ABSTRACTS
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SYMPOSIA AND ORAL SESSIONS

*** Author Presenting Paper**

PSA Ancillary Scientists Symposia: Agricultural Biosecurity: Emerging Issues in Homeland Security & Food Safety

1 Antibiotic use in Animals and the Impact of the Growth Promoter Ban in Europe. R. B. Phillips*, *Animal Health Institute, Washington, DC.*

Antibiotic use in food animals in the United States is trending down as producers become more careful and efficient in their use of antibiotics. Surveillance data and recent quantitative risk assessments suggest the human health risk from resistance food borne pathogens is quite small. Conversely, risk assessments and the European experience suggest the benefits of antibiotics used in food animals have been underappreciated. A non-science driven ban on growth promoter use in Europe resulted in increased bacterial illnesses in animals while producing no human health benefits. Taken together, these bodies of evidence suggest that policy actions not based on science will have negative unintended consequences. The best public health measures will include a combination of increased surveillance, continued improvements in food hygiene and rational, judicious use of antibiotics in food animals.

Key Words: Antibiotics, Risk Assessment, Resistance

2 Enzymatic degradation of prions and prevention of transmissible spongiform encephalopathies. J. Shih*, *Department of Poultry Science, North Carolina State University.*

Infectious prion protein (PrPres) is believed to be the causative agent of bovine spongiform encephalopathy (BSE) or made cow disease, sheep scrapie elk chronic waste disease (CWD) and human Creusfeldt-Jakob disease (CJD). The protein is recalcitrant and resistant to common proteases and heat sterilization. A feather-degrading keratinase, was found to be able to degrade PrPres in the brain tissues of BSE cows and scrapie sheep. After homogenization, pre-heating at 115 oC, and the keratinase digestion, PrPres was completely degraded to an undetectable level by Western blott. Biological tests in transgenic mice are in progress to confirm the dis-infection of the tissue born PrPres by the enzyme. In order to study the degradation mechanism and to improve the effectiveness of the enzyme, a non-pathogenic surrogate protein system was developed in this laboratory. Sup35NM, a prion-like protein from yeast, was produced and analyzed for its characteristic folding, aggregation, and degradation by proteinase K and keratinase. With the keratinase and the surrogate protein, this laboratory is equipped to develop a new process for enzymatic inactivation of PrPres in the decontamination of equipment and the rendering process for prion-free animal products. This new method and other existing dis-infection methods will be reviewed in the presentation. (Supported by USDA, FDA and National Cattlemen's Beef Association)

Key Words: Prion Protein, Keratinase

3 Mycotoxin detoxification and microorganisms in feeds. G. Schatzmayr*[1], D. Schatzmayr*[1], M. Täubel[1], S. Nitsch[1], A. P. Loibner[2], and E. M. Binder[3], [1]*Biomin IAN GmbH, Industriestr. 21, 3130 Herzogenburg, Austria,* [2]*IFA-Tulln, Department of Environmental Biotechnology, Konrad Lorenzstrasse, 3430 Tulln, Austria,* [3]*Erber AG, Industriestrasse 21, 3130 Herzogenburg, Austria.*

Mycotoxins are secondary metabolites of fungi affecting human and animal health. Mycotoxins of major concern for poultry are especially aflatoxins, trichothecenes and ochratoxins. In poultry aflatoxins cause for instance haemorrhages, nervous syndrome and pale bird syndrome whereas certain trichothecenes lead to feed refusal, haemorrhages and oral as well as dermal lesions. Ochratoxin A is responsible for damages of kidneys and liver. All of the above mentioned mycotoxins suppress the immune system of birds at relatively low concentrations. In spite of all efforts to prevent the formation of mycotoxins in the field and during storage high contaminations still occur. To alleviate negative effects on animals detoxification strategies are needed. Clay minerals have been used in the feed industry to bind aflatoxins, but it turned out that these binders are very specific for aflatoxins but not for the other toxins which show a great variation in their chemical structures. A novel strategy to control the problem of mycotoxicoses in poultry is the application of microorganisms capable of biotransforming mycotoxins into non-toxic

metabolites. A new strain belonging to the genus of Eubacterium isolated out of rumen fluid of cattle is able to deactivate trichothecenes by reduction of the epoxide ring. This mode of action was proven in vitro and also in vivo by applying trichothecenes and the detoxifying strain Eubacterium BBSH 797 to chicken. In a very recent project a novel yeast strain, capable of degrading ochratoxin A and zearalenone was isolated and characterised. Due to its affiliation to the genus of Trichosporon and to its main property to degrade mycotoxins this strain was named Trichosporon mycotoxinivorans. This strain showed detoxification in vitro and in vivo. Together with clay minerals Eubacterium BBSH 797 and Trichosporon mycotoxinivorans can be used in a formulation to prevent poultry from mycotoxicoses caused by aflatoxins, trichothecenes and ochratoxins.

