

**KAMIYA BIOMEDICAL COMPANY**

# Dog Alpha 1-Anti-trypsin ELISA

**For the quantitative determination of Alpha 1-Anti-trypsin  
in dog serum or plasma**

**Cat. No. KT-390**

**For Research Use Only.**

**PRODUCT INFORMATION****Dog Alpha 1-Anti-trypsin ELISA**  
**Cat. No. KT-390****INTENDED USE**

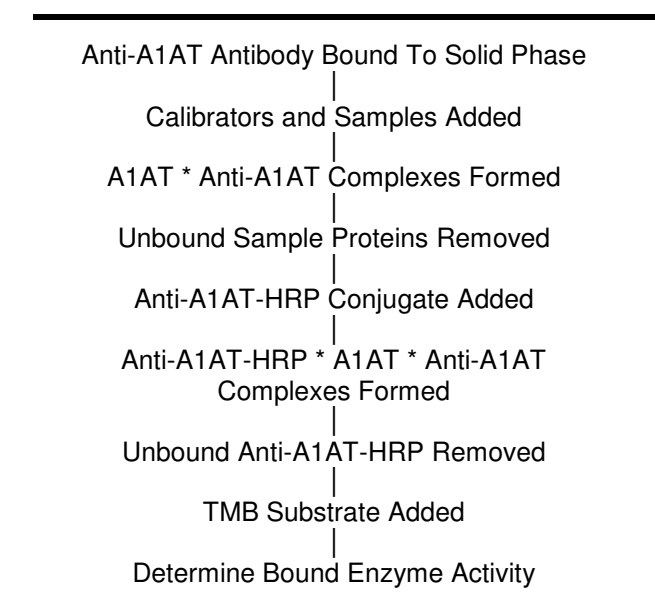
The Dog Alpha 1-Anti-trypsin ELISA is a highly sensitive two-site enzyme-linked immunoassay (ELISA) for the quantitative determination of Alpha 1-Anti-trypsin (A1AT) in dog serum or plasma. For research use only.

**INTRODUCTION**

Alpha 1-Anti-trypsin is a 52 kDa serine protease inhibitor (serpin) in blood, which protects tissue from enzymes from inflammatory cells, especially elastase. In certain acute phase inflammatory reactions, A1AT is elevated in order to limit the damage caused by activated neutrophil granulocytes and their enzyme elastase. Disorders of A1AT include A1AT deficiency, a hereditary disorder that can lead to severe tissue breakdown during inflammation. This may result in pulmonary emphysema and liver cirrhosis, in severe cases. Genetic variants of A1AT do occur.

**PRINCIPLE**

The principle of the double antibody sandwich ELISA is represented in Figure 1. In this assay the A1AT present in the serum sample reacts with the anti-A1AT antibody, which has been adsorbed to the surface of polystyrene microtiter wells. After the removal of unbound sample proteins by washing, anti-A1AT antibody conjugated with horseradish peroxidase (HRP) is added. This HRP-conjugated antibody forms a complex with the previously bound A1AT. Following another washing step, the enzyme bound to the immunosorbent is assayed by the addition of a chromogenic substrate, 3,3',5,5'-tetramethylbenzidine (TMB). The quantity of bound enzyme is proportional to the concentration of A1AT in the sample tested; thus, the absorbance, at 450 nm, is a measure of the concentration of A1AT in the test sample. The quantity of A1AT in the test sample can be interpolated from the calibration curve constructed from the calibrators and corrected for sample dilution.

**Figure 1.****COMPONENTS**

1. Diluent Concentrate  
One bottle containing 50 mL of a 5X concentrated diluent running buffer.
2. Wash Solution Concentrate  
One bottle containing 50 mL of a 20X concentrated wash solution.

3. Enzyme-Antibody Conjugate Concentrate  
One vial containing 150  $\mu$ L of a 100X concentrated affinity-purified anti-dog A1AT antibody conjugated with HRP in stabilizing buffer.
4. TMB Substrate Solution  
One vial containing 12 mL of TMB and hydrogen peroxide in citric acid buffer at pH 3.3.
5. Stop Solution  
One vial containing 12 mL of 0.3 M sulfuric acid. WARNING: Avoid contact with skin.
6. Microtiter Plate  
Twelve removable eight-well strips in well holder frame. Wells are coated with affinity-purified anti-dog A1AT.
7. Dog A1AT Calibrator  
One vial containing a Dog A1AT Calibrator.

