



SARS-CoV-2 Neutralizing Antibody ELISA Kit

Catalog Number. CSB-EL33243HU

For the qualitative determination of SARS-CoV-2 neutralizing antibody concentrations in serum, plasma.

This package insert must be read in its entirety before using this product.

If You Have Problems

Technical Service Contact information

Phone: 86-27-87582341

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In order to obtain higher efficiency service, please ready to supply the lot number of the kit to us (found on the outside of the box).

PRINCIPLE OF THE ASSAY

This assay employs the competitive inhibition enzyme immunoassay technique. The microtiter plate provided in this kit has been pre-coated with RBD. Standard or samples are added to the appropriate microtiter plate wells with Horseradish Peroxidase (HRP) conjugated ACE2. The competitive inhibition reaction is launched between with HRP-ACE2 and SARS-CoV-2 neutralizing antibody in samples. A substrate solution is added to the wells and the color develops in opposite to the amount of SARS-CoV-2 neutralizing antibody in the sample. The color development is stopped and the intensity of the color is measured.

SPECIFICITY

This assay has high sensitivity and excellent specificity for detection of SARS-CoV-2 neutralizing antibody.

Note: Limited by current skills and knowledge, it is impossible for us to complete the cross-reactivity detection between SARS-CoV-2 neutralizing antibody and all the analogues, therefore, cross reaction may still exist.

PRECISION

Intra-assay Precision (Precision within an assay): CV% <15%

Three samples of known concentration were tested twenty times on one plate to assess.

Inter-assay Precision (Precision between assays): CV% <15%

Three samples of known concentration were tested in twenty assays to assess.

LIMITATIONS OF THE PROCEDURE

- **FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.**
- The kit should not be used beyond the expiration date on the kit label.
- Do not mix or substitute reagents with those from other lots or sources.
- Any variation in Sample Diluent, operator, pipetting technique, washing technique, incubation time or temperature, and kit age can cause variation in binding.
- This assay is designed to eliminate interference by soluble receptors, binding proteins, and other factors present in biological samples. Until all factors have been tested in the Immunoassay, the possibility of interference cannot be excluded.

MATERIALS PROVIDED

Reagents	Quantity
Assay plate (12 x 8 coated Microwells)	1(96 wells)
Standard (10 x concentrate)	1 x 100 µl
HRP-conjugate (100 x concentrate)	1 x 60 µl
HRP-conjugate Diluent	1 x 10 ml
Sample Diluent	2 x 20 ml
Wash Buffer (25 x concentrate)	1 x 20 ml
TMB Substrate	1 x 10 ml
Stop Solution	1 x 10 ml
Adhesive Strip (For 96 wells)	4
Instruction manual	1

STORAGE

Unopened kit	Store at 2 - 8°C. Do not use the kit beyond the expiration date.
Opened kit	May be stored for up to one month at 2 - 8° C.

***Provided this is within the expiration date of the kit.**

OTHER SUPPLIES REQUIRED

- Microplate reader capable of measuring absorbance at 450 nm, with the correction wavelength set at 540 nm or 570 nm.
- An incubator which can provide stable incubation conditions up to 37°C±0.5°C.
- Squirt bottle, manifold dispenser, or automated microplate washer.
- Absorbent paper for blotting the microtiter plate.
- 100ml and 500ml graduated cylinders.
- Deionized or distilled water.
- Pipettes and pipette tips.
- Test tubes for dilution.

PRECAUTIONS

The Stop Solution provided with this kit is an acid solution. Wear eye, hand, face, and clothing protection when using this material.

SAMPLE COLLECTION AND STORAGE

- **Serum** Use a serum separator tube (SST) and allow samples to clot for two hours at room temperature or overnight at 4°C before centrifugation for 15 minutes at 1000 ×g. Remove serum and assay immediately or aliquot and store samples at -20°C or -80°C. Avoid repeated freeze-thaw cycles.
- **Plasma** Collect plasma using EDTA, or heparin as an anticoagulant. Centrifuge for 15 minutes at 1000 ×g at 2-8°C within 30 minutes of collection. Assay immediately or aliquot and store samples at -20°C or -80°C. Avoid repeated freeze-thaw cycles.