Key Words: Mycotoxins, Deactivation Strategies, Microorganisms

4 Withdrawn by author. , .

5 Avian Influenza, Vaccines and Control. D. Swayne*, *US Department of Agriculture, Agricultural Research Service, Southeast Poultry Research Laboratory, Athens, GA.*

Avian influenza (AI) is a viral disease of birds caused by type A orthomyxoviruses. Avian influenza viruses are further classified into 15 different hemagglutinin (H1-15) and 9 different neuraminidase (N1-9) subtypes. Biologically, AI viruses can be of low (LP) or high pathogenicity (HP) for chickens and related poultry species. Dealing with AI has focused on one of three goals: prevention, management (control) or eradication. In most developed countries, LPAI and HPAI are not common in commercial poultry and thus prevention is the primary goal. However, if AI occurs, eradication is the overall goal with epizootics of HPAI being eradicated through a strategy that includes enhanced biosecurity, surveillance or diagnostics to identify infected farms, quarantine of infected premises, depopulation and disposal of infected poultry, and cleaning and disinfection of infected premises. Vaccines have been used to manage economic losses from LPAI or, in some instances, have been used as a tool in LPAI or HPAI eradication strategies. AI vaccines can prevent clinical signs and death in poultry, increase resistance of birds to infection, and decrease the amount of virus shed in the environment. However, vaccines alone will not eradicate AI. High pathogenicity AI impacts international trade as does some forms of LPAI. Experimental studies in chickens have shown that LPAI viruses cause respiratory and gastrointestinal infections without infecting the meat. By contrast, HPAI viruses produce infection of respiratory and gastrointestinal tracts, produce a viremia and virus is present in the meat and internal contents of eggs during the acute stages of the infection. Additional experimental studies have demonstrated that pasteurization of liquid egg products using USDA guidelines will inactivate HPAI virus that have been artificially added to levels in excess of those reported in eggs laid by HPAI virus-infected hens. Although, no virus has been demonstrated in internal contents of eggs laid by LPAI virus infected hens, pasteurization has been shown to inactivate LPAI virus artificially added to egg products.

Key Words: Avian Influenza, Vaccine, Trade

Combined Animal, Dairy and Poultry Extension Workshop

6 Washington update. R. Reynnells, *National Program Leader, Animal Production Systems, USDA-CSREES.*

The 2004 Annual Extension Special Recognition Award is presented to Dr. Mike Hulet, (PA), who has made many significant leadership contributions in the areas of environmental protection and animal well-being. Muquarrab Qureshi joined us as National Program Leader (NPL) for Animal Genetics. Our NPL position for Veterinary Medicine continues to be available. I want to encourage you to participate in multi-state research committees, which will increase in importance with our ever-reducing number of poultry faculty. WCC-204, Animal Bioethics, is an important committee that complements other activities at Land Grant Universities. The Southern Region Poultry Extension Workshop (Triennial) committee is more national in character and continues discussions of scheduling changes. John Carey (TX) is Chair, and Ken Anderson, Vice Chair of that committee and they request you provide comments and volunteer. The 2004 National Poultry Waste Management Symposium is in Memphis, and is coordinated by Mike Hulet (PA); with Susan Watkins (AR) Coordinator for 2006. The Future Trends in Animal Agriculture held a program in 2002 (Standards), two in 2003 (Science and Ethics; and, Costs of Changes), with another scheduled for 2004 (Local and Global Considerations) to create opportunities for positive dialogue between industry and activists. Proceedings are available. The National Poultry Infobase will be terminated in 2004. A national Regionalization Workshop prioritized mechanisms to implement effective programs. Proceedings are available.

Key Words: Recognition Award, Animal Well-Being, Triennial Workshop

7 Confined Animal Feeding Operation (CAFO) regulations impact and record keeping requirements for livestock operations. G. E. Erickson*, R. Koelsch, C. Shapiro, and C. Wortmann, *University of Nebraska, Lincoln.*

In 2002, USEPA revised regulations for confined animal feeding operations (CAFO) to appropriately update federal requirements in the 1972 Clean Water Act, and specifically the National Pollutant Discharge Elimination System (NPDES). The goal of the revised regulations is to ensure clean surface water in the US. The revisions address runoff control, manure storage, nutrient utilization, and record-keeping and related livestock water quality issues. CAFO is defined by facility, risk of nutrients entering water, and size. Large CAFOs have at least 1000 cattle, 700 dairy, 2500 finishing swine, or 125,000 broilers. Smaller operations can be designated as a CAFO under some circumstances. By December 31, 2006, nutrient management plans (NMP) and record keeping are required for CAFOs. The USEPA requirements are the minimum requirements to which individual States must respond. State requirements may be more demanding and comprehensive than the minimum established by USEPA. Comprehensive Nutrient Management Plans (CNMP) are defined by USDA to monitor nutrient flow, minimize excretion, appropriately utilize nutrients, and keep records. CNMPs are more comprehensive than NMP and address feed management and alternative uses or technologies for managing manure. NMP records that must be maintained for five years include: the annual NMP, analysis of manure and soils receiving application, crop nutrient requirements, the basis for determining the rate of application, dates and methods of application, amounts of N and P applied, and a cropping season summary. The USEPA regulations require that CAFOs submit an annual report. USEPA is allowing the States to determine the threshold at which manure application rates can no longer be based on crop N need or removal and P-based application are required. This threshold is affected by several that define the potential for runoff P loss from individual fields. Considerable education efforts are underway nationally, regionally, and through land-grant institutions.

Key Words: Nutrient Management, Regulations, Animal Feeding Operations

8 Waste management alternatives: composting, methane production and other options. L. E. Carr, *University of Maryland, College Park.*

This presentation will address waste management alternatives to include: composting manures and normal mortalities from animal and poultry production systems; methane production from various manures and potential utilization of the end products; processing poultry and turkey litter for organic fertilizer and value added fertility products; and direct combustion. Process feedstocks will be limited to cattle, swine, horse and poultry manures/litter and normal mortalities. The carbon to nitrogen ratio of some manures are in the desirable range while others will have to be adjusted with a carbon source for good composting and methane production. Methane is not a readly compressible gas which creates some storage limitations, therefore, direct contenious use of the gas as it is generated will be discussed. In this process, the nutrient content of the feedstock changes very little which will have to be utilized properly upon discharge from a digester. Litter from broiler and turkey production are ideal for further processing into organic fertilizer and other value added fertility products because they are from dry production systems with a high NPK content. In recent years, there has