After two days of working with the local offices we realized that the issue could not be resolved in a timely fashion at the local level, so Mr. Kahlich contacted Nancy Cook of the Pet Food Institute (PFI) to seek help. This is the first time any of our companies had been put in a situation that was outside our ability to resolve. Nancy and her staff immediately gave us their attention and understood our sense of urgency. What happened next was nothing short of total commitment on the part of PFI and FSIS in Washington, DC. The relationship that PFI has built with regulatory agencies is phenomenal, to say the least. Nancy and PFI quickly conveyed our needs, the industry standard and the urgency of the situation. In all my professional experience, dealing with these types of issues, I have never been more impressed than when I received an E-mail at 10:09 PM on a Friday night from Nancy. Attached was a message from FSIS that cleared up the direction for our District USDA Office. If there was ever any doubt about the value of representation by PFI on behalf of our companies, it has been eliminated, and we are glad to have such a dedicated group working on our behalf.

Just to make certain no one misinterprets the events that occurred, our District USDA Office did everything correctly. However, there were no absolute regulations for them to follow. PFI's ability to communicate and educate on the petfood industry's behalf allowed FSIS to give direction and assistance to their District Office immediately. This ultimately allowed them to resolve the issue. My sincere thanks to those involved in USDA and FSIS for their support and immediate attention to our industry's needs.

Ed Mareth, Ed@3dcorp.sol.com

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Analyzing amines

Evaluating potential toxicity in petfood ingredients

BY JENNIFER RADOSEVICH, PhD

Biogenic amines play important roles in many human and animal physiological functions such as regulation of body temperature, stomach volume, stomach pH and brain activity (ten Brink, 1990). Amines are low-molecular-weight organic bases which can be formed and degraded during the normal metabolism of animals, plants and microorganisms.

They are essential for cell growth, and it has been suggested that these molecules promote the synthesis of DNA, RNA and protein, stabilization of ribosomes and increased amino acid uptake by cells (Smith, 1990).

Biogenic amines are produced by degradation of the corresponding free amino acid (see Table 1) precursor in foods.

This reaction is catalyzed

by bacterial amino acid decarboxylases. Prerequisites for a considerable amount of biogenic amine formation are:

- The availability of free amino acids;
- The presence of decarboxylase-positive microorganisms; and
- Conditions that allow bacterial growth.

► Toxicity

Determination of the exact threshold where these biogenic amines become toxic is extremely difficult because it is dependent on the detoxification efficiency of the individual. Upper limits of 100 mg histamine/kg in foods; 2 mg histamine/liter in beverages;

and 100-800 mg/kg tyramine and 30 mg/kg phenylethylamine in foods have been suggested. Presently, fishmeal is the only petfood ingredient that typically has a biogenic amine limit specification, and this is for histamine only.

The most well-known health impact of biogenic amines is histamine poisoning, which occurs a few minutes to several hours following the ingestion of foods containing high levels of histamine. Primary symptoms in humans are skin rash, nausea, vomiting, diarrhea, etc. The toxicity of histamine is potentiated by other biogenic amines (agmatine, putrescine, cadaverine, anserine, spermine and spermidine).

► Impact on pets

Humans may consume an occasional meal where biogenic amines are elevated either due to poor handling or contamination with a decarboxylating bacteria. Pets are more likely to encounter biogenic amines in a prepared diet where the main protein source is fish, chicken or a meat by-product. Healthy adult cats and dogs may be able to detoxify biogenic amines present in the diet; however, kittens and puppies, reproducing females and ill animals could potentially be more prone to adverse effects when consuming biogenic amines on a daily basis.

Histamine itself, along with other vasoactive biogenic amines, is frequently present in petfoods—particularly those foods containing fish products. Though the levels of these substances in petfoods are not believed to be high enough to induce a non-allergic reaction, feeding a petfood containing these chemicals may predispose some dogs to developing allergic food reactions by lowering the dog's tolerance threshold to certain food allergens (Davol, 2001).

In studies involving companion animals, dogs did not show adverse effects following oral administration of histamine alone at doses of 20 mg/kg; however, the combination of histamine with

Precursors

Table 1. Amino acid precursors and biogenic amines formed in food products.

Parent amino acid	Biogenic amine
Histidine	Histamine
Lysine	Cadaverine
Tyrosine	Tyramine
Tryptophan	Tryptamine
Serine	Ethanolamine
Methionine	Spermidine/spermine
Arginine	Agmatine/putrescine
Phenylalanine	Phenethylamine
Aspartic acid	Beta-alanine
Glutamic acid	Gamma-amino butyric acid
Threonine	2-hydroxypropylamine
Cysteine	Beta-mercaptoethylamine
Ornithine	Putrescine/spermidine

spoiled tuna did elicit emesis even at histamine doses of 1-10 mg/kg. This shows that the presence of other biogenic amines can inhibit intestinal histamine breakdown (Taylor, 1986).

► Quality indications

The presence of biogenic amines in petfood indicates that an ingredient has undergone bacterial spoilage. The method of handling of animal by-products prior to chilling, freezing, extrusion, retorting or rendering may put these materials at risk of biogenic amine formation. Proteolytic enzymes in these materials from either viscera or bacteria can generate free amino acids available for subsequent decarboxylation. Bacterial contamination can occur in the conveyors, trucks, tanks and other equipment that the by-products contact. Conditions are thus ideal for biogenic amine formation to take place until the ingredient makes its way into a high-temperature petfood extrusion or retort process where the enzymatic process is terminated.

Studies have demonstrated that biogenic amines can accumulate to reach toxic levels even at low temperatures. This is due to initial storage at higher temperatures (10-25°C) where the decarboxylase is generated and then continues to produce biogenic amines when the temperature is reduced to 5°C or below (ten Brink, 1990; Klausen and Huss, 1987). Chicken, meat or fish by-products that have experienced even a short period of high-temperature abuse prior to chilling could therefore generate significant biogenic amine levels before processing. Biogenic amines are heat stable, and decarboxylases may remain active even after pasteurization. Therefore, once formed, the amount of amine formed will not be reduced during processing and may even increase during storage (ten Brink, 1990).

Biogenic amine levels can be directly correlated with bacterial counts and food freshness. Documenting time/temperature profiles and the resulting biogenic amine levels will establish sound quality assurance parameters for classes of fresh and frozen ingredients such as:

- Fresh chilled—collection and transit time prior to chilling should be limited or eliminated to avoid mesophilic growth;
- Frozen—a reduced microbial count due to freezing will not reflect the decarboxylase and amines that may have developed in abused material;
- Hygiene—organ meats are sterile when harvested, and therefore good hygiene of transfer and processing equipment will reduce microbial growth; and
- Freshness agents—when time, temperature and hygiene are not ideal, classic food additives may be necessary in order to retain freshness.

