Field Evaluation of Yucca Schidigera on Ammonia Emission and Production Performance of Laying Hens

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Concerns about ammonia (NH₃) include issues of live production performance, animal health, welfare, and environmental impact. Retail industry marketers, as a component of an animal care audit programs, issue guidelines for the control of ammonia within poultry facilities. At the same time, pressure is placed on poultry producers from environmental groups and neighbors to reduce ammonia emissions for environmental reasons. Since the current procedure for reducing ammonia levels in animal houses is to ventilate the houses (i.e., dilution of the ammonia-laden air) as much as possible, this can conflict with efforts to reduce ammonia emissions from the production facilities. A study to investigate quantities of ammonia produced by feeding laying hens with potential ammonia-lowering diet is being done. Diet manipulation to reduce ammonia has a number of advantages, such as reducing nitrogen input into the system, retaining more nitrogen in the manure, requiring less ventilation air to dilute the indoor ammonia concentration and thus saving energy, and reducing the need to further treat the exhaust air. A laboratory study showed that laying hen manure from the 100-ppm yucca schidigera dosage treatment emitted significantly lower NH₃ than the control. This controlled study will quantify the effect of feeding laying hens a treatment diet containing Yucca on ammonia emission reduction, manure properties, and hen production performance, as compared with the control diet.

Inactivation of infectious bursal disease virus through compost of litter from poultry houses

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Very virulent infectious bursal disease virus (vIvBDV) was recognized in a pullet farm from Washington in 2014. Viral shedding in feces commences about 48 hours after infection and can continue for 14 to 16 days. IBD virus contaminated manure, can be spread by people, equipment, water and vehicles. Infectious bursal disease virus is resistant to many environmental stresses and often persists on farms for months. There have been conflicting reports as to whether composting can destroy vIvBDV in the manure. This project investigated the composting of litter from the affected house using an aerated static pile to inactivate the virus. Two weeks before the affected pullet flocks were moved to the layer house, SPF birds were placed in the barns. Ten days after they were placed, 70% of SPF birds were positive for vIvBDV. After the pullets were moved, at 20 weeks of age, the litter in the house was used to build an aerated static pile for composting. The pile was maintained at above 130F for four weeks. After this time, additional SPF birds were placed on the composted material. After 2 weeks all the birds were healthy and there was no evidence of vIvBDV. These results suggest that this composting method could be used to decontaminate the litter from vIvBDV and help prevent the spread of vIvBDV.

Efficacy of commercially available broiler vaccines against variant IBDV strain NC171 isolated in the broiler chicken industry in Canada

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Variant strains of Infectious Bursal Disease Virus (IBDV) are recognized as a leading cause of immune suppression by the broiler chicken industry in Canada. In a previous study, we demonstrated that current broiler breeder vaccines are not effective against variant IBDV (vIvBDV) in broiler chickens. The objective of this study was to determine the efficacy of commercially available IBDV broiler vaccines against vIvBDV in broilers. A group of broiler hatching eggs were vaccinated, at day 18 of incubation, with a turkey
herpes virus-infectious bursal disease (HVT-IBD) vector vaccine by in ovo route. Another group, consisting of day old broiler chickens, were vaccinated with a commercially available live-attenuated IBD vaccine by the intramuscular route. All the chickens of vaccinated and non-vaccinated (control) groups received $3 \times 10^3$ EID$_{50}$ of variant IBDV strain NC171 at day 6 post-hatch. A randomly selected sub-set of each group (n=20) were sampled at days 19 and 35 post-hatch for bursal weight to body weight percentage (BBW) and bursal histopathology. A quantitative real time RT-PCR assay was used to detect the IBD viral genome and viral load by cycle threshold values in the bursa tissues at days 1, 3, 6, 9, 13, 29 post-infection. The presence of live virus in bursa was confirmed by inoculating bursal tissue homogenate to specific pathogen free eggs and observed embryo lesions. A parallel similar trial was conducted using broiler progenies obtained from broiler breeders experimentally vaccinated with live vIBDV (single dose, $3 \times 10^3$ EID$_{50}$/bird) isolated in Canada. The groups of broilers which received either HVT-IBD or live-attenuated vaccine had significantly lower BBW and severe bursal atrophy compared to broilers from parents experimentally vaccinated with vIBDV NC171 or 05SA8 (P<0.05). Broilers from parents vaccinated against vIBDV NC171 or 05SA8 had very low IBDV load compared to broilers vaccinated with commercial broiler vaccines. It is evident that immunity induced by these commercial broiler vaccines was not able to control vIBDV infection in broilers.

Presence of infectious bursal disease virus in chicken meat and effect of vaccination in decreasing the virus titers

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Infectious bursal disease virus (IBDV) causes economic losses to the poultry industry worldwide and impacts chicken meat importation in countries with self-declared freedom. This study sought to determine the presence of IBDV in chicken meat and the role of vaccination as a mitigation strategy. In Experiment 1, broiler-type specific-pathogen-free (SPF) chickens were challenged with STC (serotype 1, classical), Indiana (serotype 1, variant), rA (serotype 1, very virulent [vvlBDV]), and Ohio (serotype 2, avirulent). No clinical signs or mortality were observed in any group but STC group, where 2 out of 18 birds died (10 and 12 days post-challenge). Infection was confirmed by virus isolation (VI) from target tissues (bursa and thymus) of all birds. Virus was isolated from breast and/or thigh meat of STC- and vvlBDV-infected chickens. In Experiment 2, 1 day-of-age (doa) maternal immunopositive broiler-type SPF chickens were either vaccinated with HVT-IBDV recombinant vaccine (Vaxxitek®, Merial) or not vaccinated, and maternal immunonegative chickens were sham-vaccinated. All birds were challenged at 21 doa with variant Indiana or vvlBDV. Maternal immunopositive chickens challenged with vvlBDV, either vaccinated or not, had statistically significant lower virus levels in the meat and in target tissues compared to sham-vaccinated chickens. No virus was detected in meat from any of the groups challenged with variant Indiana. This study indicates that only vvlBDV rA strain can be found in meat at low levels, and that the vaccination protocol currently used in the USA effectively decreases the already low presence of virus in chicken meat.

Isolation and molecular characterization of a field virulent strain of infectious bursal disease virus in Liaocheng, Shandong Province, China

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A recent outbreak of infectious bursal disease virus (IBDV) infections occurred in a broiler farm located in Liaocheng, Shandong province of China in Nov 2013. The infected flocks were 4-week-old commercial broilers with approximately 5000 birds which were all affected and about 1/3 of them died in few days after the disease onset. Clinical symptoms of depression, ruff feathers and watery diarrhea were common. Pathologic lesions of severe hemorrhage and swollen of bursa organs were observed. This IBDV outbreak was confirmed by virus isolation in SPF embryonated chicken eggs and virus identification by PCR.