

Danish Pork Industry – Antibiotics Prohibited as Growth Promoter

In October 2005, Iowa State University Extension swine field specialists, Iowa Pork Industry Center staff and IPPA president Steve Kerns traveled to Denmark for a first-hand look at the country's pork industry. The group's itinerary was designed with these primary objectives: study impacts of animal welfare legislation, examine the impacts and effects of bans on antibiotic growth promotant use, and analyze the development and management of increasing sow herd productivity. During the week-long trip, members met with industry representatives, advisors and producers; visited farms, a harvesting facility and an equipment manufacturer; and spent time with the Danish Animal Welfare Society and the Danish Bacon and Meat Council.

Denmark began a voluntary removal of antibiotics as growth promoters for finishing pigs in 1998. In 2000, the use of antibiotics as growth promoters was withdrawn for all swine. As of Jan. 1, 2006, the European Union, of which Denmark is a member, has prohibited the use of antibiotics as growth promoters in swine, cattle, poultry and rabbits.

An antibiotic is "a chemical substance produced by a microorganism which has the capacity to inhibit the growth of and/or destroy other microorganisms," but the term is used more generally to include all substances with antimicrobial activity. Antibiotics typically have been used for three purposes: treating illness, preventing disease and improving nutritional efficiency. Improving nutritional efficiency, also known as "growth promotion," is related to providing a favorable condition in the animal's intestine for the digestion of food.

The Danish Integrated Antimicrobial Resistance Monitoring and Research Program (DANMAP) was established in 1995 by the Danish Ministry of Food, Agriculture and Fisheries and the Danish Ministry of Health. This was the initial step in the process of reducing the use of antibiotics as growth promoters. DANMAP's objectives are to monitor consumption of antimicrobial agents (animal species and human); monitor antimicrobial resistance in humans and animals; and investigate associations of resistant bacteria from animals, food and humans.

History of legislation and industry agreements

While initial efforts to reduce the use of antibiotics as growth promoters (AGPs) began in 1995 with a national ban of avoparcin, it is appropriate to observe how initiatives and legislation progressed regarding animal welfare and AGPs because both issues are intertwined. Figure 1 shows the progression. Animal welfare issues are listed in green, while AGP issues are listed in black.

The structure of the Danish pork industry has contributed to these initiatives, agreements and legislation. Domestic pork harvesting, processing and merchandising activities are handled by farmer-owned cooperatives. After years of consolidation, two cooperatives remain: Danish Crown (93% of commercial harvest) and TiCan (7%). Farmers agree through long-term contracts to deliver all of their production to the cooperative of their choice. Danske Slagterier (Danish Bacon and Meat Council) is organized to work with the swine industry cooperatives and farmers in trade relations, veterinarian services, production research and meat research. Because more than 90 percent of Danish pork

production is exported either as live animals or meat, and the domestic market is quite demanding on quality, safety and welfare issues, the industry must focus on consumer and market demands.

Distribution and registration of veterinary medicines

Danish legislation mandates that distribution of all veterinary medicines takes place through authorized pharmacies based on veterinary prescriptions. Feed mills, which are subject to licensing and inspection, can hold licensed premixes for the purpose of manufacturing medicated feedstuffs. Farmers may obtain medicated feedstuffs from feed mills through a veterinary prescription for use in on-farm feed production.

Treatment of food producing animals may only occur if the product is directed toward a diagnosed infection and aimed at animal health, not growth promotion. Since mid-2000, any medications for food producing animals - including medicated feedstuffs, sera and vaccines - must be recorded by the veterinarian and reported through the official register - VETSTAT. Likewise, pharmacies and feed mills must report the processing and delivery of veterinary products to VETSTAT. Veterinarian reporting must include the veterinarian responsible for the treatment, the product prescribed, identification of the target herd, the species (including age-group) and conditions to be treated. The veterinarian may, under certain conditions, supply products directly for the treatment of animals under his care, and the farmer must follow the advice and instructions given by the veterinarian. Instructions must be given in writing and must include identification of target animals, clinical symptoms that must be present before treatment, diagnosis, product and dosage, administration route and withdrawal period.

In 1996, legislation was passed to require routine farm visits by a veterinarian (12 per year) to assist producers on the use of medications and herd health related issues and to measure compliance with the national and EU animal welfare regulations. While not specifically stated, it could be inferred that the mandated visits were designed to maintain availability of local veterinary assistance after veterinarians were no longer allowed to directly sell medication. Farmers sign a "voluntary contract on veterinary advice" with a veterinarian. The objectives of these contracts are to improve the standard of health of the herd, to minimize the risk of infectious diseases, and to optimize the use of antibiotics in order to minimize development of bacterial resistance.

One producer we visited with was Henrik Hanghøj, who owns 750 group-housed sows near Dybvad. He told us that his veterinarian contract costs approximately \$600 per month. The main components of the visit, which can last anywhere between 45 minutes and three hours, include reconciling medication usage records with medication inventory and a walk-through to observe animal health and welfare conditions provided on the farm. Treatment and preventative programs will be developed based on this regular interaction.