► Biogenic Amine Index

It has been proposed that the sum of histamine, tyramine, cadaverine and putrescine can be used as a quality index—the Biogenic Amine Index (BAI)—which has shown a correlation to both time of storage and sensory assessment. The amounts of histamine, putrescine and cadaverine usually increase during spoilage of meat, whereas the amounts of spermine and spermidine decrease during this process.

The Biogenic Amine Index (BAI) is defined as:

$$\text{BAI} = \frac{(\text{histamine} + \text{putrescine} + \text{cadaverine})}{(1 + \text{spermine} + \text{spermidine})}$$

Meat with a BAI value below 1 is considered to be top quality, whereas BAI values above 10 indicate very poor quality. Products in which lactic acid fermentation has taken place may contain considerable amounts of putrescine, cadaverine, histamine and tyramine. It is important to consider the levels of tyramine, since high content of this amine are related to toxicological problems (Veciana-Nogues, 1997).

Quality indicator

Table 2. Biogenic amine index (BAI) for chilled (4°C) chicken viscera as a function of storage days and aerobic plate counts (APC). Source: ten Brink, *et al.*, 1990; Lahsen, *et al.*

	Washed viscera		Unwashed viscera	
	Day 0	Day 3	Day 0	Day 5
	(ppm)			
Tyramine	6	148	3	537
Putrescine	2	6	4	203
Cadaverine	1	96	18	280
Histamine	6	12	3	32
Spermidine	42	47	49	139
Agmatine	13	9	17	2
Spermine	20	18	33	27
BAI	2	11	2	40
APC (cfu/g)	6 X 10⁴	2 X 10⁷	2 X 10⁶	6 X 10⁸

BAI numbers show that the proposed quality index directly correlates with the aerobic plate counts (see Table 2). A BAI of 2 corresponds to an APC of 10⁴-10⁶ cfu/gram, while an 11 is at 10⁷ and the high BAI of 40 shows an elevated 10⁸ cfu/gram APC. The BAI calculations in Table 2, although not comprehensive, suggest that the 300 mg/kg total biogenic amine content may be a reasonable quality guideline for petfood ingredients.

The total biogenic amine limit being considered in fish for human consumption is 300 mg/kg, with histamine at a current 50 mg/kg action level. Literature does not define toxic levels of biogenic amines for companion animals, but does establish the potentiating effect of several in combination and also documents their potential for reduced growth and physiological impact in production animals.

Limiting biogenic amines in petfood ingredients would reduce any unidentified adverse impact on the pet, regardless of lifestage or disease state. Processing and handling measures taken to reduce bacterial degradation, and thus biogenic amine formation, would seem consistent with the industry's dedication toward promoting the longevity and well being of companion animals. ➔

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Vitakraft *treats*

Recent pet snack introductions for cats, dogs, reptiles and rodents



BY TIM PHILLIPS, DVM

The Vitakraft® business is one of the largest international producers of petfood and supplies. This German company has branches and subsidiary companies in Germany, other European countries, the USA and Asia. They employ about 2,500 people around the world. The parent company and the combined head office are located in Bremen, Germany (www.vitakraft.de).

Vitakraft's product range includes more than 3,500 different articles for the feeding, care and keeping of animals at home. This article focuses on some of their recent pet treat introductions for dogs, cats, reptiles and rodents.



Functional treats

For animals in their natural habitat, the activity of feeding often serves several functions at the same time. For example, feeding can help to clean teeth through chewing, or to train the reflexes for tracking down food. Vitakraft now offers healthy multiple benefits in the form of "functional snacks" for dogs and cats.

For example, the Kuller ball contains aromatic Kuller snacks that tumble out of the ball, letting cat's "live out their natural hunting instincts." Vita-Dent, a prophylactic snack especially for cat teeth, cleans and takes care of teeth through chewing. The malt core of the Vitakraft Malt Crossys makes sure that swallowed cat hair is naturally regurgitated. Similar examples can be found in Vitakraft's line of dog snacks.

Malt Crossys for cats

For the regurgitation of ingested hair, Vitakraft has developed a crispy snack for cats. Malt Crossys are cereal puffs with a malt filling: "Crispy on the outside, unbelievably tasty on the inside." The malt content causes ingested hair to be regurgitated in a natural way. This highly nutritious snack can be fed daily. One bag contains 50 g.

Innovation of the year

Beef-Stick Sport is Vitakraft's self-proclaimed innovation of the year. According to the company's press materials: "Vitakraft now gives a completely new stimulus to the growth market for treats. Beef-Stick Sports are fitness snacks made of 100% pure meat, especially for dogs. Whether it's jogging, biking or in-line skating, Beef-Stick Sport helps to ensure a sustainable supply of energy when dogs accompany their master or mistress in sporting activities. Thanks to the additive, L' Carnitin, Beef-Stick Sport shortens the recovery phases after sporting activities, reduces the degeneration of muscle and thus ensures more active and more sporty dogs with a better standard of fitness.



With Beef-Stick Sport, Vitakraft is opening up a market with extremely interesting growth potential for traders: The market of active and sporty buyers of animal food. At the same time, with this product innovation, Vitakraft is creating completely new ideas for use. The hitherto neglected area of outdoor sports has become a new field of activity for lucrative additional sales. The handy pocket format with two snack sausages and the freshly sealed pack has been especially designed for being out and about."

Global value of treats

	2000 US\$	Value 2005 US\$	05 vs. 04 %	Forecast 2010 US\$
Dog treats				
World	2558.3	3840.7	7.1	4666.6
Western Europe	644.4	1208.1	11	1553.8
Eastern Europe	13.1	35.1	23	56.1
North America	1378.3	1867.5	3.8	2201.1
Latin America	54	72	10.7	88.8
Asia Pacific	426.4	539.5	7	613.7
Australasia	40.5	109.6	13.6	134.4
Africa and Middle East	1.7	8.8	35.3	18.7
Cat treats				
World	343.8	620.4	8.8	750.1
Western Europe	165.3	307	8.3	362.9
Eastern Europe	3.9	11.1	25.7	16.1
North America	155	271.5	8.6	333.4
Latin America	4.3	3.8	3.9	4.8
Asia Pacific	10.2	11.9	5.4	12.1
Australasia	4.3	12.9	13	16.3
Africa and Middle East	0.7	2.2	34.5	4.6

The value of dog and cat treats around the world, retail value US\$, current prices. Copyright and Database Right Euromonitor 2006. For more information, click the Euromonitor icon on the www.petfoodindustry.com site.

Snacks for reptiles

According to Vitakraft, a growing number of people are becoming fascinated with the exotic world of reptiles. Due to the unusual diversity of these animals, the owner is faced with the problem of the correct nutrition. Now, Vitakraft has expanded its vita terra variety.



