



COSMO BIO Co., LTD.

***PRODUCT DATA SHEET***

# Rat Microalbumin ELISA

**For the quantitative determination of microalbumin  
in rat serum, plasma or urine**

**Cat. No. KT-354**

**For Research Use Only.**

## PRODUCT INFORMATION

### **Rat Microalbumin ELISA**

**Cat. No. KT-354**

#### **INTENDED USE**

The Rat Microalbumin ELISA is a highly sensitive two-site enzyme-linked immunoassay (ELISA) for the quantitative determination of microalbumin in rat serum, plasma or urine. For research use only.

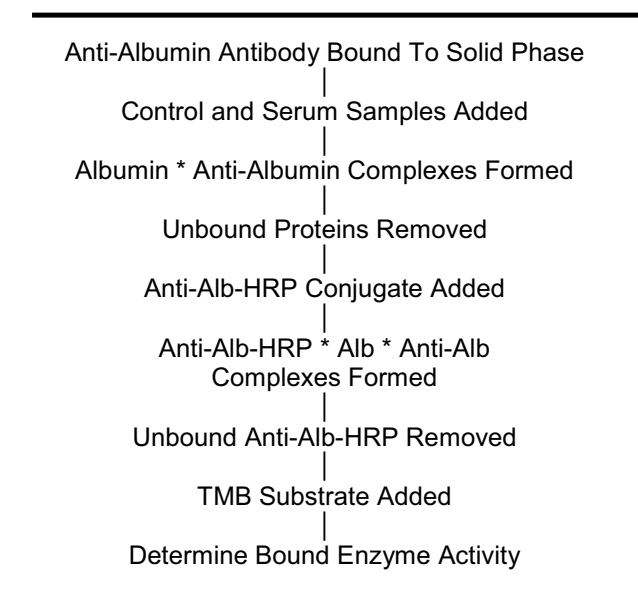
#### **INTRODUCTION**

Albumin (Alb) is an amazing polyfunctional protein contributing to homeostasis through mechanisms of hemodynamics, transport and nutrition. Albumin is found both intra- and extracellularly in all mammals and many lower vertebrates. It is a molecule of about 67,000 daltons, synthesized by the liver. Normally only very trace amounts of albumin escape reabsorption by kidney glomeruli and are excreted into the urine. Many occult diseases can cause kidney damage which may result in excessive amounts of serum proteins, including albumin, to be excreted by the kidney and into the urine. This ELISA can be used to measure albumin in serum, plasma, urine, tissue extracts and other biological fluids.

#### **PRINCIPLE**

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

**Figure 1.**



## COMPONENTS

1. Diluent Concentrate  
One bottle containing 50 mL of a 5X concentrated phosphate buffered saline (PBS) solution with 0.25% Tween, protein stabilizer and 0.25% Proclin 300 as a preservative.
2. Wash Solution Concentrate  
One bottle containing 50 mL of a 20X concentrated PBS solution with 1% Tween.
3. Enzyme-Antibody Conjugate Concentrate  
One vial containing 200  $\mu$ L of a 100X concentrated affinity-purified anti-rat albumin 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-rat albumin.
7. Rat Microalbumin Calibrator  
One vial containing a lyophilized Rat Microalbumin Calibrator.
8. Positive Control  
One vial containing 50  $\mu$ L of serum with 0.1% sodium azide. See the control certificate for the concentration.

## MATERIALS REQUIRED BUT NOT PROVIDED

- Precision pipettes (2  $\mu$ L to 200  $\mu$ L)
- 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. Preservatives
  - Diluent contains 0.25% Proclin 300 as a preservative. Positive Control contains 0.1% sodium azide.
5. No additives or preservatives are necessary to maintain the integrity of the specimen. Avoid azide contamination.
6. Azide and thimerosal at concentrations higher than 0.1% inhibit the enzyme reaction.
7. 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**  
The Enzyme-Antibody Conjugate supplied is a 100X concentrate and must be diluted 1:100. The required amount of working conjugate solution for each microtiter plate is prepared by adding 100 µL Enzyme-Antibody Conjugate to 10 mL of 1X Diluent. 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.
7. **Rat Microalbumin Calibrator**  
Add 1.0 mL of distilled or de-ionized water to the lyophilized Rat Microalbumin Calibrator and mix gently until dissolved. The calibrator is now at a concentration of 138 µg/mL (the reconstituted calibrator should be aliquoted and frozen if future use is intended). Rat Microalbumin 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
1	400	2 µL Rat Microalbumin Calibrator	690 µL
2	200	0.3 mL Calibrator 1	0.3 mL
3	100	0.3 mL Calibrator 2	0.3 mL
4	50	0.3 mL Calibrator 3	0.3 mL
5	25	0.3 mL Calibrator 4	0.3 mL
6	12.5	0.3 mL Calibrator 5	0.3 mL
7	6.25	0.3 mL Calibrator 6	0.3 mL