### **MATERIALS REQUIRED BUT NOT PROVIDED**

- Precision pipettes (2  $\mu$ L to 200  $\mu$ L) for making and dispensing dilutions
- Test tubes
- Microplate washer/aspirator
- Distilled or de-ionized H<sub>2</sub>O
- Microplate reader
- Assorted glassware for the preparation of reagents and buffer solutions
- Timer
- Vortex mixer

### **PRECAUTIONS**

1. Read the instructions carefully before beginning the assay.
2. This kit is for research use only.
3. Great care has been taken to ensure the quality and reliability of this product. However, it is possible that in certain cases, unusual results may be obtained due to high levels of interfering factors.
4. No additives or preservatives are necessary to maintain the integrity of the specimen. Avoid azide contamination.
5. Azide and thimerosal at concentrations higher than 0.1% inhibit the enzyme reaction.
6. Other precautions:
  - Do not interchange kit components from different lots.
  - Do not use kit components beyond the expiration date.
  - Protect reagents from direct sunlight.
  - Do not pipette by mouth.
  - Do not eat, drink, smoke or apply cosmetics where reagents are used.
  - Avoid all contact with the reagents by using gloves.
  - Stop solution contains diluted sulfuric acid. Irritation to eyes and skin is possible. Flush with water after contact.

### **REAGENT PREPARATION**

1. Diluent Concentrate  
The Diluent solution supplied is a 5X concentrate and must be diluted 1:5 with distilled or de-ionized water.
2. Wash Solution Concentrate  
The Wash Solution supplied is a 20X concentrate and must be diluted 1:20 with distilled or de-ionized water. Crystal formation in the concentrate is not uncommon when storage temperatures are low. Warming of the concentrate to 30-35°C before dilution can dissolve crystals.
3. Enzyme-Antibody Conjugate Concentrate  
Calculate the required amount of working conjugate solution for each microtiter plate test strip by adding 10  $\mu$ L Enzyme-Antibody Conjugate to 990  $\mu$ L of 1X Diluent for each test strip to be used for testing. Mix uniformly, but gently. Avoid foaming.

4. TMB Substrate Solution  
Ready to use as supplied.
5. Stop Solution  
Ready to use as supplied.
6. Microtiter Plate  
Ready to use as supplied. Unseal microtiter pouch and remove plate from pouch. Remove all strips and wells that will not be used in the assay and place back in pouch and re-seal.
7. Dog A1AT Calibrator  
The Dog A1AT Calibrator should be aliquoted out and stored frozen. The calibrator is now at a concentration of 2.336 mg/mL. Dog A1AT Calibrators need to be prepared immediately prior to use (see chart below). Mix well between each step. Avoid foaming.

Calibrator	Concentration (ng/mL)	Calibrator Volume added to 1X Diluent	Volume of 1X Diluent
A	23360	5 $\mu$ L Dog A1AT Calibrator	495 $\mu$ L
7	800	30 $\mu$ L Calibrator A	846 $\mu$ L
6	400	300 $\mu$ L Calibrator 7	300 $\mu$ L
5	200	300 $\mu$ L Calibrator 6	300 $\mu$ L
4	100	300 $\mu$ L Calibrator 5	300 $\mu$ L
3	50	300 $\mu$ L Calibrator 4	300 $\mu$ L
2	25	300 $\mu$ L Calibrator 3	300 $\mu$ L
1	12.5	300 $\mu$ L Calibrator 2	300 $\mu$ L
0	0		500 $\mu$ L

## STORAGE AND STABILITY

1. Complete Kit  
The expiration date for the kit is stated on the outer label. The recommended storage temperature is 4°C. **Note: See long term storage recommendations below for the Dog A1AT Calibrator.**
2. Diluent  
The 5X Diluent Concentrate is stable until the expiration date. The 1X working solution is stable for at least one week from the date of preparation. Both solutions should be stored at 4°C.
3. Wash Solution  
The 20X Wash Solution Concentrate is stable until the expiration date. The 1X working solution is stable for at least one week from the date of preparation. Both solutions can be stored at room temperature (RT, 16-25°C) or at 4°C.
4. Enzyme-Antibody Conjugate  
Undiluted anti-A1AT-HRP conjugate should be stored at 4°C and diluted immediately prior to use. The working conjugate solution is stable for up to 8 hours.
5. TMB Substrate Solution  
The TMB Substrate Solution should be stored at 4°C and is stable until the expiration date.
6. Stop Solution  
The Stop Solution should be stored at 4°C and is stable until the expiration date.
7. Microtiter Plate  
Anti-Dog A1AT coated wells are stable until the expiration date, and should be stored at 4°C in the sealed foil pouch with desiccant pack.
8. Dog A1AT Calibrator  
Aliquot Dog A1AT calibrator and store them frozen. For storage longer than 14 days, keep frozen until the expiration date. Storage of less than 14 days can be at 4°C. The calibrator is stable until the expiration date but the working calibrator solution is stable for up to 8 hours after preparation.

## INDICATIONS OF INSTABILITY

If the test is performing correctly, the results observed with the calibrator solutions should be within 20% of the expected values.

