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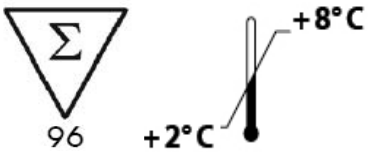
Manual

IDK® IDO activity ELISA

For the simultaneous in vitro determination of L-kynurenine and human EDTA plasma, serum and dried blood spots

Valid from 2019-10-10

REF **K 7726**



IVD CE

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1. INTENDED USE

This Immundiagnostik AG assay is intended for the quantitative determination of L-kynurenine and L-tryptophan in EDTA plasma, serum and dried blood spots. For *in vitro* diagnostic use only.

For rodent specimens (mouse, rat) and for cell culture supernatant and CSF we recommend our *IDK*® Kynurenine high sensitive ELISA K 3728 and our *IDK*® Tryptophan high sensitive ELISA K 3730.

2. INTRODUCTION

Indoleamine 2,3-dioxygenase catalyses the degradation of L-tryptophan (TRP) to L-kynurenine (KYN) and is the rate-limiting enzyme in this pathway. IDO activity is an important regulator of the innate and adaptive immune system. It plays an important role in fine-tuning of the immune system, e. g. during the development and proliferation of cancer.

The classic concept proposes that tumor cells or myeloid cells in the tumor microenvironment or draining lymph nodes express high levels of indoleamine 2,3-dioxygenase 1 (IDO1). This enzymatic activity results in the depletion of TRP in the local microenvironment and subsequent inhibition of T cell responses. At the same time, the produced L-kynurenine promotes the development of T reg cells [1]. As a result, tumors become resistant and survive immune attacks.

Numerous preclinical trials show that this immune tolerance pathway is active in cancer immunity [2]. Also, kynurenine is produced in most tumor tissues and has an important role in tumor immune resistance [3, 4].

In addition, if kynurenine levels are high, which means IDO activity is high, the outcome for patients after therapy is poor in different malignomas, i.e. colon cancer[5], lung cancer[6, 7], leukemia[8], Hodgkin lymphoma[9], cervical cancer[10].

Drugs targeting this pathway, specifically indoleamine 2,3-dioxygenase, have been developed in the last years. Those drugs aim at reverting cancer-induced immunosuppression and are already in clinical trials [11, 12].

This ELISA allows to measure L-tryptophan and L-kynurenine simultaneously in the sample. The KYN/TRP ratio indicates indoleamine 2,3-dioxygenase (IDO) activity.

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[1] Moon YW et al. (2015). Targeting the indoleamine 2,3-dioxygenase pathway in cancer. *Journal for ImmunoTherapy of Cancer*, 3(1):51.

[2] Zuo, H et al. (2016). Plasma Biomarkers of Inflammation, the Kynurenine Pathway, and Risks of All-Cause, Cancer, and Cardiovascular Disease Mortality. *American Journal of Epidemiology*, 183(4), 249–258.

[3] Platten M et al. (2015) Cancer Immunotherapy by Targeting IDO1/TDO and Their Downstream Effectors. *Frontiers in Immunology* 5: 673

[4] Van Baren N et al. (2015) Tryptophan-Degrading Enzymes in Tumoral Immune Resistance. *Frontiers in Immunology* 6:34

[5] Cavia-Saiz M. et al. (2014) The role of plasma IDO activity as a diagnostic marker of patients with colorectal cancer. *Molecular Biology Reports*, *41*:2275-2279

[6] Creelan BC et al. (2013) Indoleamine 2,3-dioxygenase activity and clinical outcome following induction chemotherapy and concurrent chemoradiation in Stage III non-small cell lung cancer. *Oncoimmunology*, *2* (March) e23428

[7] Chuang SC et al. (2014) Circulating biomarkers of tryptophan and the kynurenine pathway and lung cancer risk. *Cancer Epidemiology Biomarkers and Prevention*, *23*, 461-468

[8] Folgiero V et al. (2014) Indoleamine 2,3-dioxygenase 1 (IDO1) activity in leukemia blasts correlates with poor outcome in childhood acute myeloid leukemia. *Oncotarget*, *5*(8), 2052-64

[9] Choe J et al. (2014) Indoleamine 2,3-dioxygenase (IDO) is frequently expressed in stromal cells of Hodgkin lymphoma and is associated with adverse clinical features : a retrospective cohort study, *BMC Cancer 14*(1), 1-9

