Version 13-12/25

User's Manual

Human L-Phenylalanine ELISA Kit

REF **DEIA098J**

Σ **96T**

RUO

This product is for research use only and is not intended for diagnostic use.

For illustrative purposes only. To perform the assay the instructions for use provided with the kit have to be used.

Creative Diagnostics

Address: 45-1 Ramsey Road, Shirley, NY 11967, USA

Tel: 1-631-624-4882 (USA) 44-161-818-6441 (Europe) **Fax: 1-631-938-8221**

Email: info@creative-diagnostics.com **Web: www.creative-diagnostics.com**

PRODUCT INFORMATION

Intended Use

Enzyme Immunoassay for the quantitative determination of L-Phenylalanine (PHE) in plasma samples. After extraction and derivatization L-Phenylalanine is quantitatively determined by ELISA.

Principles of Testing

The competitive ELISA uses the microtiter plate format. The antigen is bound to the solid phase of the microtiter plate. The processed standards, controls and samples and the solid phase bound analyte compete for a fixed number of antiserum binding sites. When the system is in equilibrium, free antigen and free antigen-antiserum complexes are removed by washing. The antibody bound to the solid phase is detected by an anti-rabbit IgG-peroxidase conjugate using TMB as a substrate. The reaction is monitored at 450 nm. Quantification of unknown samples is achieved by comparing their absorbance with a reference curve prepared with known standards.

Reagents And Materials Provided

1. Adhesive Foil - Ready to use. 1 x 4 foils
2. Reaction Plate - Ready to use. 1 x 96 well plate, empty in a resealable pouch.
3. Wash Buffer Concentrate - Concentrated 50x. Buffer with a non-ionic detergent and physiological pH. 1 x 20 mL/vial.
4. Enzyme Conjugate - Ready to use. Goat anti-rabbit immunoglobulins conjugated with peroxidase. 1 x 12 mL/vial.
5. Substrate - Ready to use. Chromogenic substrate containing tetramethylbenzidine, substrate buffer and hydrogen peroxide. 1 x 12 mL/black vial.
6. Stop Solution - Ready to use. 1 x 12 mL/vial.
7. Microtiter Strips - Ready to use. 1 x 96 well (12x8) antigen precoated microwell plate in a resealable pouch with desiccant, silver bag
8. L-Phenylalanine Antiserum - Ready to use. Rabbit anti-L-Phenylalanine antibody. 1 x 6 mL/vial.
9. Assay Buffer - Ready to use. Buffer with alkaline pH. 1 x 20 mL.
10. Equalizing Reagent - Lyophilized. 1 vial.
11. D-Reagent - Ready to use. Crosslinking agent in dimethylsulfoxide. 1 x 3 mL/vial.
12. Reducing Concentrate – Concentrated 100×. Reducing agent in sodium hydroxide. 1 x 1 mL/vial.
13. PBS - Ready to use. Phosphate Buffered Saline. 1 x 50 mL/vial.
14. Precipitating Reagent - Ready to use. Acidic reagent for precipitation of plasma/serum proteins. 2 x 4 mL/vial.
15. Standards and Controls - Ready to use

Standards and Controls -Ready to use				
Component	**Colour/Cap**	**Concentration µg/mL**	**Concentration µmol/L**	**Volume/ Vial**
STANDARD A	white	0	0	4 mL
STANDARD B	light yellow	1.7	10	4 mL
STANDARD C	orange	4.1	25	4 mL
STANDARD D	dark blue	10.3	62.5	4 mL
STANDARD E	light grey	25.8	156	4 mL
STANDARD F	black	64.4	390	4 mL
CONTROL 1	light green	Refer to QC-Report for expected value and acceptable range!		4 mL
CONTROL 2	dark red			4 mL
Conversion:	L-Phenylalanine (µg/mL) × 6.06 = L-Phenylalanine (µmol/L)			
Contents:	Buffer with non-mercury stabilizer, spiked with defined quantity of L-Phenylalanine			

Materials Required But Not Supplied

1. Calibrated precision pipettes to dispense volumes between 10 – 300 µL; 12.5 mL
2. Polystyrene or polypropylene tubes (0.5 mL) and suitable rack
3. Microtiter plate washing device (manual, semi-automated or automated)
4. ELISA reader capable of reading absorbance at 450 nm and if possible 620 - 650 nm
5. Microtiter plate shaker (shaking amplitude 3 mm; approx. 600 rpm)
6. Absorbent material (paper towel)
7. Water (deionized, distilled or ultra-pure)
8. Vortex mixer

Storage

Store the unopened reagents at 2 - 8°C until expiration date. Do not use components beyond the expiry date indicated on the kit labels. Once opened the reagents are stable for 1 month when stored at 2 – 8°C. Once the resealable pouch has been opened, care should be taken to close it tightly with desiccant again.