## SPECIMEN COLLECTION AND HANDLING

Blood should be collected by venipuncture and the serum separated from the cells, after clot formation, by centrifugation. For plasma samples, blood should be collected into a container with an anticoagulant and then centrifuged. Care should be taken to minimize hemolysis, excessive hemolysis can impact your results. Assay immediately or aliquot and store samples at -20°C. Avoid repeated freezing/thawing.

For any sample that might contain pathogens, care must be taken to prevent contact with open wounds. No additives or preservatives are necessary to maintain the integrity of the specimen. Avoid azide contamination.

## ASSAY PROTOCOL

### Dilution of Samples

Due to the high sensitive nature of the assay each sample should be diluted before use for a normal assay. A 1:10,000 dilution of serum or plasma is appropriate for most samples. For absolute quantification of samples that yield results outside the range of the calibration curve, a lesser or greater dilution might be required. If unsure of sample level, a serial dilution with one or two representative samples before running the entire plate is highly recommended.

To prepare a 1:10,000 dilution of sample, transfer 2  $\mu\text{L}$  of sample to 198  $\mu\text{L}$  of 1X Diluent. This gives you a 1:100 dilution. Mix thoroughly. Next, dilute the 1:100 samples by transferring 5  $\mu\text{L}$  to 495  $\mu\text{L}$  of 1X Diluent. You now have a 1:10,000 dilution of your sample. Mix thoroughly at each stage.

### Procedure

Bring all reagents to RT before use.

1. Pipette 100  $\mu\text{L}$  of
  - Calibrator 0 (0.0 ng/mL) in duplicate
  - Calibrator 1 (12.5 ng/mL) in duplicate
  - Calibrator 2 (25 ng/mL) in duplicate
  - Calibrator 3 (50 ng/mL) in duplicate
  - Calibrator 4 (100 ng/mL) in duplicate
  - Calibrator 5 (200 ng/mL) in duplicate
  - Calibrator 6 (400 ng/mL) in duplicate
  - Calibrator 7 (800 ng/mL) in duplicate
2. Pipette 100  $\mu\text{L}$  of diluted sample in duplicate into pre-designated wells.
3. Incubate the Microtiter Plate at 22°C (RT) for thirty (30  $\pm$  2) minutes. Keep plate level and covered during incubation.
4. Following incubation, aspirate the contents of the wells.
5. Completely fill each well with appropriately diluted Wash Solution and aspirate. Repeat three times, for a total of four washes. If washing manually: completely fill wells with diluted Wash Solution, invert the plate and pour/shake out the contents in a waste container. Follow this by sharply striking the wells on absorbent paper to remove residual Wash Solution. Repeat three times for a total of four washes.
6. Pipette 100  $\mu\text{L}$  of appropriately diluted Enzyme-Antibody Conjugate to each well. Incubate at 22°C (RT) for thirty (30  $\pm$  2) minutes. Keep plate covered in the dark and level during incubation.
7. Wash and blot the wells as described in Steps 4 and 5.
8. Pipette 100  $\mu\text{L}$  of TMB Substrate Solution into each well.

9. Incubate in the dark at RT for precisely ten (10) minutes.
10. After ten minutes, add 100  $\mu$ L of Stop Solution to each well.
11. Determine the absorbance at 450 nm of the contents of each well. Zero the plate reader to air.

The absorbance of the final reaction mixture can be measured up to 2 hours after the addition of the Stop Solution. However, good laboratory practice dictates that the measurement be made as soon as possible.

## RESULTS

1. Subtract the average background value from the test values for each sample.
2. Using the results observed for the calibrators construct a calibration curve. The appropriate curve fit is that of a four-parameter logistics curve, although a second order polynomial (quadratic) or other curve fits may also be used.
3. Interpolate test sample values from calibration curve. Correct for serum dilution factor to arrive at A1AT concentration in original sample.

## PERFORMANCE CHARACTERISTICS

In accord with good laboratory practice, the assays for specific A1AT require meticulous quality control. Each laboratory should use routine quality control procedures to establish inter- and intra-assay precision and performance characteristics.

## LIMITATION OF THE PROCEDURE

1. Reliable and reproducible results will be obtained when the assay procedure is carried out with a complete understanding of the information contained in the package insert instructions and with adherence to good laboratory practice.
2. Factors that might affect the performance of the assay include proper instrument function, cleanliness of glassware, quality of distilled or de-ionized water, washing technique, incubation time or temperature, and accuracy of reagent and sample pipettings.

## **FOR RESEARCH USE ONLY**

### **KAMIYA BIOMEDICAL COMPANY**

12779 Gateway Drive, Seattle, WA 98168  
Tel: (206) 575-8068 Fax: (206) 575-8094  
Email: LifeScience@k-assay.com  
www.k-assay.com