Reptile Soft Omnivore adds variety to the menu for omnivorous reptiles. The product contains fish and vegetables. Reptile Soft Herbivore is for herbivorous reptiles, and is a blend of vegetables, fruits and other vegetable ingredients. Reptile soft products contain a balanced blend of vitamins, trace elements and minerals “that strengthen the immune system and protect the reptile from possible deficiency symptoms.” One can of Reptile Soft contains 160 g.

Funny Fitness packs

The Funny Fitness packs are specially developed for “the fitness nutrition of dwarf rabbits. To provide the necessary variety, the Funny Fitness pack has three delicious Kräcker varieties: With honey; with nuts; and with fruits of the forest—which is particularly popular. The Kräcker Bisquiti is an airy-light baked biscuit topped with apple and cinnamon as natural ingredients.”

Dental care for cats

Vitakraft is now offering Vita-Dent for cats. It is a

prophylactic snack and has been especially developed for cats’ teeth. Its elastic consistency encourages chewing and its special form offers an optimum chewing surface. The product is “free of sugar.” One pack of Vita-Dent contains 75 g.

Snack sausages for dogs

The new Vitakraft Dog Maxis are “extra-long and juicy snack sausages, especially developed for the nutritional needs of medium-size and large dogs. They are ideal as a reward when dogs have really behaved themselves well. So with the new Vitakraft Dog Maxis you can quickly increase their joy in learning.”



The product is spice-reduced and free of skin. There are no artificial colorants or aromas. It comes in a “freshly-packed can, which is easy to open, thanks to its ring-pull seal.” Its lid allows it to be resealed.

Ubiquitous

Vitakraft’s products are sold in almost every channel: Pet stores, supermarkets, drug stores, specialty stores for seeds and gardening appliances, DIY superstores and department stores. Autonomous sales departments are in charge of the pet stores and the grocery stores. This way the company has close contact with the customers and can take their interests into optimum consideration. At the same time, changes and new trends are noticed and can be acted upon right away. →

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Welsh company's rebirth

Cambrian Pet Foods
is reaping the benefits of
a multi-million-dollar project

BY PETER BEST

“**F**rom our point of view, the idea of controlling our own manufacturing has at times seemed more a dream than a plan. We had always wanted to own an extruder, but the cost seemed out of reach for a relatively young company. The fact that we have achieved it is still hard to believe. It is, however, the result of over twenty years of hard work and long hours. And it is testimony to the commitment and perseverance shown by all the team at Cambrian.”

The speaker is Jonathan Davies, standing on the site of a former farm at Pencader in the southwest of Wales. As he looks around, he sees the fruits of a multi-million-dollar project that has rocketed Cambrian Pet Foods into the 21st Century as the owner and operator of one of the newest dry-food production sites in Europe.

The contrast is extraordinary from the company's status of only a few years ago. Officially founded in 1982, it had been based on earlier petfood activities by David Davies, Jonathan's father, who, when the company was first founded, operated from a 1,500-square-foot rented industrial unit in a neighboring town.

Then came the project, bringing a new dryer and extruder from Wenger, in addition to a purpose-built rectangle of manufacturing center, administrative offices and warehousing. Since the extruder's commissioning in early 2005, the company has had a production capacity

of six tons/hour in its dry foods department managed by Jonathan. Another son, Richard, manages the canned product business. He also takes care of logistics for deliveries throughout the UK, in the company's own modern fleet of delivery vehicles.

Aggressive expansion

David Davies is the founder of the business and its managing director. He explains that the expansion project has involved a total expenditure of approximately UK £3 million, equivalent to about US\$5.5 million on 2004 currency exchange values.

“We have worked with the development authority for Wales and with the Welsh Assembly, who had the vision to look at encouraging investments by Welsh companies

Mark Creamer is the chief extruder operator at Cambrian Pet Foods in Wales, where a six tons/hour PLC-controlled C²TX 8.1 has been installed as part of a complete makeover of the dry foods business.



within Wales,” Davies comments. “Their help enabled us to secure the grant from the EU program in recognition of the fact that we were developing a food company.

“This project that has prevented a production bottleneck which we foresaw as early as 2000, allows us to keep pace with sales, manage our growth and has also given us the capability to plan five years ahead.” The installation of the C²TX allows flexibility to manufacture a very wide range of product types and formulations to exacting standards”.

“In all, the project timetable was to complete in 2½ years. The Cambrian team, working closely with a number of long standing suppliers, achieved completion in 2 years. This was done with no disruption to manufacturing or to customer service levels, and while also managing a business with a consistently healthy annual growth rate. The hours were long, but the result was well worth it!”

Cambrian managing director David Davies shows examples of the dog foods his company manufactures and sells throughout the United Kingdom.



Jonathan Davies, in charge of the dry foods division at the family-owned company, stands in front of the 80,000-square-foot warehouse that is among the new buildings constructed in the expansion project.

The big leap

By 2000 it was clear that capacity could soon be overstretched. The reality in mid-2003 was that the intention of working a single 10-hour daily shift had become an unending series of 24-hour runs from Monday until Friday every week. But the Davies family members were resolutely against any outsourcing of production because they feared it could loosen their grip on product quality. The obvious solution was to invest in another extruder and all the peripherals.

The company's extruder is a PLC-controlled C²TX 8.1 with 300kW motor that the manufacturer's documents rate at up to eight tons/hour. Extrusion is followed by drying in a direct-fired version of a Wenger Series VII, using gas.

"Our production house alone measures 45,000 square feet," Jonathan comments. "The new warehouse is 80,000 square feet, the total site now is around 200,000 square feet of industrial development. With the ancillary services and utilities, it has been a huge undertaking. As an example of what was involved, the electricity supply into the site had to be increased threefold. We are also fortunate in that this is a large site and there is plenty of available land here for further development in the longer term."

"The dryer was the first machine to be installed. That was in March 2004; it was commissioned the following June. By the final months of the same year we had also taken delivery of the C²TX extruder, and its commissioning was completed in April 2005. In other words, we have had little more than a year to adjust to the new working environment. Development has not stopped even now, and the company has also, since the extrusion facility upgrade, invested very heavily in retail packaging capability which will come on line in the Autumn of 2006."

Excellent ingredients

Superpremium rice-based chicken and lamb hypoallergenic diets have been the mainstay of the Gelert

range of dry dog foods. The manufacturer insists its Unique Selling Point has been the high quality of the raw materials employed. Whole-grain cereals, along with quality long-grain basmati rice and meat meals, were sourced from only 2-3 selected suppliers.

Jonathan reveals that there will be an extension to the dry foods range, now that the manufacturing and packaging capability are in place to produce it. Cambrian so far has been known mainly as the producer of Gelert foods for dogs. Soon, however, it will introduce a number of innovative new lines, in addition to the private-label work that has proved a strong separate area of activity.