Specimen Collection And Preparation

EDTA Plasma

Whole blood should be collected into centrifuge tubes containing EDTA as anti-coagulant and centrifuged according to manufacturer's instructions at room temperature immediately after collection.

Haemolytic and especially lipemic samples should not be used for the assay.

Storage: up to 48 hours at 2 - 8 °C, for longer period (up to 6 month) at -20 °C.

Repeated freezing and thawing should be avoided.

Reagent Preparation

Wash Buffer
Dilute the 20 mL Wash Buffer Concentrate with water (deionized, distilled or ultra-pure) to a final volume of 1000 mL.
Storage: 1 month at 2 – 8°C

Equalizing Reagent
Reconstitute the Equalizing Reagent with 12.5 mL of Assay Buffer.
Reconstituted Equalizing Reagent which is not used immediately has to be stored in aliquots for max 1 month at -20°C and may be thawed only once.

D-Reagent
The D-Reagent has a freezing point of 18.5 °C. It must be ensured that the D-Reagent has reached room temperature and forms a homogeneous, crystal-free solution.

Reducing Solution
Dilute Reducing Concentrate 1:100 with water (deionized, distilled, or ultra-pure) and mix thoroughly. Use immediately!
Examples for the preparation of Reducing Solution:

Reducing Concentrate	40 µL	50 µL	80 µL	160 µL
Water	3.96 mL	4.95 mL	7.92 mL	15.84 mL

L-Phenylalanine Microtiter Strips
In rare cases residues of the blocking and stabilizing reagent can be seen in the wells as small, white dots or lines. These residues do not influence the quality of the product.

Assay Procedure

Allow all reagents and samples to reach room temperature and mix thoroughly by gentle inversion before use. Duplicate determinations are recommended. To do that, perform duplicates after derivatization (1 derivatization well = 2 competition wells).

It is recommended to number the strips of the microwell plate before usage to avoid any mix-up.

The binding of the antisera and of the enzyme conjugate and the activity of the enzyme are temperature dependent, and the absorbance values may vary if a thermostat is not used. The higher the temperature, the higher the extinction values will be. Corresponding variations also apply to the incubation times. The optimal temperature during the Enzyme Immunoassay is between 20 – 25°C.

1. Precipitation

1. Pipette 20 µL of standards, controls and samples into the respective tubes.
2. Add 400 µL of PBS to all tubes.
3. Add 50 µL Precipitating Reagent to all tubes.
4. Mix the tubes thoroughly (vortex) and centrifuge for 15 minutes at 3000 x g.

Note: Take 25 µL of the clear supernatant for the derivatization.

2. Derivatization

1. Pipette 25 µL of the precipitated standards, controls and samples into the appropriate wells of the Reaction Plate.
2. Add 50 µL of the Equalizing Reagent into all wells.
3. Mix 2 min at RT on a plate shaker at 700 rpm to homogenize the medium.
4. Add 10 µL of the D-Reagent into all wells (immerse the tips into the reaction medium).
5. Cover plate with Adhesive Foil and incubate for 2 h at RT (20 – 25°C) on a shaker (approx. 500 rpm).
6. Prepare Reducing Solution 1X from Reducing Concentrate 100X in sterile water. The Reducing Solution should be prepared directly prior to use!
7. Add 100 µL of the Reducing Solution 1X into all wells.
8. Incubate for 10 min at RT (20 – 25°C) on a shaker (approx. 500 rpm).

Note: Use 50 µL for the ELISA!

