

# Mercodia Ultrasensitive Mouse Insulin ELISA

Directions for Use

**10-1249-01**  
**REAGENTS FOR 96 DETERMINATIONS**





**10-1249-10**  
**REAGENTS FOR 10 X 96 DETERMINATIONS**

For Research Use only

Manufactured by

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SE-754 50 Uppsala,  
Sweden

## EXPLANATION OF SYMBOLS USED ON LABELS

 $\Sigma = 96$	Reagents for 96 determinations
	Expiry date
	Store between 2–8°C
	Lot No.

## **INTENDED USE**

Mercodia Ultrasensitive Mouse Insulin ELISA provides a method for the quantitative determination of insulin in mouse serum or plasma.

## **PRINCIPLE OF THE PROCEDURE**

Mercodia Ultrasensitive Mouse Insulin ELISA is a solid phase two-site enzyme immunoassay. It is based on the direct sandwich technique in which two monoclonal antibodies are directed against separate antigenic determinants on the insulin molecule. During incubation insulin in the sample reacts with peroxidase-conjugated anti-insulin antibodies and anti-insulin antibodies bound to the microtitration well. A simple washing step removes unbound enzyme labeled antibody. The bound conjugate is detected by reaction with 3,3',5,5'-tetramethylbenzidine. The reaction is stopped by adding acid to give a colorimetric endpoint that is read spectrophotometrically.

## **WARNINGS AND PRECAUTIONS**

- Not for internal or external use in humans or animals.
- The content of this kit and their residues must not be allowed to come into contact with ruminating animal or swine.
- The Stop Solution in this kit contains 0.5 M H<sub>2</sub>SO<sub>4</sub>. Follow routine precautions for handling hazardous chemicals.
- All samples should be handled as capable of transmitting infections.

## **MATERIAL REQUIRED BUT NOT PROVIDED**

- Pipettes for 25, 50, 100 and 200 µL (Repeating pipettes preferred for addition of enzyme conjugate solution, Substrate TMB and Stop Solution.)
- Plate reader with 450 nm filter
- Wash device for microtitration plates
- Tube (10–100 mL) for preparation of enzyme conjugate solution
- 1000 mL/10 L bottle
- Redistilled water
- Plate shaker (The recommended velocity is 700-900 cycles per minute, orbital movement)

## REAGENTS FOR 1 X 96 KIT

Each Merckodia Ultrasensitive Mouse Insulin ELISA kit (10-1249-01) contains reagents for 96 wells, sufficient for 42 samples and one Calibrator curve in duplicate. For larger series of assays, use pooled reagents from packages bearing identical lot numbers. The expiry date for the complete kit is stated on the outer label. The recommended storage temperature is 2–8°C.

<b>Coated Plate</b> Mouse monoclonal anti-insulin. For unused microplate strips, reseal the bag using adhesive tape, store at 2–8°C and use within 8 weeks.	1 plate	96 wells 8-well strips	Ready for Use
<b>Calibrators 1, 2, 3, 4, 5</b> Color coded yellow. Concentration stated on vial label.	5 vials	1000 µL	Ready for Use
<b>Calibrator 0</b> Color coded yellow.	1 vial	5 mL	Ready for Use
<b>Enzyme Conjugate 11X</b> Peroxidase conjugated mouse monoclonal anti-insulin.	1 vial	1.3 mL	Preparation, see below
<b>Enzyme Conjugate Buffer</b> Color coded blue.	1 vial	13 mL	Ready for use
<b>Wash Buffer 21X</b> Storage after dilution: 2–8°C for 8 weeks.	1 bottle	50 mL	Dilute with 1000 mL redistilled water to make wash buffer 1X solution.
<b>Substrate TMB</b> Colorless solution <i>Note! Light sensitive!</i>	1 bottle	22 mL	Ready for Use
<b>Stop Solution</b> 0.5 M H <sub>2</sub> SO <sub>4</sub>	1 vial	7 mL	Ready for Use

### Preparation of enzyme conjugate 1X solution

Prepare the needed volume of enzyme conjugate 1X solution by dilution of Enzyme Conjugate 11X (1+10) in Enzyme Conjugate Buffer according to the table below. When preparing enzyme conjugate 1X solution for the whole plate, pour all of the Enzyme Conjugate Buffer into the Enzyme Conjugate 11X vial. Mix gently.

Number of strips	Enzyme Conjugate 11X	Enzyme Conjugate Buffer
12 strips	1 vial	1 vial
6 strips	600 µL	6.0 mL
4 strips	400 µL	4.0 mL

Storage after dilution: 2–8°C for 8 weeks.

## REAGENTS FOR 10 X 96 KIT

Each Mercodia Ultrasensitive Mouse Insulin ELISA kit (10-1249-10) contains reagents for 10 x 96 wells, sufficient for 42 samples and one calibrator curve in duplicate on each plate. For larger series of assays, use pooled reagents from packages bearing identical lot numbers. The expiry date for the complete kit is stated on the outer label. The recommended storage temperature is 2–8°C.