[10] Ferns DM et al. (2015) Indoleamine-2,3-dioxygenase (IDO) metabolic activity is detrimental for cervical cancer patient survival. *Oncoimmunology*. Feb 25;4(2)

[11] http://www.incyte.com/research/pipeline

[12] http://www.newlinkgenetics.com/development-pipeline

3. MATERIAL SUPPLIED

Cat. No.	Label	Kit Components	Quantity
K 7726	PLATE	Kynurenine plate: Microtiter plate, pre-coated with L-kynurenine derivative (red mark)	12 x 8 wells
K 7726	PLATE	Tryptophan plate: Microtiter plate, pre-coated with L-tryptophan derivative (yellow mark)	12 x 8 wells
K 7726	STD	Standards, ready-to-use (tryptophan: 0, 10, 20, 40, 80, 320 µmol/l, kynurenine: 0, 0.1, 0.3, 1, 3, 10 µmol/l)	6 x 200 µl
K 7726	CTRL 1	Control, ready-to-use (see specification for range)	1 x 200 µl
K 7726	CTRL 2	Control, ready-to-use (see specification for range)	1 x 200 µl
K 0006.C.100	WASHBUF A	Wash buffer concentrate, 10x	2 x 100 ml
K 7726	AB	L-kynurenine antibody, lyophilised (red mark)	1 x 1 vial
K 7726	AB	L-tryptophan antibody, lyophilised (yellow mark)	1 x 1 vial

K 7726	CONJ	Conjugate concentrate, peroxidase-labelled	2 x 65 µl
K 0010.13	CONJBUF	Conjugate stabilizing buffer, ready-to-use	2 x 13 ml
K 7726	REABUF	Reaction buffer, ready-to-use	1 x 110 ml
K 7726	DER	Derivatization reagent	4 x 25 mg
K 0008.07	DMSO	Dimethylsulfoxide (DMSO)	1 x 7 ml
K 0002.15	SUB	Substrate (tetramethylbenzidine), ready-to-use	2 x 15 ml
K 0003.15	STOP	Stop solution, ready-to-use	2 x 15 ml

For reorders of single components, use the catalogue number followed by the label as product number.

4. MATERIAL REQUIRED BUT NOT SUPPLIED

- Ultrapure water*
- Dried blood spot carrier such as DrySpot-ID cat. no. DZ9020ID or DZ9021ID
- Calibrated precision pipets and 10-1000 µl single use tips
- Foil to cover the microtiter plate
- Horizontal microtiter plate shaker
- Multi-channel pipets or repeater pipets
- Vortex
- Centrifuge, 3000 *g*
- Standard single use laboratory glass or plastic vials, cups, etc.
- Microtiter plate reader (required filters see chapter 7)

* Immundiagnostik AG recommends the use of ultrapure water (water type 1; ISO 3696), which is free of undissolved and colloidal ions and organic molecules (free of particles > 0.2 µm) with an electrical conductivity of 0.055 µS/cm at 25 °C (≥18.2 MΩ cm).

5. STORAGE AND PREPARATION OF REAGENTS

- To run the assay more than once, ensure that reagents are stored at the conditions stated on the label. **Prepare only the appropriate amount necessary for each assay**. The kit can be used up to 4 times within the expiry date stated on the label.
- Reagents with a volume less than **100 µl** should be centrifuged before use to avoid loss of volume.

