



Animal NUTRA

Animal Nutrition in a Global Marketplace

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Focus on Antibiotic Use in Livestock

Use of antibiotics in livestock for non-therapeutic reasons, specifically growth promotion, has long been debated among scientists, regulatory officials, and livestock producers. In order to fully understand the debate and its implications, one must first recall the uses of antibiotics in livestock production, which includes, treatment of illness, disease prevention during times of high stress or increased susceptibility, and growth promotion (Food Safety Network, 2008). Second, an understanding of when and how bacteria may become resistant is needed. Whenever antibiotics are used in animals or humans, resistance may be acquired by the bacteria through the development of resistant genes, or the ability to neutralize or eliminate the antibiotic (Food Safety Network, 2008). Loss of efficacy of the antibiotic against drug-resistant bacteria leads to risk of increased severity of illnesses caused by such bacteria (Food Safety Network, 2008). In attempts to minimize human exposure to drug-resistant bacteria, specific withdrawal periods for antibiotics have been implemented by regulatory officials to minimize antibiotic residues in the meat or products of animals. However, the question as to whether or not there is increased human health risk to drug-resistant strains of bacteria specifically resulting from overuse of antibiotics in livestock remains a key issue.

The ban of antimicrobials in Europe began in 1989 with four growth promoting antibiotics, followed by the complete ban of all antibiotic use for growth promotion in 2006 (Soulsby 2007). Antibiotic use for growth promotion in Denmark moved from 100 tonnes in 1997 to 0 by the end of 1999 (Phillips 2007). The experience of Denmark is often used for both sides of the debate by other regulatory bodies worldwide. This is due to the difference in experiences of different livestock industries (Dibner and Richards, 2005). The poultry industry has seen an increase in prescription antibiotic use of 1.5% over the last 10 years, however, in that same time overall antibiotic usage in poultry feed has been reduced by 54% (Dibner and Richards, 2005). Furthermore, no change in broiler productivity, and an increase in feed conversion have been reported (Dibner and Richards, 2005). There has been some success with the elimination of growth promoting antibiotic use in finishing swine; however, when the ban further included swine at the weaning stage, severe health effects were reported and an increase in prescription antibiotic use has been observed (Hayes and Jensen, 2003). There also have been noted declines in daily gains and increases in mortality since the antibiotic ban was put in place (Dibner and Richards, 2005). This increased therapeutic use has at times surpassed the total use of antibiotics prior to the ban (Hayes and Jensen, 2003).

In the years following the antibiotic ban the European Union reported increased therapeutic uses and requirements of antibiotics for food producing animals (Phillips 2007). Resistant bacteria growth has varied depending on antibiotic type, often resistance to tetracyclines has been reported while erythromycin resistance is not as commonly reported despite an increase in therapeutic use of both in livestock (Phillips 2007). The ban of antibiotics potentially increases in number of subclinically ill animals accepted for food production; therefore, increasing the risk of bacterial contamination of food and increasing the exposure to humans (Phillips 2007). At present, a total ban is not proposed for Canada or the US but monitoring programs are in place to help policy makers monitor and make decisions based on new relevant data.

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Focus on Antibiotic Use in Livestock cont'd

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There is no doubt that the issue of human health related to the use of antibiotics in livestock requires far more investigation and scientific findings than are currently available. Further cost-benefit analyses are needed, but two involving virginiamycin and macrolides have determined any human health risk is outweighed by the benefits of using these for growth promotion (Phillips 2007). In 2002, the World Health Organization (WHO) published a report titled "Impacts of antimicrobial growth promoter termination in

Denmark" and determined that the incidence of human zoonoses, specifically arising from infections of *Salmonella*, *Campylobacter*, or *Yersinia* has not been affected nor has a reduction in the prevalence of these bacteria in pork and poultry been observed (WHO, 2003). The review of problematic drug-resistant bacteria is multifactorial and cannot be determined by simply examining antibiotic use in livestock but the totality of antibiotic use in humans and animals must be considered. A full reference list is available upon request (feed@cantox.com).

