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# Yersinia enterocolitica IgG ELISA

RUO

For Research Use Only – Not for Use in Diagnostic Procedures

REF

DEYERG0990



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## 1. INTENDED USE

The Yersinia enterocolitica IgG ELISA is intended for the determination of IgG class antibodies against antigens of the 70 kb virulence plasmid of Yersinia enterocolitica in human serum or plasma (citrate, heparin).

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## 2. PRINCIPLE OF THE ASSAY

The immunoenzymatic determination of specific antibodies is based on the ELISA (Enzyme-linked Immunosorbent Assay) technique.

Microtiterplates are coated with specific antigens to bind corresponding antibodies of the sample. After washing the wells to remove all unbound sample material a horseradish peroxidase (HRP) labelled conjugate is added. This conjugate binds to the captured antibodies. In a second washing step unbound conjugate is removed. The immune complex formed by the bound conjugate is visualized by adding Tetramethylbenzidine (TMB) substrate which gives a blue reaction product.

The intensity of this product is proportional to the amount of specific antibodies in the sample. Sulphuric acid is added to stop the reaction. This produces a yellow endpoint colour. Absorbance at 450/620 nm is read using an ELISA Microtiterplate reader.

## 3. MATERIALS

### 3.1. Reagents supplied

1. **SORB** **MIT** **Microtiterplate**: 12 break-apart 8-well snap-off strips coated with specific antigen; in resealable aluminium foil.
2. **SAM** **DIL** **Sample Dilution Buffer**: 1 bottle containing 100 mL of phosphate buffer (10 mM) for sample dilution; pH 7.2 ± 0.2; coloured yellow; ready to use; white cap; ≤ 0.0015 % (v/v) CMIT/MIT (3:1).
3. **STOP** **SOLN** **Stop Solution**: 1 bottle containing 15 mL sulphuric acid, 0.2 mol/L; ready to use; red cap.
4. **WASH** **SOLN** **20x** **Washing Buffer (20x conc.)**: 1 bottle containing 50 mL of a 20-fold concentrated phosphate buffer (0.2 M), pH 7.2 ± 0.2, for washing the wells; white cap; 0.2% (w/v) 5-Bromo-5-nitro-1,3-dioxane; 0.2 % (w/v) 5-Bromo-5-nitro-1,3-dioxane.
5. **ENZ** **CONJ** **Conjugate**: 1 bottle containing 20 mL of peroxidase labelled antibody to human IgG in phosphate buffer (10 mM); coloured blue; ready to use; black cap.
6. **SUB** **TMB** **TMB Substrate Solution**: 1 bottle containing 15 mL 3,3',5,5'-tetramethylbenzidine (TMB), < 0.1 %; ready to use; yellow cap.
7. **CAL** **C** **Positive Control**: 1 vial containing 2 mL control; coloured yellow; ready to use; red cap; ≤ 0.02 % (v/v) MIT.
8. **CAL** **B** **Cut-off Control**: 1 vial containing 3 mL control; coloured yellow; ready to use; green cap; ≤ 0.02 % (v/v) MIT.
9. **CAL** **A** **Negative Control**: 1 vial containing 2 mL control; coloured yellow; ready to use; blue cap; ≤ 0.0015 % (v/v) CMIT/MIT (3:1).

\*For hazard and precautionary statements see 11.1

### 3.2. Materials supplied

- 1 Cover foil
- 1 Instructions for use (IFU)

### 3.3. Materials and Equipment needed

- ELISA Microtiterplate reader, equipped for the measurement of absorbance at 450/620 nm
- Incubator 37 °C
- Manual or automatic equipment for rinsing Microtiterplates
- Pipettes to deliver volumes between 10 and 1000 µL
- Vortex tube mixer
- Distilled water
- Disposable tubes

### 4. STABILITY AND STORAGE

Store the kit at 2...8 °C. The opened reagents are stable up to the expiry date stated on the label when stored at 2...8 °C.