- **Preparation of the wash buffer**: The **wash buffer concentrate (WASHBUF A)** has to be diluted with ultrapure water **1:10** before use (100 ml WASHBUF A + 900 ml ultrapure water), mix well. Crystals could occur due to high salt concentration in the concentrate. Before dilution, the crystals have to be redissolved at room temperature or in a water bath at 37 °C. The **WASHBUF A** is stable at **2-8 °C** until the expiry date stated on the label. **Wash buffer** (1:10 diluted WASHBUF A) can be stored in a closed flask at **2-8 °C for 1 month**.
- **DMSO** crystallises at 2-8 °C. Before use, bring to room temperature to dissolve the crystals.
- Reconstitute the content of one vial of **derivatisation reagent (DER)** (25 mg) **with 1.5 ml DMSO.** Allow to dissolve for 10 minutes and mix thoroughly with a vortex-mixer. The derivatisation reagent must be **prepared immediately before use**. When more than one vial is to be used, combine the contents and mix prior to use. Discard any rest of the reagent after use. Please note: DMSO attacks all plastics but not polypropylene products and laboratory glass.
- The **lyophilised L-kynurenine antibody (AB)** (red mark) is stable at **2-8 °C** until the expiry date stated on the label. Reconstitute the AB with **6 ml of wash buffer**. **L-kynurenine antibody** (reconstituted AB) **can be stored at 2-8 °C for 2 months.**
- The **lyophilised L-tryptophan antibody (AB)** (yellow mark) is stable at **2-8 °C** until the expiry date stated on the label. Reconstitute the AB with **6 ml of wash buffer**. **L-tryptophan antibody** (reconstituted AB) **can be stored at 2-8 °C for 2 months.**
- **Preparation of the conjugate**: Before use, the conjugate concentrate has to be diluted **1:201** with **conjugate stabilizing buffer (CONJBUF)** (e.g. 60 µl CONJ + 12 ml CONJBUF, prepare only the required amount). The CONJ is stable at **2-8 °C** until the expiry date stated on the label. **Conjugate** (1:201 diluted CONJ) **can be stored at 2-8 °C for 1 month.**
- All other test reagents are ready-to-use. Test reagents are stable until the expiry date (see label) when stored at **2-8 °C.**

6. STORAGE AND PREPARATION OF SAMPLES

EDTA plasma and serum samples

In the samples, kynurenine and tryptophan are stable for 72 h at 2-8 °C or at room temperature. For longer storage keep samples frozen at -20 °C.

Samples are used **undiluted**.

For sample preparation, a derivatisation reagent (DER) for derivatisation of kynurenine and tryptophan is added (see derivatisation procedure).

Dried blood spots

Collection and storage of dried blood spots

50 µl whole blood dripped on a dried sample carrier cleared by Immundiagnostik AG are suitable as sample material after complete drying. We recommend DrySpot-ID (catalogue no. DZ9020ID or DZ9021ID) as dried blood spot carrier. The moistened cards are stable for 8 days at room temperature. For longer storage, store at -20°C in a dry place.

For sample preparation, a derivatisation reagent is added (see derivatisation procedure).

7. ASSAY PROCEDURE

Principle of the test

This ELISA is designed for the quantitative determination of L-kynurenine and L-tryptophan. The assay is based on the method of competitive enzyme linked immunoassays.

The sample preparation includes the addition of a derivatisation reagent for derivatisation of kynurenine and tryptophan. Afterwards, the treated standards, controls and samples are incubated in the wells of two microtiter plates coated with

(I) L-kynurenine-derivative (tracer) (red mark),

(II) L-tryptophan-derivative (tracer) (yellow mark).

Also, a polyclonal L-kynurenine antiserum and a polyclonal L-tryptophan antiserum is added respectively. During the incubation period, the target antigen in the sample competes with the tracer, immobilized on the wall of the microtiter wells, for the binding of the polyclonal antibodies.

In the second incubation step, a peroxidase-conjugated antibody is added to each microtiter well to detect the polyclonal antibodies. After washing away the unbound components, tetramethylbenzidine (TMB) is added as a peroxidase substrate. Finally, the enzymatic reaction is terminated by an acidic stop solution. The color changes from blue to yellow and the absorbance is measured in the photometer at 450 nm. The intensity of the yellow color is inverse proportional to the target antigen concentration in the sample. This means, high L-kynurenine or

L-tryptophan concentration in the sample reduces the concentration of tracer-bound antibodies and lowers the photometric signal. A dose response curve of absorbance unit (optical density, OD at 450 nm) vs. standard concentration is generated, using the values obtained from the standards. L-kynurenine and L-tryptophan, present in the patient samples, are determined directly from this curves.

Derivatisation procedure

Bring **all reagents and samples to room temperature** (15-30 °C) and mix well.

Derivatisation of standards, controls and samples is carried out in single analysis in 1.5 ml polypropylene tubes.

We recommend preparing one derivatisation per standard, control and sample and transferring it in duplicate determinations into the wells of the microtiter plate.

EDTA plasma and serum samples, standards and controls

1.	Add **25 µl standard** (STD)/**control** (CTRL)/**sample** in labelled 1.5 ml polypropylene tubes.
2.	Add **1 ml reaction buffer** (REABUF) into each tube (STD, CTRL, sample).
3.	Add **50 µl** of freshly prepared **derivatisation reagent** into each tube (STD, CTRL, sample) and **mix thoroughly** by repeated inversion or several seconds on a vortex mixer.
4.	Incubate for **45 min** at room temperature (15-30°C) on a **horizontal shaker**.

