



4320 Forest Park Ave  
Suite 303  
Saint Louis, MO | 63108  
+1 (314) 833-9764

## CHO HCP ELISA KIT

Complete kit for the determination of Chinese Hamster Ovary (CHO) host cell protein contamination bulk products expressed in CHO expression systems.

### KIT INCLUDES

- Coated 96-Well Strip Plate
- CHO Protein Standard
- 5x Dilution Buffer
- 10x PBS-T
- Reporting Antibody
- Streptavidin-HRP Conjugate
- TMB Substrate
- Stop Solution
- Plate Sealer

PRODUCT MANUAL HCP-001

# CHO HOST CELL PROTEIN ELISA KIT

## ASSAY PRINCIPLE

The Chinese Hamster Ovary (CHO) Host Cell Protein (HCP) ELISA kit is designed to quantitatively measure HCP contamination in bulk products expressed in CHO expression systems. A vial of concentrated CHO protein is provided to generate a standard curve for the assay. CHO standards or unknown samples are pipetted into the provided 96-well strip plate, which has been pre-coated with anti-CHO HCP antibodies to capture CHO proteins from biologics samples. Following an incubation to allow capture of the CHO protein by the antibodies on the plate, a second anti-CHO HCP antibody, conjugated with biotin, is added and incubated to allow it to bind to the captured CHO proteins. Next, a Streptavidin-HRP conjugate is added and will be captured by any biotin labeled antibody bound to the plate. TMB substrate is added and converted by the captured HRP to a colored product in proportion to the amount of HCP bound to the plate. The reaction is stopped and the intensity of the generated color is detected in a spectrophotometer plate reader capable of measuring 450 nm wavelength. A standard curve should be generated from the CHO protein standards and used to calculate the concentration of CHO proteins in the unknown samples, taking into account any unknown sample dilution made. A pilot experiment may be run first to determine the optimal dilution of your sample so that the sample falls within the linear range of the standard curve.

**Note, sodium azide will interfere with this assay and should not be used in samples or buffers.**

# SUPPLIED COMPONENTS

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ENTIRE KIT MUST BE STORED AT 4°C.

## Clear 96-Well Strip Plate

Clear plastic strip-well microtiter plate coated with rabbit anti-CHO HCP IgG. Can be used as individual strips.

## CHO Protein Standard (2430 ng/ml, 600 µl)

Concentrated CHO proteins sufficient for generating a standard curve from 810 ng/ml to 1.1 ng/ml.

## 5x Dilution Buffer (15 ml)

1x Dilution Buffer is used for dilution of Reporting Antibody and Streptavidin-HRP conjugate. 1x Dilution Buffer is used to dilute samples if necessary. The 10 ml of 5x concentrate should be diluted to 50 ml with 40 ml of milliQ water to achieve 1x Dilution Buffer.

## 10x PBS-T (30 ml)

1x PBS-T is used for wash steps. The 25 ml of 10x concentrate should be diluted to 250 ml with 225 ml of milliQ water to achieve 1x PBS-T.

## Reporting Antibody (90 µl/tube)

A biotin labeled rabbit polyclonal antibody specific for CHO cell proteins. Immediately prior to the assay, dilute 75 µl into 15 ml of 1x Dilution Buffer.

## Streptavidin-HRP Conjugate (4 µg/ml, 420 µl/tube)

A Streptavidin-Horse Radish Peroxidase conjugate in a stabilizing solution. Immediately prior to the assay, dilute 375 µl into 15 ml of 1x Dilution Buffer to give a 0.1 µg/ml working stock.

## TMB Substrate (15 ml)

Use directly without dilution.

## Stop Solution (15 ml)

A 1M solution of sulfuric acid. CAUSTIC. Use directly without dilution. The solution should not come in contact with skin or eyes. Take appropriate precautions when handling this reagent.

## Plate Sealer

# OTHER MATERIALS REQUIRED

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milliQ water

Single- and multi-channel micro-pipettes with disposable tips to accurately dispense volumes 5-250 µl.

1.5 ml eppendorf tubes

Reagent reservoirs for sample addition

Colorimetric 96-well microplate reader capable of reading optical density at 450 nm.