<b>Coated Plate</b> Mouse monoclonal anti-insulin For unused microplate strips, reseal the bag using adhesive tape, store at 2–8°C and use within 8 weeks.	10 plate	96 wells 8-well strips	Ready for Use
<b>Calibrators 1, 2, 3, 4, 5</b> Color coded yellow Concentration stated on vial label.	5 vials	1000 µL	Ready for Use
<b>Calibrator 0</b> Color coded yellow	1 vial	5 mL	Ready for Use
<b>Enzyme Conjugate 11X</b> Peroxidase conjugated mouse monoclonal anti-insulin	1 vial	12 mL	Preparation, see below
<b>Enzyme Conjugate Buffer</b> Color coded blue.	1 vial	120 mL	Ready for use
<b>Wash Buffer 21X</b>	2 bottles	200 mL	Preparation, see below
<b>Substrate TMB</b> Colorless solution <i>Note! Light sensitive!</i>	1 bottle	220 mL	Ready for Use
<b>Stop Solution</b> 0.5 M H <sub>2</sub> SO <sub>4</sub>	1 vial	70 mL	Ready for Use

### Preparation of enzyme conjugate 1X solution

Prepare the needed volume of enzyme conjugate 1X solution by dilution of Enzyme Conjugate 11X in Enzyme Conjugate buffer 1+10 according to the table below. Mix gently.

Number of plates	Enzyme Conjugate 11X	Enzyme Conjugate Buffer
10 plates	1 vial	1 vial
5 plates	6000 µL	60 mL
3 plates	3600 µL	36 mL
2 plates	2400 µL	24 mL
1 plate	1200 µL	12 mL

Storage after dilution: 2–8°C for 8 weeks.

### Preparation of wash buffer 1X solution

Prepare the needed volume of wash buffer by dilution of Wash Buffer 21X in redistilled water 1+20 according to the table below. Mix gently.

Number of plates	Wash Buffer 21X	Redistilled water
10 plates	2 bottles	8 000 mL
5 plates	180 mL	3600 mL
3 plates	110 mL	2200 mL
2 plates	70 mL	1400 mL
1 plate	35 mL	700 mL

Storage after dilution: 2-8°C for 8 weeks.

### SPECIMEN COLLECTION AND HANDLING

#### Serum

Collect blood by venipuncture, allow to clot, and separate the serum by centrifugation. Samples can be stored at 2–8°C up to 24 hours. For longer periods store samples at -20°C. Avoid repeated freezing and thawing.

#### Plasma

Collect blood by venipuncture into tubes containing heparin or EDTA as anticoagulant, and separate the plasma fraction. Samples can be stored at 2–8°C up to 24 hours. For longer periods store samples at -20°C. Avoid repeated freezing and thawing.

### Preparation of samples

No dilution is normally required, however, samples containing insulin concentration above the highest Calibrator should be diluted 1/10 v/v with Calibrator 0. *Note!* Buffers containing sodium azide ( $\text{NaN}_3$ ) can not be used for sample dilution.

## TEST PROCEDURE

Prepare a calibrator curve for each assay run. All reagents and samples must be brought to room temperature before use.

1. Prepare enzyme conjugate 1X solution (according to the table on previous page), wash buffer 1X solution and samples.
2. Prepare sufficient microplate wells to accommodate Calibrators and samples in duplicate.
3. Pipette 25  $\mu$ L each of Calibrators and samples into appropriate wells.
4. Add 100  $\mu$ L of enzyme conjugate 1X solution into each well.
5. Incubate on a plate shaker (700-900 rpm) for 2 hours at room temperature (18-25°C).
6. Wash 6 times with 700  $\mu$ L wash buffer 1X solution per well using an automatic plate washer with overflow-wash function, after final wash, invert and tap the plate firmly against absorbent paper. Do not include soak step in washing procedure.  
Or manually,  
Discard the reaction volume by inverting the microplate over a sink. Add 350  $\mu$ L wash solution to each well. Discard the wash solution, tap firmly several times against absorbent paper to remove excess liquid. Repeat 5 times. Avoid prolonged soaking during washing procedure.
7. Add 200  $\mu$ L Substrate TMB into each well.
8. Incubate 15 minutes at room temperature (18-25°C).
9. Add 50  $\mu$ L Stop Solution to each well.  
Place the plate on the shaker for approximately 5 seconds to ensure mixing.
10. Read optical density at 450 nm and calculate results.  
Read within 30 minutes.

*Note!* To prevent contamination between the conjugate and substrate, separate pipettes are recommended.

## INTERNAL QUALITY CONTROL

Commercial controls such as Mercodia Diabetes Antigen Control Rat, Mouse (L, M, H) (10-1220-01) and/or internal serum pools with low, intermediate and high insulin concentrations should routinely be assayed as samples, and results charted from day to day. It is good laboratory practice to record the following data for each assay: kit lot number, dilution and/or reconstitution dates of kit components, OD values for the blank, Calibrators and Controls.

