

Avian Encephalomyelitis ELISA

The Synbiotics ProFLOK® **Avian encephalomyelitis (AE) ELISA kit** is a rapid, specific and sensitive USDA-licensed immunoassay for the detection of AE antibodies in chicken serum samples.

AE is an infectious viral disease that is characterized by ataxia, rapid tremors and mortality in young chicks from susceptible breeder flocks and egg production losses in mature birds^{1,2}. AE virus is transmitted vertically from hen to chick through the egg or horizontally within a flock or among flocks^{1,2}.

Suggested Uses

Suggested uses for the Synbiotics AE ELISA kit:

1. Monitoring Maternal Antibody Levels

- Collect and assay 20-25 serum samples from 1-3 day old chicks.

2. Evaluating AE Vaccinations

- Randomly collect and assay 30 serum samples per flock immediately prior to AE vaccination (pre-vaccination) and 14 to 18 days post-vaccination.

Plate Antigen

The AE test plates have been coated with the Van Roekel strain of AE that has been inactivated.

Test Features

The Synbiotics AE ELISA kit has been extensively tested for the following features:

1. Specificity

The results shown in Table 1 below indicate that the Synbiotics AE ELISA kit demonstrates excellent specificity by detecting AE antibodies and not cross-reacting to other serum samples. The Synbiotics AE ELISA kit, like all Synbiotics ELISA kits, is highly specific to provide valid, reproducible test results.

Table 1. Specificity.

Average sample-to-positive (SP) ratio values, SP ranges, and titer values for a specificity serum panel assayed with the SBIO AE ELISA test.

Antisera	Average SP ^{A,B} Ratio Values	SBIO AE ELISA SP Range ^C	SBIO AE ELISA Titer Values ^D
Avian pox virus (POX)	0.000	-	0
Avian reovirus (REO)	0.008	-	0
Reticuloendotheliosis virus (REV)	0.008	-	0
Chicken embryo fibroblast (CEF)	0.072	-	0
Infectious bursal disease (IBD)	0.000	-	0
Infectious laryngotracheitis virus (ILT)	0.000	-	0
Lymphoid leukosis virus	0.000	-	0
Mycoplasma synoviae (Ms)	0.006	-	0
Mycoplasma gallisepticum (Mg)	0.002	-	0
Normal control serum (NCS)	0.002	-	0
Newcastle disease virus (NDV)	0.000	-	0
Avian adenovirus type-1 (AD-CELO)	0.002	-	0
Chicken anemia virus (CAV)	0.000	-	0
Herpesvirus of turkeys (HVT)	0.000	-	0
Infectious bronchitis virus (IBV-ARK)	0.000	-	0
Infectious bronchitis virus (IBV-CONN)	0.056	-	0
Infectious bronchitis virus (IBV-MASS)	0.000	-	0
Avian encephalomyelitis virus (AE)	0.648	+	5901

^AValues are the arithmetic mean of 15 replicate samples (3 replicates/5 ELISA plates)

^BSample SP Ratio = $\frac{\text{Optical Density (OD) sample} - \text{Avg. OD Normal Control}}{\text{Avg. OD Positive Control} - \text{Avg. OD Normal Control}}$

^CSBIO AE ELISA SP threshold ranges: Negative (-) = $\leq .300$
Positive (+) = $> .300$

^D Log_{10} titer = $(0.717 \times \text{Log}_{10} \text{ SP}) + 3.906$

2. Sensitivity

Table 2. Sensitivity. Comparison of SBIO AE ELISA sample-to-positive (SP) ratio values, and titer values to the conventional AE agar gel precipitin (AGP) test for an AE sensitivity serum panel generated by serially diluting a high-titered AE serum in chicken normal control serum.

The data shown in Table 2 demonstrate the sensitivity of the Synbiotics AE ELISA kit compared to the conventional AE AGP test. Additionally, the Synbiotics AE kit provides AE ELISA results within 3 hours compared to the 24 hours or more needed for the AGP test.