Producer records of veterinary medicines

When herd owners use registered medicines to treat food- or fur-producing animals, they must keep a journal detailing the animals treated, the product used, date and reason for treatment, dosage and administration route, responsible person and origin of product (if not administered by a veterinarian). This type of recording is not required for treatment with minerals or vitamin

compounds. Medication records must be kept for five years.

Other restricted use compounds

Hormones and substances with hormone-like effects, including somatotropins, used for growth and carcass improvement purposes are not allowed to be used in food producing animals. Beta-agonists and substances with estrogenic, androgenic and gestagenic effects are prohibited for use in food producing animals.

Certain groups of medications may only be used by the veterinarian in person: analgesic injections (non-steroid anti-inflammatory); anesthetics; injectable selenium; and hormones and compounds with hormonal effect such as oxytocin, progesterone, and prostaglandins.

Impacts of banning AGPs

The 1998 voluntary removal of antibiotic growth promoters (AGPs) for finishing pigs was accomplished through a tax, as well as market pressure by the processing/marketing cooperatives. Farmers were required either to pay a tax of ~\$2.00 per head on animals for which the products were used or to agree to discontinue use. Faced with this tax, most producers stopped using the products at the finishing stage. Farmers generally reported few health problems and there was not a "public outcry" by producers against the removal. Some farms noted an increase in ileitis, which was confirmed with increased diagnostic submissions and clinical diagnosis.

The 2000 removal of all AGPs from the weaning stage presented greater challenges. Producers and veterinarians we talked with noted an increase in piglet diarrhea, higher mortality rate, decreased weight gains and greater weight variation within a group. Therapeutic medication was increased and health management and diet formulation became more focused to address these challenges.

While there is a move toward two-site production (movement to finishers at 30 kg. (66 lbs.)), many Danish farms are farrow-to-finish operations with an average inventory of 350 sows. We had the opportunity to visit with two practicing veterinarians who shared comments regarding producer challenges with the removal of AGPs and the disease pressure of Postweaning Multisystemic Wasting Syndrome (PMWS). They told us that health improvements resulted from changes in pig flow to all-in/all-out, improved farrowing house and nursery environments, and increasing weaning age from 21 days to 28 or 35 days. The importance of good sanitation was stressed. Dietary changes such as inclusion of fiber, restricted feeding the first two weeks in nursery, and using probiotics and diet acidification have been attempted. The Danish Ministry allows producers to use high-level zinc supplementation for the first two weeks in the nursery.

Danish antimicrobial usage

The removal of antibiotics as growth promoters lowered total antimicrobial usage. However, therapeutic usage of antimicrobials has been on the rise (Figure 2.). According to the 2004 DANMAP report, the yearly antimicrobial consumption in food animals was 112.5 metric tons, with swine accounting for 92.7 metric tons. Taking production into account, this equals 47 mg

antimicrobial/kg of pork meat produced.

The 2005 Annual Report from the National Committee for Pig Production (NCP) reported a 13 percent increase in antimicrobial usage in 2004 compared to 2003, while the increase in [pork] production was three percent. The report noted that between 2000 and 2004, nursery and finisher mortality rates increased, which might indicate greater disease prevalence in herds. PMWS and Lawsonia (ileitis) have contributed to increased antimicrobial usage. These diarrheal conditions require group treatment; results from a herd with ileitis "... show that group treatment administered via feed (7 day) resulted in significantly fewer sick and dead pigs, a significantly higher daily gain, and a lower feed conversion compared to pens in which 55 percent of the pigs were treated by injection for three days."

Prudent use of antibiotics is stressed by the NCP 2005 Annual Report: "Antibiotics must be used with care both for the sake of production economy and to ensure that we still have effective antibiotics and a high level of food safety. More efficient treatment and consumption of antibiotics can be obtained through herd strategies such as: evaluation of the effect of the administered treatment; use of group treatment directed towards the sick pigs; use of hospital pens; adequate training of the staff and improvement of feed and housing facilities."

U.S. antimicrobial usage in pork production

Antibiotics are important in swine production for treatment of illness, prevention of disease or improved nutritional efficiency. In 2003, a report by Iowa State University economists Dermot Hayes and Helen Jensen titled "Lessons from the Danish Ban on Feed-Grade Antibiotics" noted that if the U.S implemented a similar AGP ban, cost of production would likely increase by \$3.00 to \$4.50 per pig.

The Pork Checkoff's "Take Care - Use Antibiotics Responsibly™" program outlines the USA pork industry position on antimicrobial usage: "Producers, veterinarians, and other food-chain participants share the concerns regarding the use of antibiotics as tools utilized in the production of our food supply. The responsible use of these products is beneficial both for the health and welfare of the animal and for food safety and human health. It is important to use antibiotics responsibly to minimize the development of antibiotic resistance, preserve their effectiveness and to maintain availability of these products. Antibiotics, and other health products, while important tools for good animal health, are only one component in a comprehensive herd health program. Antibiotics should not be used to replace good management, but rather as a supplement to management when appropriate."

For more information, contact the Iowa Pork Industry Center at (800) 808-7675 or any ISU Extension swine/livestock field specialist. Field specialists are available to present information on the Danish pork industry or the specific issues of productivity, antibiotic growth promotants and animal welfare.