As David Davies comments, "we have always been fortunate with regards to the people we've had working with us in Cambrian, and also we have always had long-standing and quality suppliers and customers. I am now confident that we have the physical infrastructure and foundation firmly in place for a further period of continued growth and development." →

Peter Best is the European editor for Petfood Industry magazine. He can be contacted at best@watt-4.demon.co.uk.

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Deficiencies and difficulties

New NRC guide fails to make the grade for PFI

The long-anticipated National Research Council (NRC) work *Nutrient Requirements of Dogs and Cats* has finally been released. The text has been billed as the most authoritative compilation of up-to-date research on the nutritional needs for dogs and cats. Unfortunately, and despite significant scientific contributions of many experts from academia and the petfood industry during the last 20 years, the NRC has fallen far short of its stated goals. Those goals included providing a research compendium that is truly useful to pet owners, government and, very importantly, the petfood industry.

The NRC has fallen far short of its stated goals.

— Nancy K. Cook



The Pet Food Institute (PFI) and its members actively supported the development of the NRC's new document. Since the panel of experts was convened, the petfood industry has tried to share information that would aid in the

development of a truly comprehensive collection of the best data available on pet nutrition. Even since before the pre-publication version of the guide was released, which itself was rife with errors and editorial difficulties beyond mere

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typos, PFI has offered input. Again and again, unfortunately, that input, designed only to improve the final document, has been largely ignored.

Safe Upper Limits

For example, and without addressing many of the other errors contained in that document, the data charts and the concept of Safe Upper Limits (SULs), as presented in the book, are still deeply flawed. The SULs, supposed maximums of nutrients an animal should receive, seem arbitrary and in many instances appear to lack a scientific basis or a consistent definition. There are many complete and balanced petfoods currently on the market that exceed some of the SULs listed in the document. These petfoods have been tested to substantiate that they provide safe and adequate nutrition for the tested lifestage and, contrary to the SULs, pose no safety risk.

Furthermore, the recommended allowances (RA) (minimums) do not correlate with Safe Upper Limits (maximums) and do not provide consistent data. Users of the document who rely on this information could then draw incorrect conclusions about the nutrition or safety of petfood products that differ from the descriptions in the text.

Fewer ingredients

The new book lists fewer ingredients than found in the individual NRC reports for dog and cat nutritional requirements. This failure to include many commonly-used petfood ingredients further exacerbates the report's lack of utility.

It can be used by students and teachers at universities as one of many reference materials since it represents a good literature review on canine and feline nutrition. That said, unfortunately there remain too many other problems within the text and charts for the book to be effectively used in real-world situations, such as formulating products for optimal pet nutrition.

Lack of practical information

In conclusion, and as PFI has previously stated, the final document suffers from many of the same deficiencies and difficulties—as did the pre-publication version. Despite

the work of many pet nutrition experts, the final *Nutrient Requirements of Dogs and Cats* does not provide the practical information that would be expected, even required, in an expert discussion of dog and cat nutrition.

Thus, we are forced to conclude that the final version of the report has failed to present the required data in a manner which could meet its stated goals. The acceptance of this document as the best

new guidance could even cause regulators and the public to question the excellent nutrition provided by commercial petfoods currently on the market, as well as the science on which they are based. ➔

Ms. Cook is vice president, Technical and Regulatory Affairs for the Pet Food Institute. She can be reached at Tel: +1.202.367.1120, E-mail: info@petfoodinstitute.org, Website: www.petfoodinstitute.org.

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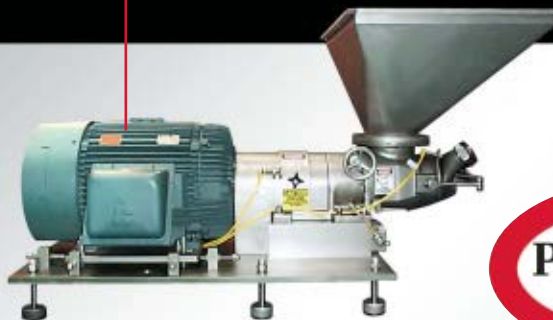
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The new NRC is here!

It's true: The new NRC is here!

I admit, I may have been a tad premature in my announcement of the imminent publication of the National Research Council (NRC) *Nutrient Requirements of Dogs and Cats* based on the release of its preliminary report (Dzanis, D.A., 2003. The new NRC is out! *Petfood Industry* 45(10):30). Regardless, I can now say with utmost confidence that the final NRC report is now available to the public.

As a member of the Ad Hoc Committee on Dog and Cat Nutrition that prepared the report, I can tell you I'm glad the going-on-six-year process has come to fruition. The publication can be viewed online and purchased at the National Academies Press website at: <http://www.nap.edu/catalog/10668.html>.

What's in the new NRC?

The previous editions of *Nutrient Requirements of Dogs* and *Nutrient Requirements of Cats* were published in 1985 and 1986, respectively. Thus, 20 years of accumulated data on canine and feline nutrition have been incorporated compared to previous versions. That means, in addition to the fact that the new edition covers two species, the resulting work is much more extensive than in the past. At almost 400 pages in length, it beats the 2001 *Nutrient Requirements of Dairy Cattle* by a bit more than a few pages and, to the best of my knowledge, may be the largest book in the *Nutrient Requirements* series to date.

I can now say with utmost confidence that the final NRC report is now available to the public.

— David Dzanis



Similar to previous versions, the text discusses data on requirements for energy, protein, fat, minerals, vitamins and water, as well as information on other food constituents and diet formulation and processing—although in significantly more detail than in the past. Quite extensively updated is the discussion on carbohydrates. What was covered in two pages in the 1985 dog book and one page in the 1986 cat book now commands its own 31-page chapter. New to this edition are chapters on digestive physiology, feeding behavior, considerations for laboratory animals and effects of physical activity and environment on nutrient requirements.

The crux of the report, though, is the tables. In addition to a table of proximate analysis values for major petfood ingredients, there are separate tables for fatty acid, carbohydrate, amino acid, mineral and vitamin contents of ingredients. With respect to nutrient requirements, there is a separate table for each lifestage (maintenance, growth and gestation/lactation) for each species. Minimal requirements (or adequate intakes,

where no minimal requirements are known), recommended allowances and safe upper limits are expressed both in terms of the food (amount per kilogram dry matter and per 1,000 kilocalories metabolizable energy) and the animal (amount per kilogram body weight raised to the three-quarter power).

Regulatory impact

Presently in the United States, the Association of American Feed Control Officials (AAFCO) does not recognize NRC as the authority for label substantiation of nutritional adequacy for dog and cat foods. Because of concerns related to the practical applicability of the NRC recommendations in the 1985 and 1986 editions, AAFCO replaced “meets or exceeds NRC recommendations” with reference to the AAFCO Dog and Cat Food Nutrient Profiles in the early 1990s. The expert panels that developed the Profiles did largely base its nutrient requirement values on NRC recommendations, though, albeit with additional considerations for practical petfood formulation with commonly-used ingredients.