### 5. REAGENT PREPARATION

It is very important to bring all reagents and samples to room temperature (20...25 °C) and mix them before starting the test run!

#### 5.1. Microtiterplate

The break-apart snap-off strips are coated with specific antigen. Immediately after removal of the strips, the remaining strips should be resealed in the aluminium foil along with the desiccant supplied and stored at 2...8 °C.

#### 5.2. WASH SOLN 20x

Dilute WASH SOLN 20x 1 + 19; e. g. 10 mL WASH SOLN 20x + 190 mL distilled water. The diluted buffer (WASH SOLN 1x) is stable for 5 days at room temperature (20...25 °C). In case crystals appear in the concentrate, warm up the solution to 37 °C e.g., in a water bath. Mix well before dilution.

#### 5.3. SUB TMB

The reagent is ready to use and has to be stored at 2...8 °C, away from the light. SUB TMB should be colourless or could have a slight blue tinge. If the SUB TMB turns into blue, it may have become contaminated and should be thrown away.

### 6. SAMPLE COLLECTION AND PREPARATION

Use human serum or plasma (citrate, heparin) samples with this assay. If the assay is performed within 5 days after sample collection, the samples should be kept at 2...8 °C; otherwise, they should be aliquoted and stored deep-frozen (-70...-20 °C). If samples are stored frozen, mix thawed samples well before testing. Avoid repeated freezing and thawing.

Heat inactivation of samples is not recommended.

#### 6.1. Sample Dilution

Before assaying, all samples should be diluted 1+100 with SAM DIL. Dispense 10 µL sample and 1 mL SAM DIL into tubes to obtain a 1+100 dilution and thoroughly mix with a Vortex.

## 7. ASSAY PROCEDURE

Please read the instructions for use carefully before performing the assay. Result reliability depends on strict adherence to the instructions for use as described. The following test procedure is only validated for manual procedure. If performing the test on ELISA automatic systems, we recommend increasing the washing steps from three up to five and the volume of **WASH SOLN 1x** from 300 µL to 350 µL to avoid washing effects. Pay attention to chapter 11. Prior to commencing the assay, the distribution and identification plan for all samples and standards/controls (duplicates recommended) should be carefully established. Select the required number of microtiter strips or wells and insert them into the holder.

Perform all assay steps in the order given and without any delays.

A clean, disposable tip should be used for dispensing each standard/control and sample.

Adjust the incubator to  $37 \pm 1$  °C.

1. Dispense 100 µL standards/controls and diluted samples into their respective wells. Leave well A1 for the Substrate Blank.
2. Cover wells with the foil supplied in the kit.
3. **Incubate for 1 hour  $\pm$  5 min at  $37 \pm 1$  °C.**
4. When incubation has been completed, remove the foil, aspirate the content of the wells and wash each well three times with 300 µL of **WASH SOLN 1x**. Avoid overflows from the reaction wells. The interval between washing and aspiration should be > 5 sec. At the end carefully remove remaining fluid by tapping strips on tissue paper prior to the next step!  
Note: Washing is important! Insufficient washing results in poor precision and false results.
5. Dispense 100 µL Conjugate into all wells except for the Substrate Blank well A1.
6. **Incubate for 30 min at room temperature (20...25 °C).** Do not expose to direct sunlight.
7. Repeat step 4.
8. Dispense 100 µL **SUB TMB** into all wells.
9. **Incubate for exactly 15 min at room temperature (20...25 °C) in the dark.** A blue colour occurs due to an enzymatic reaction.
10. Dispense 100 µL **STOP SOLN** into all wells in the same order and at the same rate as for the **SUB TMB**, thereby a colour change from blue to yellow occurs.
11. Measure the absorbance at 450/620 nm within 30 min after addition of the **STOP SOLN**.

### 7.1. Measurement

Adjust the ELISA Microtiterplate reader **to zero** using the **Substrate Blank**.