Log 2	Dilution Ratio	SBIO AE SP Values ^{1,2}	SBIO AE ELISA Titer Values ³	AGP Results ⁴
-1	1:2	1.380	10146	N/A
-2	1:4	1.240	9397	+
-3	1:8	1.110	8680	++
-4	1:16	0.990	7996	+++
-5	1:32	0.774	6702	++
-6	1:64	0.554	5275	++
-7	1:128	0.310	3478	+

¹Values are the arithmetic mean of 8 replicates.

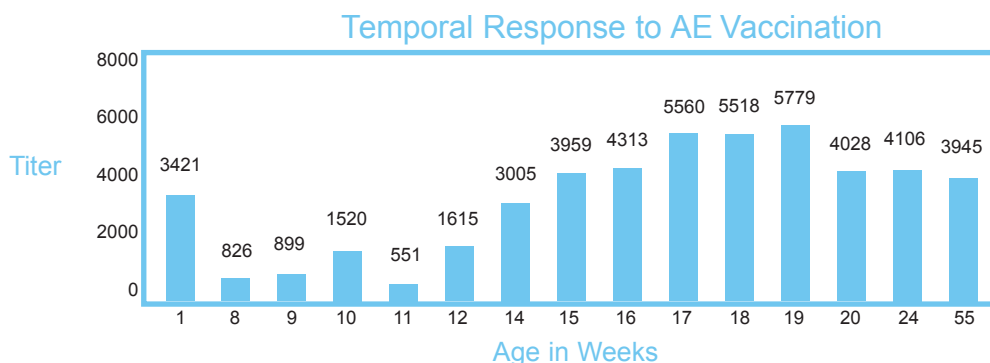
²SBIO AE antigen ELISA SP threshold ranges: Negative (-) = ≤ 0.300
Positive (+) = > 0.300

³Log 10 titer = (0.717 x Log 10 SP) + 3.906

⁴AE Agar gel precipitin (AGP) test results, based on + = weak to +++ = very strong reaction scoring system. From a commercial laboratory.

The data presented in Chart 1 indicate a typical antibody profile obtained with the Synbiotics AE ELISA kit for breeder flocks following a typical vaccination program. All Synbiotics ELISA kits are optimized to provide valid, reproducible results test after test, day after day.

Chart 1. Typical antibody profile. Each data point represents the antibody response to a typical AE vaccination program of approximately 125 flocks. Measured using the SBIO AE ELISA test.



Interpreting Results

Evaluate Synbiotics AE ELISA results for the following:

1. Uniformity

- Measured by the coefficient of variation value (CV%).
- the lower the CV% value for a flock tested, the better the titer value uniformity.
- Strive for the best 1-3 day old, pre-vaccination, and post-vaccination AE titer value uniformity (i.e. CV of less than 50%).

2. Titer Values

SP Threshold: Each Synbiotics ELISA kit has a sample-to-positive (SP) value threshold that clearly separates positive samples from negative samples. A negative sample is one that is not significantly different from the kit normal control serum. The SP threshold for the AE ELISA is as follows:

SP Value	Titer
0.300 or less	0
0.301 and greater	3397 and greater

Titer Evaluation: Compare pre- and post-vaccination ELISA mean titers and geometric mean titers. Average ranges for flock mean titer values based on flock age are listed below:

Average Flock AE ELISA Titers*:

Flock Age	Below Average	Average Range	Above Average
1 - 6 days	< 1000	1000 - 3500	> 3500
3 - 10 weeks	< 500	500 - 3000	> 3000
10 - 20 weeks	< 2000	2000 - 6000	> 6000
20 - 40 weeks	< 4000	4000 - 6400	> 6400
> 40 weeks	< 4000	4000 - 7000	> 7000

*Gathered from lab and field data. Note: Above values are flock mean titers, not individual bird titers.

References

1. Calnek, B., R.E. Luginbuhl, and C.E. Helmboldt. Avian encephalomyelitis. In: *Diseases of Poultry*. 9th ed. B.W. Calnek et al eds. Iowa University Press, Ames, IA. pp. 520-531. 1991.
2. Van der Heide, L. Encephalomyelitis. In: *A Laboratory Manual for the Isolation and Identification of Avian Pathogens*. 3rd ed. AAAP. Kendall/Hunt Publishing Co. Dubuque, IA. pp. 149-151. 1989.