The new NRC does address at least some of the practical applicability issues of the previous versions. Since it has been about 10 years since the Profiles were revised, they are not up-to-date at this time either. However, that does not mean AAFCO intends to forego recognition of the Profiles as the label authority in deference to the new NRC.

As I understand it, AAFCO intends to reconvene its expert panel to review the recent NRC recommendations along with any other newly-available information. As an outcome of its deliberation, the AAFCO Dog and Cat Food Nutrient Profiles most likely will be revised as seen fit and appropriate by the

AAFCO intends to reconvene its expert panel to review the recent NRC recommendations.

panel. Since there will be members of the petfood industry on the panel, I'm sure any practical applicability concerns will be addressed. In any event, I anticipate this process to take some time. I'm guessing it will take until issuance of the 2008 AAFCO *Official Publication* before any changes to the Profiles become effective, if that soon.

I assume other petfood nutritional standard-setting organizations (FEDIAF in Europe, CVMA in Canada, etc.), will also be looking at the new NRC recommendations with an eye on updating their recommendations for dog and cat foods. Some other countries, though, do rely on the NRC recommendations directly as the authority for determining nutritional adequacy of petfoods. Based on some petfood manufacturers' concerns regarding the preliminary NRC report, it will

be interesting to see their reaction to the final publication. ➔

Dr. Dzanis is a writer and independent consultant for the petfood and animal feed industries on matters related to veterinary nutrition, labeling and regulation. He can be reached at Tel: +1.661.251.3543, Fax: +1.661.251.3203, E-mail: dzanis@aol.com.

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Vitamin E

Not all vitamin E is created equal

Vitamin E, in the parlance of nutrition, is a key nutrient with specific physiological functions and a chemical with varied configurations and properties. In petfood, we also speak of vitamin E as an ingredient purchased as part of a vitamin premix. Regardless of perspective, the primary function of vitamin E is as an antioxidant whose job is to mop up free radicals.

Free radicals are molecules with unpaired electrons that have been generated as a result of such events as incomplete electron exchange during respiration, decomposition due to ultraviolet radiation or contact with another free radical. They can do substantial damage if left unchecked, with long-term effects including rancidity in foods and degenerative diseases such as arthritis, coronary artery disease, dementia and cancer in animals. Thus, the need for a free radical scavenger (antioxidant) like vitamin E to keep the damage in check—or even better, to stop it before it can start.

Fortifying diets with an adequate quantity of vitamin E is necessary to provide protection against deficiency symptoms. Vitamin E deficiency in dogs and cats can result in muscular atrophy, reproductive problems, pancreatitis, depression, coma and even death. In addition, higher levels of dietary vitamin E enhance skin and coat condition, eye health, cognition, recovery from exertion and joint health. While the need for fortification is pretty straightforward, working through some of the specifics of vitamin E is not quite so simple.

The goal is to formulate with plenty of vitamin E to meet necessary levels, with a little room to spare.

— Greg Aldrich



Function follows form

At the heart of the matter is how well a particular vitamin E structure is recognized by a specific binding protein. Ingested vitamin E is absorbed along with other lipids and, like other lipids, it is repackaged by the liver into lipoproteins for transport. Vitamin E is packaged into very-low-density lipoproteins (VLDLs) with the aid of α -tocopherol-binding protein. This binding protein is very specific to a particular vitamin E structure—anything different and the binding affinity (and biopotency) diminishes substantially.

Structurally, vitamin E is a two-sided molecule with a ring structure (chromanol) on one end and a 16-carbon side chain (isoprenoid) on the other. Most of the antioxidant activity is found at the chromanol ring structure. The isoprenoid side chain serves little function short of being a hindrance if not in just the right configuration. The binding protein has highest affinity for the vitamin E structure in which the chromanol ring is fully methylated ($-\text{CH}_3$) and the side chain is both saturated and has its 3 chiral carbons in the R, rather than S, projection. This

molecule is often written as RRR- α -tocopherol and IS vitamin E (100% vitamin E activity).

It is this RRR- α -tocopherol that occurs naturally in vegetable oils along with minor amounts of a few other homologues; the so-called natural vitamin E. However, to fortify diets, synthetically-produced vitamin E is more common. The production of synthetic vitamin E occurs via a complex series of chemical reactions and results in an “all-racemic” mix in which only 1/8 (12.5%) is RRR-tocopherol. For the other 7/8 of the mixture, the chiral carbons of the side chain are found as RRS, RSS, SSS, etc. This lowers the vitamin E activity of the mix to 75% of the naturally-occurring vitamin E. Commercially, both the natural and synthetic vitamin E are further modified to enhance stability and shelf life through an acetylation reaction with acetate (e.g., α -tocopheryl acetate), or sometimes succinate. This, too, lowers the biopotency to 91% (for natural) and 67% (for synthetic) of RRR- α -tocopherol.

The all-racemic (all-*rac*) mix of α -tocopheryl acetate (synthetic vitamin E) is the most common form

of vitamin E sold today. Due in part to its popularity, the *US Pharmacopeia and Natural Formulary* (the authority in these matters) set the synthetic all-*rac*- α -tocopheryl-acetate to 1.00 international units (1 IU) of vitamin E. Thus, 1 mg of all-*rac*- α -tocopheryl acetate is equivalent to 1 IU of vitamin E. All other sources are subsequently ranked according to their relative biopotency. It follows then that the naturally-occurring RRR- α -tocopherol is 1.49 IU/mg due to its higher biopotency. So, whether natural or synthetic, suppliers selling vitamin E on the basis of international units help take the guesswork out of computing vitamin E content.

Standardizing to IU also corresponds well with the nutrient profiles according to AAFCO (2006) which are expressed in IU/kg (50 and 30 IU/kg DM for dogs and cats, respectively). However, one must be

aware that this is not universal. The new *Nutrient Requirements of Dogs and Cats* (NRC, 2006) expresses the requirements as mg α -tocopherol (30 and 38 mg/kg DM for dogs and cats, respectively) and provides the conversion to IU in the footnotes. For many ingredients used in petfood, vitamin E content is not reported in IU, but rather, in terms of mg/kg vitamin E, mg/kg α -tocopherol and as the proportion of total tocopherols on a ppm basis.

Reconciliation

So, how does one determine the amount of vitamin E (the ingredient) to add to meet vitamin E (the nutrient) needs? Some nutritionists and food scientists discount the amount of vitamin E from the base ingredients and formulate vitamin premixes to cover all vitamin E needs. Another approach is to overlook the inherently

greater potency of naturally-occurring vitamin E from base ingredients and consider milligrams and international units equal. Both of these methods tend to overestimate the vitamin E content of the finished product.