SAMPLE PREPARATION

Recommend to dilute the serum or plasma samples with Sample Diluent (1:20) before test. The suggested 20-fold dilution can be achieved by adding 15µl sample to 285µl of Sample Diluent. The recommended dilution factor is for reference only. The optimal dilution factor should be determined by users according to their particular experiments.

Note:

1. CUSABIO is only responsible for the kit itself, but not for the samples consumed during the assay. The user should calculate the possible amount of the samples used in the whole test. Please reserve sufficient samples in advance.
2. Samples to be used within 2 days may be stored at 2-8°C, otherwise samples must be stored at -20°C (≤1month) or -80°C (≤2month) to avoid loss of bioactivity and contamination.
3. Grossly hemolyzed samples are not suitable for use in this assay.
4. If the samples are not indicated in the manual, a preliminary experiment to determine the validity of the kit is necessary.
5. Fresh samples without long time storage are recommended for the test. Otherwise, protein degradation and denaturalization may occur in those samples and finally lead to wrong results.

REAGENT PREPARATION

Note:

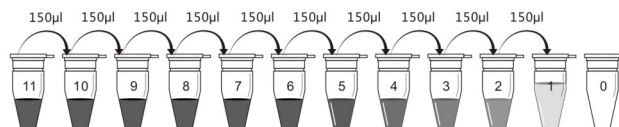
- **Kindly use graduated containers to prepare the reagent. Please don't prepare the reagent directly in the Diluent vials provided in the kit.**
- Bring all reagents to room temperature (18-25°C) before use for 30min.
- Making serial dilution in the wells directly is not permitted.
- Distilled water is recommended to be used to make the preparation for reagents. Contaminated water or container for reagent preparation will influence the detection result.

1. **HRP-conjugate (1x)** - Centrifuge the vial before opening.
HRP-conjugate requires a 100-fold dilution. A suggested 100-fold dilution is 10 µl of **HRP-conjugate** + 990 µl of **HRP-conjugate Diluent**.
2. **Wash Buffer(1x)**- If crystals have formed in the concentrate, warm up to room temperature and mix gently until the crystals have completely dissolved. Dilute 20 ml of Wash Buffer Concentrate (25 x) into deionized or distilled water to prepare 500 ml of Wash Buffer (1 x).

3. **Standard**

Centrifuge the Standard vial at 6000-10000rpm for 30s before opening. Dilute the **Standard (10x)** with **Sample Diluent**. A suggested 10-fold dilution is 30 μ l of **Standard (10x)** + 270 μ l of **Sample Diluent**. This diluted Standard (S11) serves as the high Standard (10000 ng/ml or 125 nM). Do not substitute other diluents. Mix the Standard to ensure complete dilution and allow the Standard to sit for a minimum of 15 minutes with gentle agitation prior to making dilutions.

Pipette 150 μ l of **Sample Diluent** into each tube (S0-S10). Use the diluted **Standard (S11)** solution to produce a **2-fold** dilution series (below). Mix each tube thoroughly before the next transfer. **Sample Diluent** serves as the zero Standard (0 ng/ml or 0 nM)..



Tube	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
ng/ml	10000	5000	2500	1250	625	312	156	78	39	19.5	9.75	0
nM	125	62.5	31.25	15.625	7.813	3.906	1.953	0.977	0.488	0.244	0.122	0

ASSAY PROCEDURE

Bring all reagents and samples to room temperature before use. Centrifuge the sample again after thawing before the assay. It is recommended that all samples and Standard be assayed in duplicate.

1. Prepare all reagents and samples as directed in the previous sections.
2. Refer to the Assay Layout Sheet to determine the number of wells to be used and put any remaining wells and the desiccant back into the pouch and seal the ziploc, store unused wells at 4°C.
3. Set a Blank well without any solution.
4. Add 50µl of **Standard** and diluted **Sample** per well.
5. Add 50µl **HRP-conjugate (1x)** to each well immediately (not to Blank well). Mix well with the pipette or shake the plate gently for 60 seconds. A plate layout is provided to record Standard and samples assayed.
6. Cover with the adhesive strip provided. Incubate for 1 hour at 37°C.
7. Aspirate each well and wash, repeating the process four times for a total of five washes. Wash by filling each well with **Wash Buffer** (250µl) using a squirt bottle, multi-channel pipette, manifold dispenser, or autowasher, and let it stand for 2 minutes, complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.
8. Add 90µl of **TMB Substrate** to each well. Incubate for 20 minutes at 37°C. **Protect from light.**
9. Add 50µl of **Stop Solution** to each well, gently tap the plate to ensure thorough mixing.
10. Determine the optical density of each well within 5 minutes, using a microplate reader set to 450 nm.