If - due to technical reasons - the ELISA Microtiterplate reader cannot be adjusted to zero using the Substrate Blank, subtract its absorbance value from all other absorbance values measured in order to obtain reliable results!

**Measure the absorbance** of all wells at **450 nm** and record the absorbance values for each standard/control and sample.

Bichromatic measurement using a reference wavelength of 620 nm is recommended.

**Where applicable calculate the mean absorbance values of all duplicates.**

## 8. RESULTS

### 8.1. Run Validation Criteria

In order for an assay run to be considered valid, these instructions for use have to be strictly followed and the following criteria must be met:

- **Substrate Blank:** Absorbance value < **0.100**
- **Negative Control:** Absorbance value < **0.200** and < **Cut-off**
- **Cut-off Control:** Absorbance value **0.150 – 1.300**
- **Positive Control:** Absorbance value > **Cut-off**

If these criteria are not met, the test is not valid and must be repeated.

### 8.2. Results

The Cut-off is the mean absorbance value of the Cut-off Control determinations.

Example: Absorbance value Cut-off Control 0.44 + absorbance value Cut-off control 0.42  
= 0.86 / 2 = 0.43

Cut-off = 0.43

### 8.3. Results in Units [U]

$\frac{\text{Sample (mean) absorbance value} \times 10}{\text{Cut-off}} = \text{[Units = U]}$

Example:  $\frac{1.591 \times 10}{0.43} = 37 \text{ U}$

### 8.4. Evaluation of Results

10 U	Cut-off
> 11 U	Antibodies against the antigen are present.
9 – 11 U	Antibodies against the antigen could not be detected clearly. It is recommended to repeat the test with a fresh sample in 2 to 4 weeks.
< 9 U	The sample contains no antibodies against the antigen.

## 9. SPECIFIC PERFORMANCE CHARACTERISTICS

The results refer to the groups of samples investigated; these are not guaranteed specifications.

### 9.1. Precision

#### 9.1.1. Single-Site Study

The precision study was performed at a single site. Samples were run in 4 replicates, two times per day for 12 days for a total of 96 results.

Sample	n	Mean (U)	Repeatability		Between Run		Within Day		Between Day		Within lab	
			SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV
1	96	21.50	0.8883	4.1	1.6690	7.8	1.8907	8.8	0.9469	4.4	2.1145	9.8
2	96	15.28	0.6923	4.5	1.0913	7.1	1.2924	8.5	0.0000	0.0	1.2924	8.5
3	96	8.56	0.5784	6.8	0.7467	8.7	0.9445	11.0	0.2395	2.8	0.9744	11.4
4	96	4.60	0.4439	9.7	0.3461	7.5	0.5629	12.2	0.1438	3.1	0.5810	12.6

#### 9.1.2. Multisite-Study

The precision study was performed at two different sites. Samples were run in 5 replicates, once a day for 5 days for a total of 50 results.

Sample	n	Mean (U)	Repeatability		Within Site		Reproducibility	
			SD	%CV	SD	%CV	SD	%CV
1	50	21.68	0.6338	2.9	1.4163	6.5	2.1946	10.1
2	50	14.58	0.5295	3.6	1.1098	7.6	1.2922	8.9
3	50	8.60	0.4094	4.8	0.9157	10.6	1.2857	14.9
4	50	3.93	0.3859	9.8	0.7162	18.2	0.9696	24.7

### 9.2. Specificity

The specificity is defined as the probability of the assay of scoring negative in the absence of the specific analyte. It is 98.82 % (95 % confidence interval: 95.81 % - 99.86 %).

### 9.3. Sensitivity

The sensitivity is defined as the probability of the assay of scoring positive in the presence of the specific analyte. It is 95.65 % (95 % confidence interval: 85.16 % - 99.47 %).

### 9.4. Interferences

The assay was evaluated for interferences according to guideline EP07-A3. Three samples, covering the relevant measuring range, were spiked with high levels of interferents and were tested along with the unspiked sample. The following table shows the tested substances added to samples at the indicated concentrations.