A third approach which more closely compares “apples to apples” is to convert the vitamin E content of the base ingredients from milligrams to international units by the appropriate factor. In the end, the goal is to formulate with plenty of vitamin E (the ingredient) to meet necessary levels of vitamin E (the nutrient) with a little room to spare. ➔

Dr. Greg Aldrich is president of Pet Food & Ingredient Technology, Inc., which facilitates innovations in foods and ingredients for companion animals. Tel: +1.785.271.0238, E-mail: aldrich4@cox.net.



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May days

Interzoo: A resounding success for the “home animal industry” exhibition

Interzoo 2006, held May 11-14, in Nuremberg, Germany, was “the world’s largest trade fair for the home animal industry.”

It featured 1,275 exhibitions, up 16% vs. 2004, from 56 nations. There were 34,181 visitors, up 10% vs. 2004, from all regions of the world. Interzoo 2008 will be held May 22-25 in Nuremberg (www.interzoo.com). Following is our gallery of photos from the event.

Largest sections: Petfoods and treats

Petfoods represented the largest single product section at the show in terms of area, but snacks and treats came in as a close second for number of exhibits. Biomill from Switzerland was one of the few complete-food suppliers to include treats in their display. In this case, Swiss-made ostrich meat chews from Delipet that Biomill has started to supply to a Moscow-based Russian customer.



Jan Scheurwater of Provimi points out that its Interzoo stand paraded the creation of Provimi Pet Food NL. The plan is to bring

together administration and marketing for the group’s wet and dry petfood activities in the Netherlands, while retaining their product brand identities.

Asian activities surge

Nory from China was a first-time Interzoo exhibitor, explaining that the company was started five years ago by a Shanghai family with support from a Norwegian investor. The family had an established business in equipment for fishermen, but decided to diversify because it saw greater growth opportunities in making and selling petfoods. It now has China’s second-largest petfood sales force, with almost 100 sales people in nearly every major town and city.



Meat treats or chews from China were strongly represented in the ranks of numerous Asian suppliers, no doubt reflecting the opening of the European Union market to Chinese product in November 2005. Weifang Heiwa-en Pet Foods Co Ltd, located in China’s Shandong province, brought samples of its Betterpet meat chews. The company reckons to produce more than half of all

chicken products made in China. Its five manufacturing sites produce 300 items within six product lines. Annual production capacity was reported to be 4,000 tons of dried chicken snacks for pets, 2,500 tons of canned petfood and 1,000 tons of biscuit-type products.

Also representing the chicken treats sector in Asia was Pet Treats Ltd. Japanese-owned, although based in Thailand, it is part of a group that also includes Thai manufacturer Natural Pet Foods Ltd. The company was established in 2000, about 20 kilometers from Bangkok. It claims today to be Thailand’s biggest supplier of dog treats made from dried chicken.



Pet vitality drinks

Interzoo showed more evidence of the fast-growing trend to supply petfood drinks. Liquid Petfood Company from Belgium launched Viyo vitality drinks for dogs and cats with a recommendation for daily use to increase the animal’s water intake.

Rinaldo Franco, a company from Italy, presented Lap broth-type drinks for active or working dogs. Calcium in the puppy version is higher due to the use of whey, which is obtained from factories making Italy’s famous Parmesan cheese.



Peter Best is the European editor for Petfood Industry magazine. He invites comments and suggestions from all readers about future topics for his column. He can be contacted at: best@watt-4.demon.co.uk.

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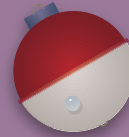
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Research Notes

Effects of *Lactobacillus acidophilus* in healthy adult cats

This study was conducted in order to evaluate the effect of dietary supplementation with the probiotic strain *Lactobacillus acidophilus* DSM13241 in healthy adult cats. Fifteen adult cats were fed a nutritionally-complete dry food for 5 weeks. Fecal character was assessed daily, and a single fecal sample and 3 ml blood sample were collected for bacterial enumeration and hematologic analysis, respectively. Cats were then fed the same diet supplemented with *L. acidophilus* DSM13241 (2×10^8 CFU/d) for 4.5 weeks. Repeat fecal and hematologic measurements were taken prior to the return to control diet for a 4-week period.

The probiotic species was recovered from feces, demonstrating survival through the feline gastrointestinal tract. Probiotic supplementation was associated with increased numbers of beneficial *Lactobacillus* and *L. acidophilus* groups in feces and decreased numbers of *Clostridium* spp. and *Enterococcus faecalis*, indicating an altered bacterial balance in the gastrointestinal tract microflora. Fecal pH was also decreased suggesting a colonic environment selective for the beneficial lactic acid bacterial population. Systemic and immunomodulatory effects were associated with administration of *L. acidophilus* DSM13241, including altered cell numbers within WBC subsets and enhanced phagocytic capacity in the peripheral granulocyte population. In addition, plasma endotoxin concentrations were decreased during probiotic feeding, and RBCs had a decreased susceptibility to osmotic pressure.

It was surmised that probiotic strain *L. acidophilus* DSM13241 fed at 2×10^8 CFU/day can alter the balance of gastrointestinal microflora in healthy cats. Furthermore, administration of this probiotic results in beneficial systemic and immunomodulatory effects in cats.

Source: Marshall-Jones, Z.V., et al., 2006. Effects of *Lactobacillus acidophilus* DSM13241 as a probiotic in healthy adult cats. *AJVR* 67(6):1005-1012.

Diagnosis of adverse food reaction

Data from dietary trials in 181 dogs with non-seasonal pruritus were collected retrospectively. One group of dogs was fed home-prepared foods and a second group was fed a chicken hydrolysate food in the diagnosis of adverse reactions to food (AFR). Owners chose the type of food at presentation and the ingredients of home-prepared foods were selected depending on each dog's dietary history. Ectoparasitic infestations and microbial infections were treated during the trials. Cutaneous and gastrointestinal signs and pruritus scores were recorded before starting the food, 6 weeks into the trials, and after provocation with the original foods. AFR was

diagnosed if pruritus resolved during the trial and recurred on dietary provocation. Seventy-two dogs were fed home-prepared foods and 109 the hydrolysate. The dropout rate was lower for home-prepared foods, although the difference was not statistically significant (18.1% home-prepared; 24.7% hydrolysate, $P=0.377$).