Scientific Review: Obesity in Companion Animals

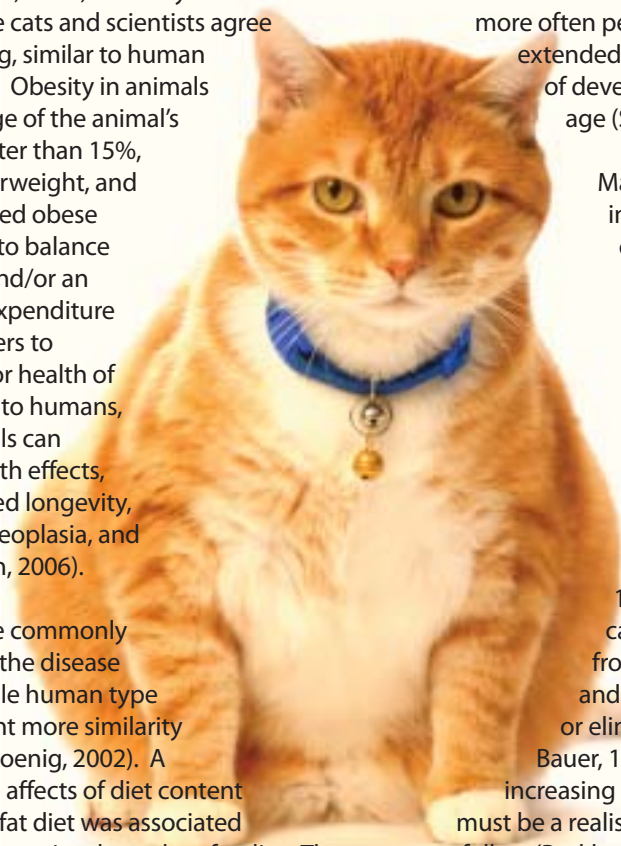
The prevalent nutritional disorder of obesity is an increasing concern in companion animals (German, 2006; DSM, 2009; Robertson, 2003; Scarlett *et al.*, 1994). Obesity rates are 22-40% in dogs and 25-40% in house cats and scientists agree that this number is increasing, similar to human populations (German, 2006). Obesity in animals is determined as a percentage of the animal's optimal body weight. If greater than 15%, the animal is considered overweight, and greater than 30% is considered obese (German, 2006). The ability to balance over-consumption of food and/or an insufficient level of energy expenditure is a challenge for many owners to manage which results in poor health of companion animals. Similar to humans, obesity in companion animals can lead to several negative health effects, including, diabetes, decreased longevity, cardiorespiratory diseases, neoplasia, and general poor health (German, 2006).

Diabetes mellitus is a disease commonly diagnosed in cats and dogs; the disease state in cats tends to resemble human type 2 diabetes while dogs present more similarity to human type 1 diabetes (Hoenig, 2002). A study designed to assess the affects of diet content in cats observed that a high-fat diet was associated with higher insulin-to-glucose ratios than a low-fat diet. These results suggest that the obese state in cats may be associated with the increased risk of developing diseases such as diabetes (Rand *et al.*, 2003). Additional research suggest that obesity in cats may increase the risk of developing type 2 diabetes by up to 5-fold (Hoenig, 2002). Similar conclusions were made in a study examining the feeding patterns and activity levels of dogs

that had diabetes compared to dogs that did not (Klinkenberg, 2006). Researchers determined that dogs with diabetes received treats more often, and owners of the diabetic group more often perceived their dogs to be overweight for an extended period of life. Furthermore, the risk in dogs of developing diabetes due to obesity increases with age (Serisier, 2007).

Maintaining healthy weight requires involvement of the pet owners. A survey conducted in 1998 determined that the energy requirements of adult dogs may be overestimated and as a result, feeding recommendations may be higher than what is actually required (Butterwick and Hawthorne, 1998). The diet of an overweight pet should be closely monitored, and owners may wish to discuss their pet's energy requirements with their veterinarian, as there is large variation between animals and also between breeds (Butterwick and Hawthorne, 1998). It also is important to monitor added calories that companion animals may receive from table scraps, pet treats, or other sources and these extra calories may need to be reduced or eliminated in obese animals (Burkholder and Bauer, 1998). The second half of the equation involves increasing activity level of the companion animal which must be a realistic approach that owners can be encouraged to follow (Burkholder and Bauer, 1998).