2 x 50 µl of the derivatised standards, controls and samples are used in the ELISA as duplicates.

Dried blood spots, standards and controls

1.	Remove filter from sampling device and put it in a labelled 1.5 ml polypropylene tube. Add **1 ml reaction buffer** (REABUF) to each sample, mix thoroughly. Allow sample to stand for **30 min** at room temperature (15-30°C), afterwards mix thoroughly.

2.	Add **25 µl standard** (STD)/**control** (CTRL) in labelled 1.5 ml polypropylene tubes. Add **1 ml reaction buffer** (REABUF) to the standards and controls.
3.	Add **50 µl** of freshly prepared **derivatisation reagent** into each tube (STD, CTRL, sample) and **mix thoroughly** by repeated inversion or several seconds on a vortex mixer.
4.	Incubate for **45 min** at room temperature (15-30°C) on a **horizontal shaker.**

2 x 50 µl of the derivatised standards, controls and samples are used in the ELISA as duplicates.

Test procedure

Mark the positions of standards/controls/samples in duplicate on a protocol sheet.

Take as many microtiter strips (PLATE) as needed from the kit. Store unused strips covered with foil at 2-8 °C. Strips are stable until expiry date stated on the label.

(I) Kynurenine plate (red):

1.	**Before use**, wash the wells **5 times** with **250 µl wash buffer**. After the final washing step, remove residual wash buffer by firmly tapping the plate on absorbent paper.
2.	For the analysis in duplicate take **2 x 50 µl** of the **derivatised standards/ controls/ samples** out of the tubes and add into the respective wells of the plate.
3.	Add **50 µl L-kynurenine antibody** into each well.

(II) Tryptophan plate (yellow):

4.	**Do not wash the plate.**
5.	For the analysis in duplicate take **2 x 50 µl** of the **derivatised standards/ controls/ samples** out of the tubes and add into the respective wells of the plate.
6.	Add **50 µl L-tryptophan antibody** into each well.

4.	Cover the strips tightly and incubate for **2 hours at room temperature** (15-30°C) on a **horizontal shaker**, or incubate over night at 2-8 °C.
5.	Discard the content of each well and wash **5 times** with **250 µl wash buffer**. After the final washing step, remove residual wash buffer by firmly tapping the plate on absorbent paper.

6.	Add **100 µl conjugate** into each well.
7.	Cover the strips and incubate for **1 hour** at **room temperature** (15-30 °C) on a **horizontal shaker**.
8.	Discard the content of each well and wash **5 times** with **250 µl wash buffer**. After the final washing step, remove residual wash buffer by firmly tapping the plate on absorbent paper.
9.	Add **100 µl substrate** (SUB) into each well.
10.	Incubate for **10-15 min*** **at room temperature** (15-30 °C) in the **dark.**
11.	Add **100 µl stop solution** (STOP) into each well and mix well.
12.	Determine **absorption immediately** with an ELISA reader at **450 nm** against 620 nm (or 690 nm) as a reference. If no reference wavelength is available, read only at 450 nm. If the extinction of the highest standard exceeds the range of the photometer, absorption must be measured immediately at **405 nm** against 620 nm (690 nm) as a reference.

* The intensity of the colour change is temperature sensitive. We recommend observing the colour change and stopping the reaction upon good differentiation.

For automated ELISA processors, the given protocol may need to be adjusted according to the specific features of the respective automated platform. For further details please contact your supplier or Immundiagnostik AG.

8. RESULTS

The following algorithms can be used alternatively to calculate the results. We recommend using the 4 parameter algorithm.

1. **4 parameter algorithm**

   It is recommended to use a linear ordinate for optical density and a logarithmic abscissa for concentration. When using a logarithmic abscissa, the zero standard must be specified with a value less than 1 (e.g. 0.001).

2. **Point-to-point calculation**

   We recommend a linear ordinate for optical density and a linear abscissa for concentration.

3. Spline algorithm

We recommend a linear ordinate for optical density and a linear abscissa for concentration.

The plausibility of the duplicate values should be examined before the automatic evaluation of the results. If this option is not available with the program used, the duplicate values should be evaluated manually.