8. **Positive Control**  
The concentration and recommended dilution are provided on the control certificate. Before use, briefly centrifuge the Positive Control to allow all of the liquid to collect in the bottom of the vial.

## 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 Rat Microalbumin Calibrator and Positive Control.**
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-Alb-HRP conjugate should be stored at 4°C and diluted immediately prior to use. The working conjugate solution is stable for one day.
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-rat albumin coated wells are stable until the expiration date, and should be stored at 4°C in the sealed foil pouch with desiccant pack.

8. Rat Microalbumin Calibrator

The lyophilized Rat Microalbumin Calibrator should be stored at 4°C or frozen until reconstituted. The reconstituted calibrator should be aliquoted and stored frozen. Avoid multiple freeze/thaw cycles. The working calibrator solutions should be prepared immediately prior to use and are stable for 1 day.

9. Positive Control

For storage longer than 7 days keep frozen until the expiration date. Storage less than 7 days can be at 4°C. Avoid multiple freeze/thaw cycles.

### 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. Specimens may be shipped at RT and then stored refrigerated at 4°C if testing is to take place within one week after collection. If testing is to take place later than one week, specimens should be stored 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 1:500 dilution is appropriate for most urine samples while serum or plasma samples may need to be diluted 1:1,000,000. For absolute quantification of samples that yield results outside the range of the calibration curve, a lesser or greater dilution might be required.

To prepare a 1:500 dilution of sample, transfer 2 µL of sample to 998 µL of 1X Diluent. This gives you a 1:500 dilution. For serum or plasma samples, transfer 1.0 µL of serum or plasma to 999 µL of 1X Diluent. You now have a 1:1,000 dilution. Next, mix 1.0 µL of the 1:1,000 dilution with 999 µL of 1X Diluent. You now have a 1:1,000,000 dilution. Mix thoroughly at each stage.

#### Procedure

Bring all reagents to RT before use.

1. Add 100 µL of 1X Diluent to each of the wells in A1 & A2. These will serve for an evaluation of the background associated with the assay.
2. Pipette 100 µL of
  - Calibrator 1 (400 ng/mL) into wells B1 & B2
  - Calibrator 2 (200 ng/mL) into wells C1 & C2
  - Calibrator 3 (100 ng/mL) into wells D1 & D2
  - Calibrator 4 (50 ng/mL) into wells E1 & E2
  - Calibrator 5 (25 ng/mL) into wells F1 & F2
  - Calibrator 6 (12.5 ng/mL) into wells G1 & G2
  - Calibrator 7 (6.25 ng/mL) into wells H1 & H2
3. Pipette 100 µL of diluted Positive Control into wells A3 & A4.
4. Pipette 100 µL of diluted sample (test sample 1) into wells B3 & B4. The next sample goes in wells C3 & C4, the next in D3 & D4 and so on.

5. Incubate the Microtiter Plate at 22°C (RT) for thirty (30 ± 2) minutes. Keep plate level during incubation.
6. Following incubation, aspirate the contents of the wells.
7. 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.
8. Pipette 100 µL of appropriately diluted Enzyme-Antibody Conjugate to each well. Incubate at 22°C (RT) for thirty (30 ± 2) minutes.
9. Wash and blot the wells as described in Steps 6 and 7.
10. Pipette 100 µL of TMB Substrate Solution into each well.
11. Incubate at RT for precisely ten (10) minutes.
12. After ten minutes, add 100 µL of Stop Solution to each well.
13. 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. Value should not be greater than 0.2.
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 microalbumin concentration in original sample.

## **PERFORMANCE CHARACTERISTICS**

In accord with good laboratory practice, the assays for specific microalbumin 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 thoroughly and accuracy of reagent and sample pipetting.

**FOR RESEARCH USE ONLY**