3. L-Phenylalanine ELISA

1. Pipette 50 µL of the prepared standards, controls and samples into the appropriate wells of the LPhenylalanine Microtiter Strips. Be carefull not to pipette bubbles!
2. Add 50 µL of the L-Phenylalanine Antiserum into all wells and mix shortly.
3. Cover plate with Adhesive Foil and incubate for 15 - 20 h (overnight) at 2 – 8 °C.
4. Remove the foil. Discard or aspirate the content of the wells. Wash the plate 4 x by adding 300 µL of Wash Buffer, discarding the content and blotting dry each time by tapping the inverted plate on absorbent material.
5. Pipette 100 µL of the Enzyme Conjugate into all wells.
6. Incubate for 30 min at RT (20 – 25 °C) on a shaker (approx. 500 rpm).
7. Discard or aspirate the content of the wells. Wash the plate 4 x by adding 300 µL of Wash Buffer, discarding the content and blotting dry each time by tapping the inverted plate on absorbent material.
8. Pipette 100 µL of the Substrate into all wells and incubate for 15 - 25 min at RT (20 – 25 °C) on a shaker (approx. 500 rpm). Avoid exposure to direct sunlight!
9. Add 100 µL of the Stop Solution to each well and shake the microtiter plate to ensure a homogeneous distribution of the solution.
10. Read the absorbance of the solution in the wells within 10 minutes, using a microplate reader set to 450 nm (if available a reference wavelength between 620 nm and 650 nm is recommended).

Calculation of results

Measuring range: L-Phenylalanine 10 – 390 µM

The calibration curve is obtained by plotting the absorbance readings (calculate the mean absorbance) of the standards (linear, y-axis) against the corresponding standard concentrations (logarithmic, x-axis). Use non-linear regression for curve fitting (e.g. spline, 4- parameter, akima).

Note: This assay is a competitive assay. This means: the OD-values are decreasing with increasing concentrations of the analyte. OD-values found below the standard curve correspond to high concentrations of the analyte in the sample. The concentrations of the samples and controls can be read directly from the standard curve.

Quality Control

The confidence limits of the kit controls are indicated on the COA.

Calculation

Method Comparison ELISA vs LC-MS - Plasma Sample

$[\text{L-Phenylalanine}]_{ELISA} = 0{,}9812*[\text{LPhenylalanine}]_{LC\text{-}MS} + 7{,}248$

$R^2 = 0{,}9946$

N = 40

Detection Limit

1.7 µM

Specificity

Substance Cross Reactivity (%)

L-Phenylalanine 100%

L-Tyrosine <2,5%

L-DOPA <1,5%

Dopamine hydrochloride <0,1%

Noradrenaline <0,1%

Precautions

(1)This kit is intended for professional use only. Users should have a thorough understanding of this protocol for the successful use of this kit. Only the test instruction provided with the kit is valid and has to be used to run the assay. Reliable performance will only be attained by strict and careful adherence to the instructions provided.

(2) This assay was validated for certain types of samples as indicated in Intended Use. Any off-label use of this kit is in the responsibility of the user and the manufacturer cannot be held liable.

(3) The principles of Good Laboratory Practice (GLP) have to be followed.

(4) In order to reduce exposure to potentially harmful substances, wear lab coats, disposable protective gloves and protective glasses where necessary.

(5) All kit reagents and specimens should be brought to room temperature and mixed gently but thoroughly before use. Avoid repeated freezing and thawing of reagents and specimens.

(6) For dilution or reconstitution purposes, use deionized, distilled or ultra-pure water.

(7) The microplate contains snap-off strips. Unused wells must be stored at 2 °C to 8 °C in the sealed foil pouch with desiccant and used in the frame provided.

(8) Duplicate determination of sample is highly recommended to be able to identify potential pipetting errors.

(9) Once the test has been started, all steps should be completed without interruption. Make sure that the required reagents, materials and devices are prepared ready at the appropriate time.

(10) Incubation times do influence the results. All wells should be handled in the same order and time intervals.

(11) To avoid cross-contamination of reagents, use new disposable pipette tips for dispensing each reagent, sample, standard and control.

(12) A standard curve must be established for each run.

(13) The controls should be included in each run and fall within established confidence limits. The confidence limits are listed in the COA.

(14) Do not mix kit components with different lot numbers within a test and do not use reagents beyond expiry date as shown on the kit labels.

(15) Avoid contact with Stop Solution containing 0.25 M H_2SO_4. It may cause skin irritation and burns. In case of contact with eyes or skin, rinse off immediately with water.

(16) TMB substrate has an irritant effect on skin and mucosa. In case of possible contact, wash eyes with an abundant volume of water and skin with soap and abundant water. Wash contaminated objects before reusing them.

(17) The expected reference values reported in this test instruction are only indicative. It is recommended that each laboratory establishes its own reference intervals.

(18) Kit reagents must be regarded as hazardous waste and disposed of according to national regulations.

Limitations

Any inappropriate handling of samples or modification of this test might influence the results. Samples containing precipitates or fibrin strands or which are haemolytic or lipemic might cause inaccurate results.