# ASSAY PROTOCOL

1. Dilute the 10x PBS-T and 5x Dilution Buffer to 1x-strength with milliQ water. Check both concentrate bottles for precipitates before proceeding and if found warm slightly in a water bath to dissolve before proceeding. 25 ml of 10x PBS-T should be diluted to 250 ml with 225 ml milliQ water. 10 ml of 5x Dilution Buffer should be diluted to 50ml with 40 ml of milliQ water.
2. Prepare the HCP standards by numbering eight 1.5 ml tubes and adding 1ml of Dilution Buffer to each. Cap the eighth tube, this will be the blank (0 ng/ml HCP). To tube one add 500  $\mu$ l of the provided 2430 ng/ml HCP stock and mix well, this will be the 810 ng/ml standard. Then serially dilute 500  $\mu$ l of tube one across tubes two through seven to generate the remainder of the standards, with an 8th tube serving as a blank using Dilution Buffer alone. Pipette 100  $\mu$ l of each standard and the blank into the plate.
3. Pipette 100  $\mu$ l of samples into wells in the plate. If necessary, first dilute the samples in 1x Dilution Buffer.
4. Cover plate with individual plate seal and incubate **1.5 hours** at room temperature.
5. During the above incubation, dilute the Reporting Antibody by adding 75  $\mu$ l to 15 ml of 1x Dilution Buffer.
6. Wash plate by emptying contents and adding 250  $\mu$ l of 1x PBS-T to each well. Empty wells again and tap the plate firmly upside down on a paper towel to fully empty well. **Repeat 1x PBS-T wash step two additional times.**
7. Pipette 100  $\mu$ l of Reporting Antibody into each well. Cover plate with the plate seal and incubate plate **45 minutes** at room temperature.
8. During the above incubation, dilute the 4  $\mu$ g/ml Streptavidin-HRP conjugate to 0.1  $\mu$ g/ml by adding 375  $\mu$ l to 15 ml of 1x Dilution Buffer.
9. Wash plate by emptying contents and adding 250  $\mu$ l of 1x PBS-T to each well. Empty wells again and tap the plate firmly upside down on a paper towel to fully empty well. **Repeat 1x PBS-T wash step two additional times.**
10. Pipette 100  $\mu$ l of Streptavidin-HRP conjugate into wells. Cover plate and incubate plate **30 minutes** at room temperature.
11. Wash plate by emptying contents and adding 250  $\mu$ l of 1x PBS-T to each well. Empty wells again and tap the plate firmly upside down on a paper towel to fully empty well. **Repeat 1x PBS-T wash step two additional times.**
12. Add 100  $\mu$ l of TMB substrate to each well. Monitor color development. Generally 10 minutes time will be sufficient; incubating longer may increase the background.
13. Stop reaction by adding 100  $\mu$ l of Stop Solution to each well containing TMB when the color development within standards is sufficient.
14. Read the optical density generated from each well in a plate reader capable of reading at 450 nm. A standard curve should be generated from the CHO protein standards and used to calculate the concentration of CHO proteins in the unknown samples, taking into account any unknown sample dilution made.

# VALIDATION SUMMARY

Validation assays were performed on the CHO HCP ELISA kit. Precision was quantified by calculating the coefficient of variation (%CV). %CV is calculated by dividing the standard deviation by the mean. Validation assays were performed using samples that fall within the high, medium, and low range of the standard curve. An intra-assay experiment was performed to assess well-to-well variation in the assay. Negligible well-to-well variation was observed in the assay. Lot-to-lot variation was also assessed. Negligible lot-to-lot variation was observed.

## Table 1: Intra-Assay

# of tests	Mean ng/ml	Standard Deviation	% CV
24	90.68	5.96	6.6%
24	48.93	1.78	3.6%
24	30.40	1.21	4%
24	12.26	0.54	4%

## Table 2: Lot-to-Lot Variation Assay

Standard (ng/ml)	Mean OD Values Lot 1	Mean OD Values Lot 2	Mean OD Values Lot 3	Overall Mean	Standard Deviation	% CV
90	2.22	2.22	2.44	2.29	0.12	5%
30	1.10	1.03	1.17	1.10	0.06	6%
10	0.53	0.49	0.61	0.55	0.05	9%