Interferent	Concentration tested
Albumin	60 mg/mL
Bilirubin, unconjugated	0.4 mg/mL
Bilirubin, conjugated	0.4 mg/mL
Cholesterol	4 mg/mL
Hemoglobin	10 mg/mL
Triglycerides	15 mg/mL

No significant interference effect was found for all tested substances.

### 9.5. Cross Reactivity

A minimum of 5 samples with antibody activities to potentially cross-reacting parameters (Adenovirus, Borrelia burgdorferi, Brucella, Campylobacter jejuni, Chlamydia pneumoniae, Enterovirus, Epstein-Barr virus, Helicobacter pylori, Parvovirus B19) or samples positive for ANA or rheumatoid factors, and samples from pregnant subjects were tested to evaluate the cross reactivity of the assay. Positive findings were additionally analyzed with a reference assay. The results are shown in the following table.

Antigen	Samples tested	Number of positive samples	
		Yersinia enterocolitica IgG	reference assay
Adenovirus	15	2	4
Antinuclear antibodies (ANA)	15	3	2
Borrelia burgdorferi	15	4	4
Brucella	10	9	9
Campylobacter jejuni	8	4	5
Chlamydia pneumoniae	12	4	2
Enterovirus	15	7	5
Epstein-Barr virus (EBV)	15	3	3
Helicobacter pylori	14	6	6
Parvovirus B19	14	6	1
Pregnancy samples	14	1	0
Rheumatoid factor (RF)	13	4	5

Cross-reactions with antibodies against Adenovirus, Borrelia burgdorferi, Brucella, Campylobacter jejuni, Chlamydia pneumoniae, Enterovirus, Epstein-Barr virus, Helicobacter pylori, Parvovirus B19 as well as with samples from pregnant subjects or samples positive for antinuclear antibodies (ANA) or rheumatoid factor (RF) cannot be excluded.



## 10. LIMITATIONS OF THE PROCEDURE

Bacterial contamination or repeated freeze-thaw cycles of the sample may affect the absorbance values.

## 11. PRECAUTIONS AND WARNINGS

- The test procedure, the information, the precautions and warnings in the instructions for use have to be strictly followed. The use of the testkits with analyzers and similar equipment has to be validated. Any change in design, composition and test procedure as well as for any use in combination with other products not approved by the manufacturer is not authorized; the user himself is responsible for such changes. The manufacturer is not liable for false. The manufacturer is not liable for any results by visual analysis of the samples.
- For research use only.
- All materials of human or animal origin should be regarded and handled as potentially infectious.
- All components of human origin used for the production of these reagents have been tested for anti-HIV antibodies, anti-HCV antibodies and HBsAg and have been found to be non-reactive.
- Do not interchange reagents or Microtiterplates of different production lots.
- No reagents of other manufacturers should be used along with reagents of this test kit.
- Do not use reagents after expiry date stated on the label.
- Use only clean pipette tips, dispensers, and lab ware.
- Do not interchange screw caps of reagent vials to avoid cross-contamination.
- Close reagent vials tightly immediately after use to avoid evaporation and microbial contamination.
- After first opening and subsequent storage check conjugate and standard/control vials for microbial contamination prior to further use.
- To avoid cross-contamination and falsely elevated results pipette samples and dispense reagents without splashing accurately into the wells.
- The ELISA is only designed for qualified personnel following the standards of good laboratory practice (GLP).
- For further internal quality control each laboratory should additionally use known samples.

**11.1. Safety note for reagents containing hazardous substances**

Reagents may contain CMIT/MIT (3:1) or MIT (refer to 3.1).

**Warning**

H317	May cause an allergic skin reaction.
P261	Avoid breathing spray.
P280	Wear protective gloves/ protective clothing.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P333+P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

Reagents may contain 5-Bromo-5-nitro-1,3-dioxane (refer to 3.1).