The issue of obesity in companion animals may be as much of a concern as the issue of obesity in humans. Increased awareness and active involvement of the owner and their veterinarian will ensure healthy, happy lives for companion animals. A full reference list is available upon request (feed@cantox.com).



European Update...

- **Regulation (EC) No 767/2009**
A major piece of new animal feed legislation was adopted by the EU in June 2009 and will come into force September 2010. Regulation (EC) No 767/2009 is intended to update and replace previous legislation relating to the marketing of feed and pet food. In particular, the legislation includes provisions for:
 - Simplification of the requirements on feed operators including the abolition of pre-market authorisations for bio-proteins
 - Clarification of the labelling requirements to ensure greater transparency, and protection of animal health and customer interest including in its scope, feed materials, compound feed and dietetic feed
 - Specific labelling rules relating to claims, contaminant levels and pet foods
 - The creation of a Community catalogue of feed materials.
- **EFSA Scientific Documents**
Guidance on Feed Additive Authorisations
A new version of the guidance for the preparation of dossiers for sensory additives has been published by EFSA which replaces the previous document adopted in September 2008. The new document provides much greater guidance to applicants and in particular, now includes details on the data requirements for flavouring compounds in addition to colouring agents.
- **Review of Mycotoxin Detoxifying Agents**
In May 2009, Commission Regulation (EC) No 386/2009 amended Regulation (EC) No 1831/2003 by establishing mycotoxin binders as a new functional group of technological feed additives. As part of an ongoing objective by the EFSA to develop guidelines for the risk and efficacy assessment of mycotoxin-detoxifying agents in feed, a scientific review of these agents has been published. The review focuses on the mode of action and on the benefits/risks associated with their potential use as feed additives and provides a detailed and critical information resource on this "grey" area of the literature.

Don't miss the opportunity to meet with Nigel Baldwin at the upcoming IPE/IFE Conference in Atlanta. Mr. Baldwin will be available to discuss European feed and feed additive issues (*i.e.*, the impending deadline for re-review or November dossier deadline). To set up a meeting during this event contact: nbaldwin@cantox.com.

Off the Press..

- Card JW, Magnuson BA (2009). Proposed minimum characterization parameters for studies on food and food-related nanomaterials. *J Food Sci* 74(8):vi-vii.
- Bugusu B, Meija C, Magnuson B, Tafazolli S (2009). Global regulatory policies on food nanotechnology. *Food Technol* 63(5):24-28.
- AAFCO. 2010. 2010 Official Publication. Association of American Feed Control Officials Incorporated (AAFCO); Oxford, Indiana.

Upcoming Events

- **Managing Agri-Food Legal & Business Risks**
January 25 - 26, 2010
Winnipeg, MB, Canada
(<http://canadianinstitute.com/agri-food.htm>)
- **Pet Food Conference**
January 26 - 27, 2010
Atlanta, Georgia, USA
(<http://www.petfoodconference.com/>)
- **IPE/IFE Atlanta 2010**
January 27 - 29, 2010
(<http://www.internationalpoultryexposition.com/>)
Atlanta, Georgia, USA
Cantox will be exhibiting at booth number 455. Don't miss Dr. Berna Magnuson's presentation on "Can nanotechnology improve feed ingredients and safety?" on January 28, 2010 at 12:00 in Hall A.
- **Petfood Forum 2010**
April 12 - 14, 2010
Chicago, Illinois, USA
(<http://www.petfoodindustry.com/forum2010/content.aspx>)
- **NGFA's 114th Annual Convention**
March 3 - 5, 2010
MAUI, HI, USA
(<http://www.ngfa.org/conv2010.cfm>)
- **Agriculture 2.0**
March 24, 2010
Palo Alto, California, USA
(<http://www.newseedadvisors.com/silcon-valley-2010/>)
- **Global Pet Expo**
March 25 - 27, 2010
Orlando, Florida, USA
(<http://globalpetexpo.org/Default.asp?gclid=CN-OmnLPPiJ4CFYZM5QodgGZPqA>)
- **VIV Europe**
April 20 - 22, 2010
Utrecht, The Netherlands
(http://www.viv.net/sites/exhibitors_viveurope_nl/en/index.asp)

