Comparison of Same-Hen Yolk and Serum Antibody Levels Using the Elisa Test Following Vaccination with Typical Vaccines Used in Commercial Laying Hens

Shepherd, Jesse (School: Spanish Fork High School)

Commercial quality assurance plans require ranches to maintain flock health programs that include periodic monitoring to evaluate vaccination response or disease exposure in egg laying chickens. Avian venipuncture is a difficult and time consuming procedure without the assistance of a veterinarian or other trained person. Even when this procedure is done by a veterinarian, it can potentially induce added bird stress, which may have an adverse effect on individual hen egg production, antibody levels, and the hen's immune resoponse. A previous study (Mohammed, Yamamoto, Carpenter, & Ortmayer, 1986) used egg yolks to evaluate flocks for Mycoplasma gallisepticum exposure by comparing serum and yolk samples from individual laying hens to see if egg yolk antibody levels correlated with serum antibodies. In this study, the ELISA test was used to compare measurable antibody levels in egg yolk vs. serum to some typical layer vaccines. These vaccines include M. gallisepticum, Bronchitis, Virulent Newcastle Disease, and Avian Encephalomyelitis. 120 healthy, white leghorn laying hens had blood and yolk samples taken. The samples were matched and run simultaneously. The results of the ELISA tests were statistically analyzed using several methods including Pearson's Correlation, Analysis of Variance, and Beta Level Hypothesis Tests. Statistical analysis showed that each test had a Pearson's Correlation value of $r>.78$, where values between $r>.70$ and $r<=1.0$ are significant. Analysis of Variance showed that all four tests had P-Values of $p<0.0001$, where $p<0.01$ allows for the rejection of the null hypothesis. Beta Level Hypothesis Tests showed that each test had a probability of a Type II Error (chance of a false positive or false negative) of 0.0%.

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