***Samples may require dilution. Please refer to Sample Preparation section.**

Note:

1. The final experimental results will be closely related to validity of the products, operation skills of the end users and the experimental environments.
2. Samples or reagents addition: Please carefully add samples to wells and mix gently to avoid foaming. Do not touch the well wall as possible. For each step in the procedure, total dispensing time for addition of reagents or samples to the assay plate should not exceed 10 minutes. This will ensure equal elapsed time for each pipetting step, without interruption. Duplication of all specimens, although not required, is recommended. To avoid cross-contamination, change pipette tips between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.
3. Incubation: To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary. Do not allow wells to sit uncovered for extended periods between incubation steps. Once reagents have been added to the well strips, DO NOT let the strips DRY at any time during the assay. Incubation time and temperature must be observed.
4. Washing: The wash procedure is critical. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Solution by aspirating or decanting and remove any drop of water and fingerprint on the bottom of the plate. Insufficient washing will result in poor precision and falsely elevated absorbance reading. When using an automated plate washer, adding a 30 second soak period following the addition of wash buffer, and/or rotating the plate 180 degrees between wash steps may improve assay precision.
5. Controlling of reaction time: Observe the change of color after adding TMB Substrate (e.g. observation once every 10 minutes), TMB Substrate should change from colorless or light blue to gradations of blue. If the color is too deep, add Stop Solution in advance to avoid excessively strong reaction which will result in inaccurate absorbance reading.
6. TMB Substrate is easily contaminated. TMB Substrate should remain colorless or light blue until added to the plate. Please protect it from light.

7. Stop Solution should be added to the plate in the same order as the TMB Substrate. The color developed in the wells will turn from blue to yellow upon addition of the Stop Solution. Wells that are green in color indicate that the Stop Solution has not mixed thoroughly with the TMB Substrate.

CALCULATION OF RESULTS

1. Average the duplicate readings for each Standard and sample and subtract the average optical density of Blank.
2. Calculate the binding rate(%): the OD value of Standard and sample are divided by the OD value of S₀ and multiplied by 100%.

$$\text{Binding rate (\%)} = \frac{B}{B_0} \times 100\%$$

B —the average absorbance value of the sample or Standard

B₀ —the average absorbance value of the 0 ng/ml (0 nM) Standard

3. Draw the curve: take the Standard concentration as the x-axis and the corresponding percentage binding rate as the y-axis, draw the smooth curve, and calculate the IC₅₀, for reference.
4. Judgment: cut-off = 1/2 OD_{S₀}
While OD_{sample} < 1/2 OD_{S₀}: Positive
While OD_{sample} ≥ 1/2 OD_{S₀}: Negative

新型冠状病毒(SARS-CoV-2)中和抗体酶联免疫试剂盒 使用说明书

【产品编号】 CSB-EL33243HU

【预期应用】 ELISA 法定性测定血清、血浆中 SARS-CoV-2 中和抗体。

【产品性能指标】

- 1、 精密度：批内差 CV%<15%，批间差 CV%<15%
- 2、 特异性：本试剂盒特异性检测 SARS-CoV-2 中和抗体，且与其他相关蛋白无交叉反应。

【实验原理】

用纯化的 RBD 蛋白包被微孔板，制成固相载体，往包被 RBD 蛋白的微孔中依次加入标本或标准品、HRP 标记的 ACE2。样本中的 SARS-CoV-2 中和抗体与 HRP 标记的 ACE2 竞争结合预包被的 RBD 蛋白。经过彻底洗涤后用底物 TMB 显色。TMB 在过氧化物酶的催化下转化成蓝色，并在酸的作用下转化成最终的黄色。颜色的深浅和样本中的 SARS-CoV-2 中和抗体呈负相关。用酶标仪在 450nm 波长下测定吸光度（OD 值），判断样本。