AFR alone was diagnosed in 10 dogs (17%) using home-prepared foods and in 15 (18.3%) fed the hydrolysate. Gastrointestinal problems were more frequent in dogs with AFR than in dogs without AFR ($P=0.001$). Another 11 dogs (18.6%) in the home-prepared group and 20 (24.4%) in the hydrolysate group had AFR concurrent with other pruritic diseases, mainly atopy. The similar frequencies of AFR diagnosis in the two groups ($P=0.837$ AFR; $P=0.416$ concurrent AFR) indicate that the chicken hydrolysate food may be a valuable alternative to home-prepared foods in the diagnosis of canine AFR.

Source: Loeffler, A., et al., 2006. Diagnosis of adverse food reaction in 181 pruritic dogs: A retrospective comparison of case series involving home-prepared foods and a chicken hydrolysate. Hill's 2006 Symposium on Dermatology, Palm Springs, California, USA.

Antioxidant status affected by diet restriction and aging

Twenty-four sibling pairs of 8-week-old Labrador Retrievers were assigned to an experiment to determine the effects of diet restriction (75% of control-fed pair mate) on the quality and span of canine life and to identify biological markers of aging in dogs. The antioxidant status of these dogs was monitored by annual assays for serum retinol (RT), retinyl palmitate (RP), total vitamin A (VA), vitamin E (VE), selenium (Se), copper (Cu), ceruloplasmin (Cp), plasma ascorbic acid (AA), uric acid (UA), total peroxy-radical trapping activity (TRAP) and whole-blood glutathione peroxidase (Gpx).

Data in this report are for the 6-year period of the experiment when the dogs were between 5 and 10 years of age. Dietary restriction reduced RT, VE, Cu and Cp. Aging was associated with decreased RP, VA, VE, Se and Cu and with increased RT, Cp and Gpx. Female dogs had lower RP, VA, Cu and Cp than male dogs. Litter effects were observed for VE, Cu, UA and Gpx.

Treatment effects on serum RT and Cu suggest that these variables are not as regulated homeostatically by hepatic storage as in most other species. Although the antioxidant profiles did not elucidate how dietary restriction contributes to longevity, they have the potential to enhance our understanding of canine clinical nutrition and to have practical applications in formulating canine diets.

Source: Stowe, H.D., Lawler, D.F. and Kealy, R.D., 2006. Antioxidant Status of Pair-Fed Labrador Retrievers Is Affected by Diet Restriction and Aging. *J Nutr* 136:1844-1848.

Send your meeting dates to: Dorothy Randecker, Petfood Industry, 122 S. Wesley Ave., Mt. Morris, IL 61054-1497 USA, Fax: +1.815.734.5649, E-mail: randecker@wattmm.com. Please include the dates and location of the event along with the name, address, telephone number, fax number, E-mail address and website of the contact person. Please note that, while most submissions will appear on our website, space constraints may limit the number of events that appear in print.

► **Western Pet Expo** (PIJAC Canada), September 9-10, 2006, Richmond, British Columbia, Canada. Contact: Pet Industry Joint Advisory Council - Canada (PIJAC), 2442 St. Joseph Blvd., Suite 102, Ottawa, Ontario K1C 1G1 Canada, Tel: +1.613.834.2111, Fax: +1.613.834.4854, E-mail: executiveoffice@pijaccanada.com, Website: www.pijaccanada.com.

► **National Annual Pet Industry Trade Show**, September 17-18, 2006, Toronto, Ontario, Canada. Contact: Pet Industry Joint Advisory Council - Canada (PIJAC), 2442 St. Joseph Blvd., Suite 102, Ottawa, Ontario K1C 1G1 Canada, Tel: +1.613.834.2111, Fax: +1.613.834.4854, E-mail: executiveoffice@pijaccanada.com, Website: www.pijaccanada.com.

► **Glee**, September 17-19, 2006, National Exhibition Centre (NEC), Birmingham, England. Contact: Adam Ash, Tel: +1.609.921.0222, Fax: +1.609.921.0292, E-mail: a.ash@whitehoundadv.com, Website: www.gleebirmingham.com.

► **American Association of Cereal Chemists Annual Meeting**, September 17-20, 2006, The Moscone Center, San Francisco, California USA. Contact: American Association of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, Minnesota 55121-2097 USA, Tel: +1.651.454.7250, Fax: +1.651.454.0766, E-mail: aacc@scisoc.org, Website: www.aaccnet.org.

► **SuperZoo**, September 20-22, 2006, Mandalay Bay Convention Center, Las Vegas, Nevada USA. Contact: World Wide Pet Industry Association (WWPIA), Tel: +1.800.999.7295, Website: www.pia.org.

► **Pet South America International Trade Show**, September 20-22, 2006, Sao Paulo, Brazil. Contact: VNU Business Media do Brasil, Tel: +55.11.3873.0081, ext. 110, Fax: +55.11.3873.1912, E-mail: pet@vnu.com.br, Website: www.petsa.com.br.

► **Pet Fair Asia Professional**, September 21-22, 2006, Shanghai, China. Contact: VNU Exhibitions Asia, 3/F - Business Mansion, Shanghai Exhibition Center, No. 1333 Nanjing Road (W), Shanghai 200040, China, Tel: +86.21.6247.7668, Fax: +86.21.6247.9818, E-mail: vnu@vnuexhibitions.com.cn, Website: www.vnuexhibitions.com.

► **Practical Short Course on Aquaculture Feed Extrusion, Nutrition & Feed Management**, September 24-29, 2006, Texas A&M University, College Station, Texas USA. Contact: Dr. Mian N. Riaz, 2476 TAMU - Food Protein R&D Center, Texas A&M University, College Station, Texas 77843-2476 USA, Tel: +1.979.845.2774, Fax: +1.979.458.0019, E-mail: mnriaz@tamu.edu, Website: www.tamu.edu/extrusion.

► **VIV China**, September 27-29, 2006, Beijing, China. Contact: Richard de Boer, VNU Exhibitions Europe, PO Box 8800, 3503 RV Utrecht, Netherlands, Tel: +31.30.295.2714, Fax: +31.30.295.2809, E-mail: richard.de.boer@vnuexhibitions.com, Website: www.vnuexhibitions.com or www.viv.net.

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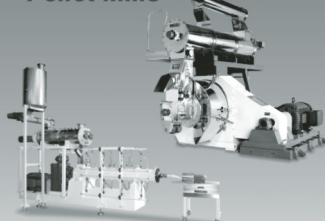
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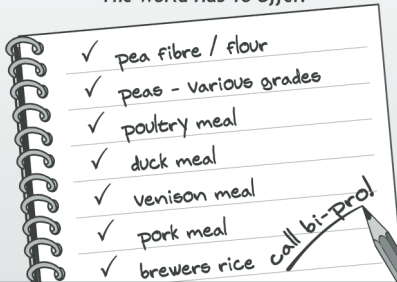
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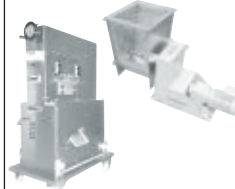
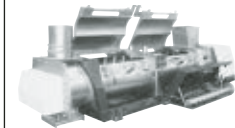
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Brand + private label = Mars, Inc.