EDTA plasma and serum

No factor is required.

In case another dilution factor has been used, multiply the obtained result by the dilution factor used.

Dried blood spots

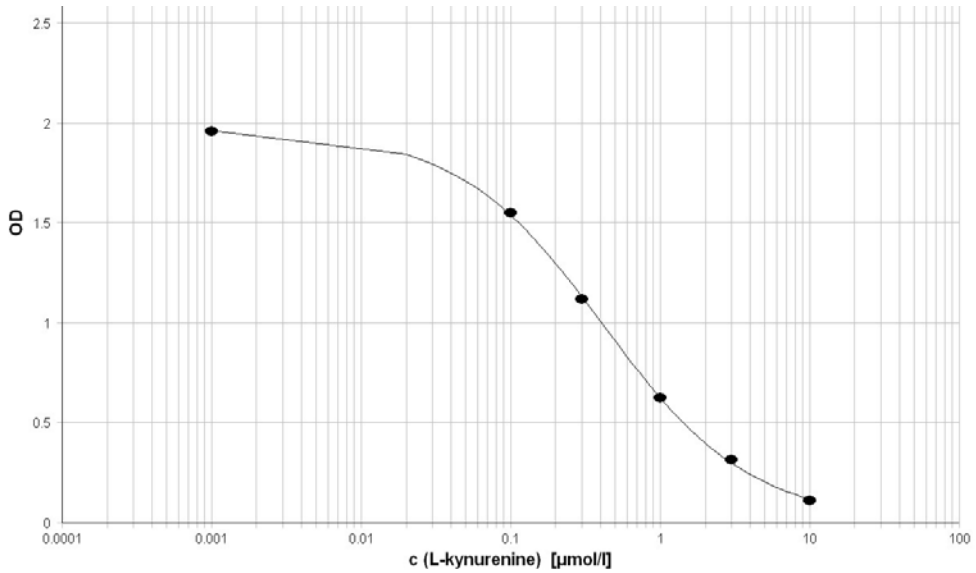
Kynurenine

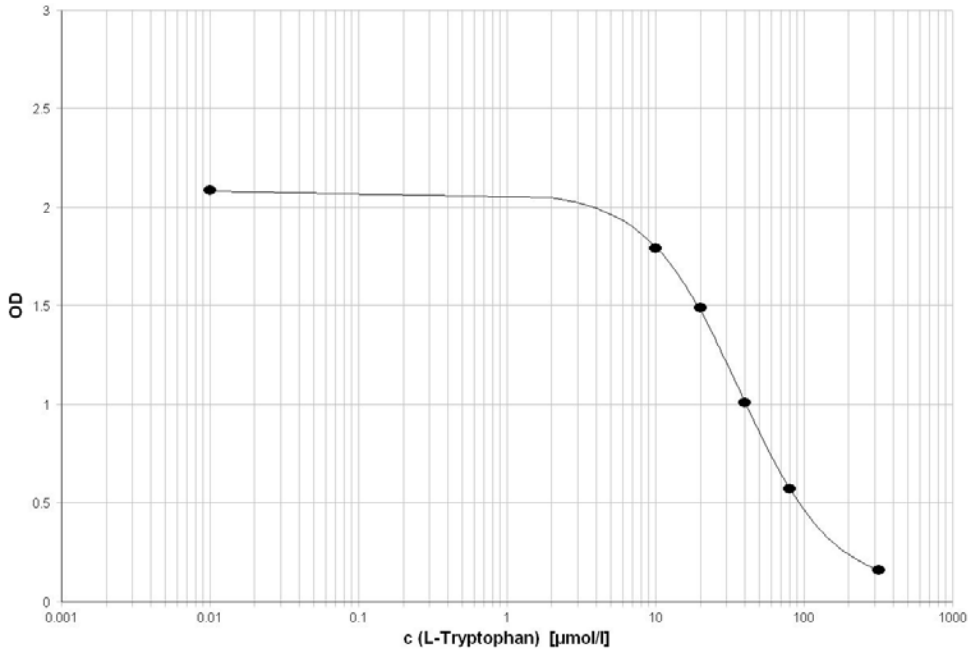
The obtained results have to be multiplied by the **factor of 2** to get the actual concentrations.

Tryptophan

The obtained results have to be multiplied by the **factor of 1.5** to get the actual concentrations.