【试剂盒组成成分】

组份	96T
酶标板 (Assay plate)	12 条×8 孔
标准品(Standard)	1 x 100 μl/瓶 (10×)
酶结合物 (HRP-conjugate)	1 x 60 μl/瓶 (100×)
酶结合物稀释液 (HRP-conjugate Diluent)	1 x 10 ml/瓶
样本稀释液 (Sample Diluent)	2 x 20 ml/瓶
浓洗涤液 (Wash Buffer)	1 x 20 ml/瓶 (25×)
底物溶液 (TMB Substrate)	1 x 10 ml/瓶
终止液 (Stop Solution)	1 x 10 ml/瓶
板贴	4

【存储条件及有效期】

1. 未开封的试剂盒避光保存于2-8℃。有效期为六个月。请在试剂盒标注的有效日期内使用。
2. 酶标板打开后应置有干燥剂的铝箔袋中置于2-8℃密封防潮保存，2-8℃条件下最多可保存一个月。

【所需试剂和器材】

标准规格酶标仪；高速离心机；电热恒温培养箱；干净的试管和离心管；容量瓶；

系列可调节移液器及吸头；多通道移液器；蒸馏水 等

【样本采集及保存】

- 1、 血清：全血标本请于室温放置 2 小时或 4℃ 过夜后于 1000g 离心 15 分钟，取上清即可立即检测；或进行分装，并将标本放于-20℃或-80℃保存，但应避免反复冻融。解冻后的样本应再次离心，然后检测。
- 2、 血浆：可用 EDTA 或肝素作为抗凝剂，标本采集后 30 分钟内于 2 - 8℃ 1000 g 离心 15 分钟，取上清即可立即检测；或进行分装，并将标本放于-20℃或-80℃保存，但应避免反复冻融。解冻后的样本应再次离心，然后检测。

注：标本溶血会影响最后检测结果，因此溶血标本不宜进行此项检测。

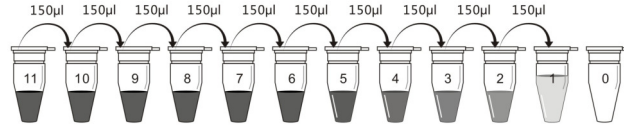
【样本稀释】

血清，血浆样本用样本稀释液进行1:20倍稀释后进行检测，具体操作如下：取15μl 样本加入到285μl 的样本稀释液中混匀。此推荐稀释倍数仅供参考，用户应根据实验自行确定其最优稀释倍数。

【试剂配制】

1、标准品

- (1) 从试剂盒中取出标准品，于 6000-10000rpm 离心 30 秒。用样本稀释液进行按 1:10 倍稀释。具体操作如下：取 30 μ l 标准品(10x) 加入到 270 μ l 的样本稀释液中混匀，得到的标准品标记为 S11(10000 ng/ml 或者 0nM)。
- (2) 取 10 个 1.5 ml 离心管(S0-S10)依次排列，各加入 150 μ l 样本稀释液。吸取 150 μ l 标准品 S11 到第一个离心管中(S10)，轻轻吹打混匀。从 S10 中吸取 150 μ l 到第二个 EP 管中(S9)，轻轻吹打混匀。以此类推进行标准品的倍比稀释。S0 为样本稀释液。



【标准品浓度】

Tube	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
ng/ml	10000	5000	2500	1250	625	312	156	78	39	19.5	9.75	0
nM	125	62.5	31.25	15.625	7.813	3.906	1.953	0.977	0.488	0.244	0.122	0

2、洗液工作液

浓洗涤液按1:25倍用去离子水进行稀释。例如用量筒量取480ml去离子水，倒入烧杯或其他洁净容器中，再量取20ml浓洗涤液，均匀加入，搅拌均匀，在临用前配妥。浓洗涤液低温保存会有盐析出，稀释时可在水浴中加温助溶。