## CALCULATION OF RESULTS

### Computerized calculation

The concentration of insulin is obtained by computerized data reduction of the absorbance for the Calibrators, except for Calibrator 0, versus the concentration using cubic spline regression.

## Manual Calculation

1. Plot the absorbance values obtained for the Calibrators, except for Calibrator 0, against the insulin concentration on a log-log paper and construct a calibrator curve.
2. Read the concentration of the samples from the calibrator curve.

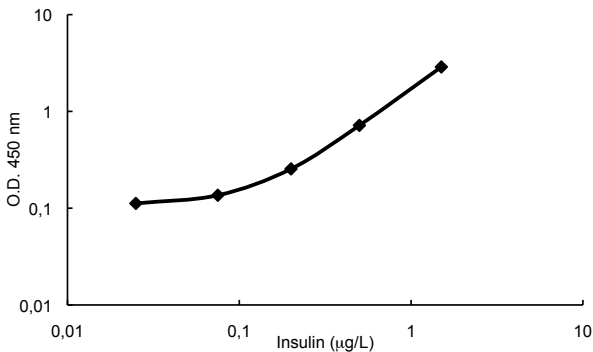
## Example of results

Wells	Identity	A <sub>450</sub>	Mean conc. µg/L
1A–B	Calibrator 0	0.099/0.094	
1C–D	Calibrator 1*	0.115/0.109	
1E–F	Calibrator 2*	0.136/0.136	
1G–H	Calibrator 3*	0.248/0.261	
2A–B	Calibrator 4*	0.703/0.730	
2C–D	Calibrator 5*	2.877/2.881	
2E–F	Sample 1	0.184/0.180	0.131
2G–H	Sample 2	0.248/0.260	0.200
3A–B	Sample 3	0.386/0.409	0.308

\* Concentration stated on vial label.

## Calibrator curve

A typical calibrator curve is shown here. Do not use this curve to determine actual assay





## Conversion factor

1 µg corresponds to 174 pmol.

## LIMITATIONS OF THE PROCEDURE

### Performance limitations

Grossly lipemic, icteric or hemolyzed samples do not interfere in the assay. Insulin is, however, degraded over time in hemolyzed samples. The degradation could give falsely low values and contributes to higher inter assay variation.

## EXPECTED VALUES

Good practice that each laboratory establishes its own expected range of values.

## PERFORMANCE CHARACTERISTICS

### Detection limit

Detection limit is defined as the Capability of Detection according to ISO11843-Part 1. Capability of Detection should be seen as a part of a method validation, rather than the lowest concentration that can be measured.

The detection limit is 0.025 µg/L as determined with the methodology described in ISO11843-Part 4.

Concentration of samples with absorbance below Calibrator 1 should not be calculated, instead expressed less or equal to ( $\leq$ ) the concentration indicated on the vial for Calibrator 1.

### Recovery

Recovery upon addition is 76-94 (mean 85) %.

Recovery upon dilution is 110-132 (mean 123) %.

### Hook effect

Samples with a concentration up to at least 450 µg/L can be measured without giving falsely low results.

### Precision

Each sample was analyzed in four replicates on 16 different occasions.

Sample	Mean value µg/L	Coefficient of variation		
		within assay %	between assay %	total assay %
1	0.14	2.9	4.9	5.1
2	0.22	1.5	3.9	3.9
3	0.26	2.2	4.5	4.6

## Specificity

Human insulin	195%
Human proinsulin	82%
Human C-peptide	<0.05%
IGF-I	<0.02%
IGF-II	<0.02%
Rat insulin	146%
Rat proinsulin	14%
Rat C-peptide	<0.001%
Porcine insulin	628%
Sheep insulin	256%
Bovine insulin	110%

## WARRANTY

The performance data presented here was obtained using the procedure indicated. Any change or modification in the procedure not recommended by Mercodia AB may affect the results, in which event Mercodia AB disclaims all warranties expressed, implied or statutory, including the implied warranty of merchantability and fitness for use.

Mercodia AB and its authorised distributors, in such event, shall not be liable for damages indirect or consequential.

## REFERENCES

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**SUMMARY PROTOCOL SHEET**  
**Mercodia Ultrasensitive Mouse Insulin ELISA**

X-O Graf/Tryden/AB

Add Calibrators, Controls and Samples	25 $\mu$ L
Add enzyme conjugate 1X solution to all wells	100 $\mu$ L
Incubate	2 hours at 18-25°C on a plate shaker
Wash plate with wash buffer 1X solution	6 times
Add Substrate TMB	200 $\mu$ L
Incubate	15 minutes
Add Stop Solution	50 $\mu$ L Shake for 5 seconds to ensure mixing
Measure $A_{450}$	Evaluate results