A global positioning strategy for the future

The cat and dog petfood market has seen dynamic shifts from major players in recent times. Mars, Inc. recently acquired Doane Pet Care, the largest maker of private label dog and cat food in the US and Europe. This merger was a significant development and requires further insight on how it affects the petfood marketplace.

Mars, which holds the lion's share of the petfood market (approximately 25%, before the Doane acquisition), decided to strategically focus on the private label segment. Though this acquisition was expected to provide production capacity and accelerate the innovation pipeline (which would strengthen and grow their pet business in North America), the implications of this move could impact the balance of power within the private label arena—targeting major players in the US, as well as players in international markets.

The US private label petfood market

Doane Pet Care is the largest manufacturer of private label petfoods and the second-largest producer of dry petfoods in the US market. Doane not only supplies some national brands, and approximately 175 store brands, but also supplies product to support the Ol' Roy brand of dog food and Special Kitty brands for the mass merchandiser Wal-Mart.

In 2003, dry dog food accounted for 46% of the market share of all private label petfood product. Sales were skewed higher by Wal-Mart private label dog food brands. In 2006, this

Mars now has a brilliant strategy for maintaining market dominance in the petfood segment.

— Huntley Manhertz, Jr.



trend continues with Wal-Mart seeing a +3% growth rate versus last year of its US\$3.4 billion petfood business.

Strong year-over-year performances in Wal-Mart's private label sales have fueled the Doane Pet Care bottom line. Wal-Mart is Doane's largest customer, representing about 65% of Doane's business. It is evident that this strong financial contribution, coupled with the leverage Mars now has in negotiating power with the most powerful retailer in the world, is a brilliant strategy for maintaining market dominance in the petfood segment.

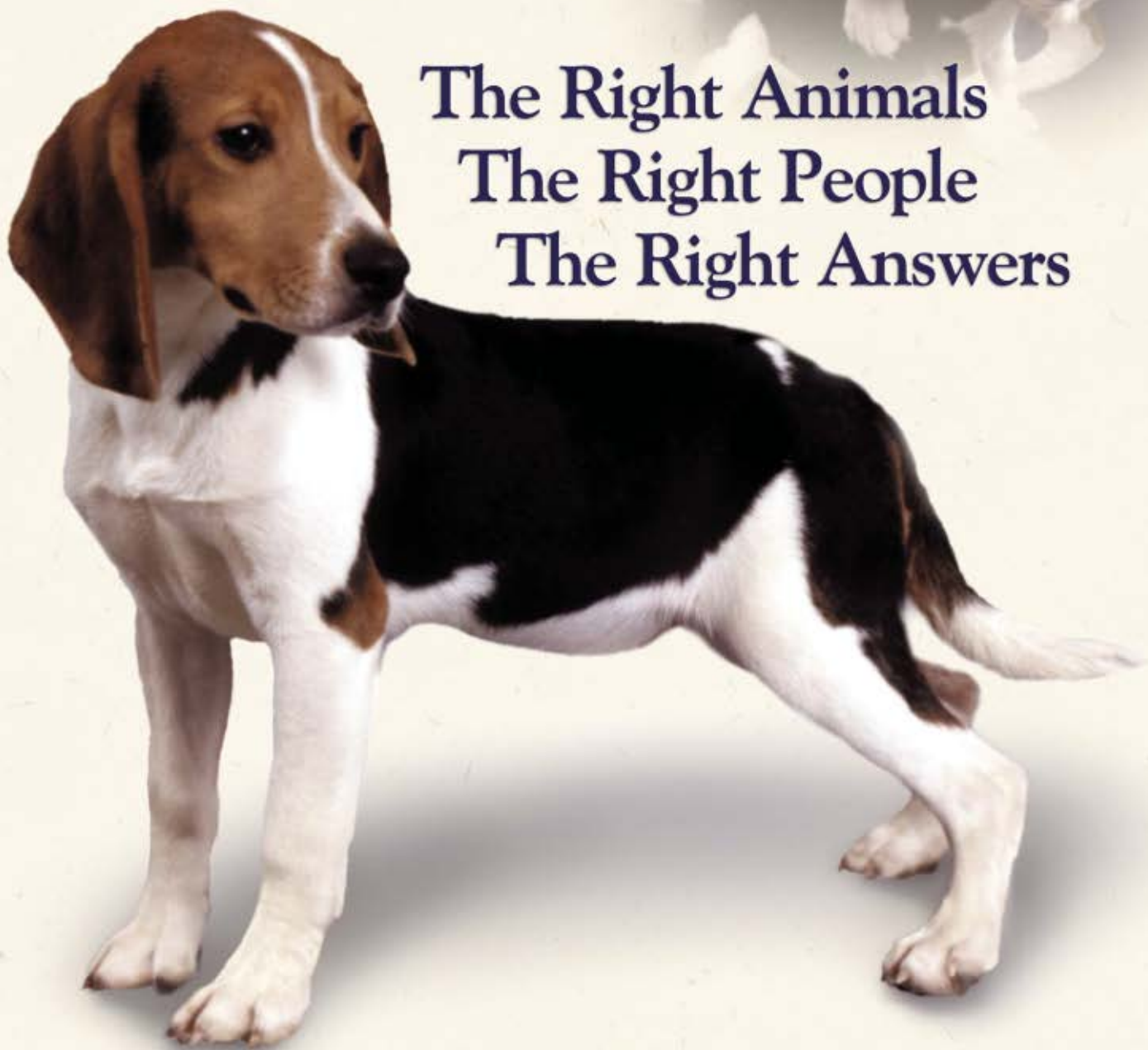
The international petfood market

The acquisition of Doane Pet Care also gives Mars a competitive advantage internationally. Globally, private label petfoods account for approximately 21% of all private label commodities sold, and is projected to grow at 11% per annum with private label dog food (12%) more than doubling the growth of manufacturer brands (5%). Most of the growth comes from countries such as New Zealand, Portugal, Puerto Rico,

Mexico, Finland, Sweden, Brazil and Argentina. Mars, Inc. has the capacity and global experience to strategically play in these international markets and is well positioned to do so given the growing demand internationally for private label petfoods.

While growing up in Jamaica, and being the proud owner of 12 dogs at the age of 13, we fed our dogs the typical canine cuisine of "turn," or corn meal flavored with last night's leftovers. So, going to the local supermarket or store to purchase dog food (either a manufacturer or store brand) was not a routine concept. In less developed countries awareness is shifting as brand awareness and low prices allow for easier market penetration. I suspect that Mars may have seen this as a significant opportunity and has made a very innovative move to become a greater part of this global growth market in private label petfoods. ➔

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