3、酶结合物工作液

酶结合物按1:100倍用酶结合物稀释液进行稀释。如10 μ l酶结合物加990 μ l酶结合物稀释液，轻轻混匀，在临用前10分钟内配妥。

【重要提示】

- 1、 实验开始前，请提前配置好所有试剂。试剂或样本稀释时，均需混匀，混匀时尽量避免起
- 2、 用户在初次使用试剂盒时，应将各种试剂管离心，以便管盖和管壁上的液体集中到管底。
- 3、 **因实际装量多于标示装量，配制工作试剂请用精准的计量工具（移液枪或量筒等）量取，切勿不经量取直接使用。**
- 4、 标准品的稀释请勿于板中进行，于临用前 15 分钟内配制。为保证实验有效性，建议每次实验使用新配制的。
- 5、 在配制溶液工作液时，请以相应的稀释液配制，不能混淆。

【操作步骤】

- 1、 将各种试剂移至室温（18-25℃）平衡至少 30 分钟，按前述方法配制试剂，备用。
- 2、 设置一个空白孔，不加任何溶液。
- 3、 加样：分别设标准品孔、待测样本孔。每孔分别加标准品或待测样本 50 μ l。
- 4、 每孔加入 50 μ l 酶结合物工作液（空白孔不加）。轻轻晃动混匀，覆上板贴，37℃温育 1 小时。
- 5、 弃去孔内液体，甩干，洗板 5 次。每次浸泡 2 分钟，250 μ l/孔，甩干。
- 6、 依序每孔加底物溶液 90 μ l，37℃避光显色 20 分钟。
- 7、 依序每孔加终止溶液 50 μ l，终止反应。
- 8、 在反应终止后 5 分钟内用酶标仪在 450nm 波长依序测量各孔的光密度（OD 值）。

【操作要点】

- 1、 为保证检测结果的准确性，建议设双孔测定。
- 2、 **加样：**加样时，请使用一次性的洁净吸头，避免交叉污染。加样时应尽量轻柔，避免起泡，将样本加于酶标板孔底部，切勿沿孔壁加样。一次加样时间最好控制在 10 分钟内，如标本数量多，推荐使用排枪加样。
- 3、 **温育：**为防止样本蒸发或污染，温育过程中酶标板必须覆上板贴，实验过程中酶标板应避免处于干燥的状态。温育过程中应随时观察温箱温度是否恒定于 37℃，及时调整。温育过程中，温箱不易开启太多次，以免影响温度平衡。
- 4、 **洗涤：**洗涤过程非常重要，不充分的洗涤易造成假阳性。
 - (1) 手工洗板方法：吸去（不可触及孔壁和孔底）或甩掉酶标板内的液体；在实验台上铺垫几层吸水纸，酶标板朝下用力拍几次；将推荐的洗涤缓冲液按 250 μ l/孔注入孔内，浸泡 2 分钟。根据操作步骤中所述，重复此过程数次。
 - (2) 自动洗板：如果有自动洗板机，应在熟练使用后再用到正式实验过程中。
- 5、 **显色：**为保证实验结果的准确性，底物反应时间到后应尽快加入终止液。可在加入底物溶液后每隔一段时间观察一下显色情况以控制反应时间（比如每隔 10 分钟）。当肉眼可见明显蓝色，即可加入终止液终止反应，此时蓝色立刻变为黄色。终止液的加入顺序应尽量与底物溶液的加入顺序相同。
- 6、 底物溶液应为浅蓝色或无色，如果颜色严重变深则必须弃用。底物溶液易受污染，请避光妥善保存。

【数据处理】

- 1、 将标准品孔及样本孔值减去空白孔数值，如果设置复孔，则应取其平均值计算。
- 2、 计算百分结合率：用标准品或样品的 OD 值除以 S₀ 的 OD 值，为百分结合率。
- 3、 作图：以标准品浓度为横轴，以对应的百分结合率为纵轴，绘制出平滑曲线，计算 IC₅₀ 的对应值，以作参考。
- 4、 判断：判断值=零孔平均 OD 值/2
大于等于判断值为阴性，小于判断值为阳性。

【说明】

- 1、 本试剂盒仅供研究使用。
- 2、 中、英文说明书可能会有不一致之处，请以英文说明书为准。
- 3、 不同批号试剂不能混用。不要用其它生产厂家的试剂替换试剂盒中的试剂。
- 4、 刚开启的酶标板孔中可能会含有少许水样物质，此为正常现象，不会对实验结果造成任何影响。