**Warning**

H315	Causes skin irritation.
H319	Causes serious eye irritation.
P280	Wear protective gloves/ protective clothing.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.

Further information can be found in the safety data sheet

**11.2. Disposal Considerations**

Residues of chemicals and preparations are generally considered as hazardous waste. The disposal of this kind of waste is regulated through national and regional laws and regulations. Contact your local authorities or waste management companies which will give advice on how to dispose hazardous waste.

**SUMMARY OF TEST PROCEDURE****SCHEME OF THE ASSAY**

Yersinia enterocolitica IgG










**Test Preparation**

Prepare reagents and samples as described.  
Establish the distribution and identification plan for all samples and standards/controls.  
Select the required number of microtiter strips or wells and insert them into the holder.

**Assay Procedure**

	Substrate Blank (A1)	Negative Control	Cut-off Control	Positive Control	Sample (diluted 1+100)
Negative Control	-	100 µL	-	-	-
Cut-off Control	-	-	100 µL	-	-
Positive Control	-	-	-	100 µL	-
Sample (diluted 1+100)	-	-	-	-	100 µL
Cover wells with foil supplied in the kit <b>Incubate for 1 h at 37 ± 1 °C</b> Wash each well three times with 300 µL of <b>WASH SOLN 1x</b>					
Conjugate	-	100 µL	100 µL	100 µL	100 µL
<b>Incubate for 30 min at room temperature (20...25 °C)</b> Do not expose to direct sunlight Wash each well three times with 300 µL of <b>WASH SOLN 1x</b>					
<b>SUB TMB</b>	100 µL	100 µL	100 µL	100 µL	100 µL
<b>Incubate for exactly 15 min at room temperature (20...25 °C) in the dark</b>					
<b>STOP SOLN</b>	100 µL	100 µL	100 µL	100 µL	100 µL
Photometric measurement at 450 nm (reference wavelength: 620 nm)					

## SYMBOLS USED WITH DEMEDITEC ASSAYS

Symbol	English	Deutsch	Française	Espanol	Italiano
	European Conformity	CE-Konformitätskennzeichnung	Conforme aux normes européennes	Conformidad europea	Conformità europea
	Consult instructions for use	Gebrauchsanweisung beachten	Consulter les instructions d'utilisation	Consulte las Instrucciones	Consultare le istruzioni per l'uso
	In vitro diagnostic device	In-vitro-Diagnostikum	utilisation Diagnostic in vitro	Diagnóstico in vitro	Per uso Diagnostica in vitro
	For research use only	Nur für Forschungszwecke	Seulement dans le cadre de recherches	Sólo para uso en investigación	Solo a scopo di ricerca
	Catalogue number	Katalog-Nr.	Référence	Número de catálogo	No. di catalogo
	Lot. No. / Batch code	Chargen-Nr.	No. de lot	Número de lote	Lotto no
	Contains sufficient for <n> tests/	Ausreichend für "n" Ansätze	Contenu suffisant pour "n" tests	Contenido suficiente para <n> ensayos	Contenuto sufficiente per "n" saggi
	Note warnings and precautions	Warnhinweise und Vorsichtsmaßnahmen beachten	Avertissements et mesures de précaution font attention	Tiene en cuenta y advertencias precauciones	Annoti avvisi e le precauzioni
	Storage Temperature	Lagerungstemperatur	Température de conservation	Temperatura de conservación	Temperatura di conservazione
	Expiration Date	Mindesthaltbarkeitsdatum	Date limite d'utilisation	Fecha de caducidad	Data di scadenza
	Legal Manufacturer	Hersteller	Fabricant	Fabricante	Fabbricante
<i>Distributed by</i>	Distributed by	Vertrieb durch	Distribution par	Distribución por	Distribuzione da parte di
	Version	Version	Version	Versión	Versione
	Single-use	Einmalverwendung	À usage unique	Uso único	Uso una volta