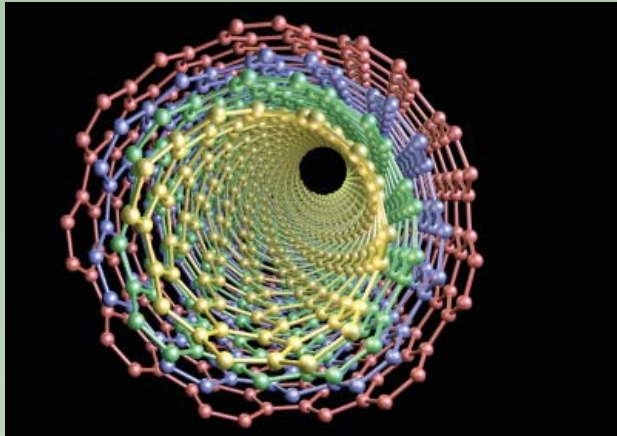
Do you have some exciting research data on one of your products or an upcoming event?

Find out how you can highlight it in our newsletter by sending an email to: feed@cantox.com.

In Profile with...

Bernadene Magnuson, Ph.D
Senior Scientific and Regulatory Consultant
Cantox Health Sciences International (Cantox)

The animal feed industry is yet another area in which the application of nanoscience can potentially improve not only the efficacy, delivery and long-term costs, but also safety. It is clear that even the things that are good for animals can still be toxic if given at the wrong concentration or at the wrong time or in the wrong way. However, through careful manipulation of delivery systems, concentrations or production, there are a number of ways that nanotechnology could benefit not only feeds manufacturers and farmers, but the animals as well.



To learn more about these innovative applications of nanomaterials in animal feed and to learn where the industry stands and gaps that need to be filled, please join us at the 2010 IPE InfoMart where Dr. Bernadene Magnuson will be giving a presentation entitled, "Can nanotechnology improve feed ingredients and safety?".

Dr. Magnuson is a pioneer in the developing field of food and nutritional nanoscience, and is leading efforts to address issues facing the food and feed industry in the adoption of this promising new technology. Her research has been published in over 40 peer-reviewed journal articles and book chapters, and had led to several patents.

A significant goal at Cantox is to help industry leaders by informing and educating them on the latest regulations and news in this field. Our newsletter is one of the means by which we'll achieve this goal. We're also offering our readers the opportunity to profile their company and what's new in our "In Profile" section. If you would like to profile your company please contact Cantox at feed@cantox.com. Let others know of new products, research or hurdles you have overcome.

Helping Companies Do the Right Thing, the Right Way!

Regulations worldwide on animal feed provide a framework for ensuring that feedstuffs do not present any danger to human or animal health or to the environment. They include rules on the circulation and use of feed materials, requirements for feed hygiene, limits on undesirable substances in animal feed guidelines on genetically modified food, and conditions for the use of feed additives in animal nutrition.

The FDA Center of Veterinary Medicine is currently creating new guidelines for Generally Recognized as Safe (GRAS) animal feed ingredient notifications.

Cantox provides fast access to current and leading-edge technology to benefit the development of your feed products. Cantox will use this knowledge and experience to help clients with their new feed GRAS determinations.

Cantox has successfully completed GRAS notifications and self-affirmed GRAS assessments for a wide variety of food and now feed ingredients and their uses. Our internal expertise and resources are able to meet your time-to-market targets. Time and money can be saved by our superior quality regulatory submissions, petitions, and notifications.

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HEALTH SCIENCES INTERNATIONAL

Animal Nutra is a periodic newsletter published by Cantox Health Sciences International (Cantox) for the purpose of keeping our clients and other interested parties informed of brief reviews of regulatory updates, and exciting events of interest to the global market for veterinary feeds and nutraceuticals. Email us with your new research, upcoming events and business items at feed@cantox.com.

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