In the following, examples of standard curves are given. Do not use them for the calculation of your results.





9. LIMITATIONS

Samples with concentrations above the measurement range must be with reaction buffer and re-assayed. Please consider this dilution factor when calculating the results.

Samples with concentrations lower than the measurement range cannot be clearly quantified.

The upper limit of the measurement range can be calculated as:

highest concentration of the standard curve × sample dilution factor to be used

The lower limit of the measurement range can be calculated as:

LoB × sample dilution factor to be used

LoB see chapter "Performance Characteristics".

Biotin interference

Samples containing a biotin concentration of < 133 ng/ml show a change of the results of ≤ 25 %. Higher concentrations of biotin can lead to falsely low results. Patients taking > 5 mg biotin per day should wait at least 24 hours after taking biotin to have their samples collected. Results of patients taking biotin supplements or receiving a high-dose biotin therapy should generally be interpreted along with the total clinical picture.

10. QUALITY CONTROL

Immundiagnostik AG recommends the use of external controls for internal quality control, if possible.

Control samples should be analysed with each run. Results, generated from the analysis of control samples, should be evaluated for acceptability using appropriate statistical methods. The results for the patient samples may not be valid if within the same assay one or more values of the quality control samples are outside of the acceptable limits.

Reference Range

The normal range was generated from data of the Hordaland Health Study[1]. Based on the results of 5,519 persons[2] the following values for the IDO activity (ratio kynurenine/tryptophan) were calculated:

Median:	21.6 µmol/mmol
10th percentile:	15 µmol/mmol
90th percentile:	31 µmol/mmol

We recommend each laboratory to establish its own reference range.

11. PERFORMANCE CHARACTERISTICS

Precision and reproducibility

Kynurenine in plasma or serum

Repeatability (Intra-Assay); n = 14

The repeatability was assessed with 2 samples under constant parameters (same operator, measurement system, day and kit lot) in single determinations.

sample	L-kynurenine [µmol/l]	CV [%]
1	0.82	7.6
2	2.86	6.2

[1] Zuo H et al (2016): Plasma Biomarkers of Inflammation, the Kynurenine Pathway, and Risks of All-Cause, Cancer, and Cardiovascular Disease Mortality. *American Journal of Epidemiology*. 2016;**183**(4):249-258

[2] The study included 7,015 subjects. However, only the patients who were still alive at the conclusion of the study (after 14 years) were included in the assessment of the statistical data.

Reproducibility (Inter-Assay); n = 8

The reproducibility was assessed with 2 samples under varying parameters (different operators, measurement systems, days and kit lots) in duplicate determinations.

sample	L-kynurenine [µmol/l]	CV [%]
1	0.80	9.2
2	2.80	6.2

Kynurenine in dried blood spot

Repeatability (Intra-Assay); n = 10

The repeatability was assessed with 2 samples on 10 dried blood spot carriers each, under constant parameters (same operator, measurement system, day and kit lot) in duplicate determinations.

sample	L-kynurenine [µmol/l]	CV [%]
1	2.01	7.1
2	3.01	10.2

Reproducibility (Inter-Assay); n = 12

The reproducibility was assessed with 2 samples on 12 dried blood spot carriers each, under varying parameters (different operators, measurement systems, days and kit lots) in duplicate determinations.

sample	L-kynurenine [µmol/l]	CV [%]
1	1.22	12.6
2	2.78	8.9

Tryptophan in plasma or serum

Repeatability (Intra-Assay); n = 14

The repeatability was assessed with 2 samples under constant parameters (same operator, measurement system, day and kit lot) in single determinations.

sample	L-tryptophan [µmol/l]	CV [%]
1	51.4	4.3
2	105.7	6.9

Reproducibility (Inter-Assay); n = 7

The reproducibility was assessed with 2 samples under varying parameters (different operators, measurement systems, days and kit lots) in duplicate determinations.

sample	L-tryptophan [µmol/l]	CV [%]
1	63.7	8.4
2	60.6	9.1

Tryptophan in dried blood spot

Repeatability (Intra-Assay); n = 10

The repeatability was assessed with 2 samples on 10 dried blood spot carriers each, under constant parameters (same operator, measurement system, day and kit lot) in duplicate determinations.

sample	L-tryptophan [µmol/l]	CV [%]
1	47.8	10.2
2	70.9	9.8

Reproducibility (Inter-Assay); n = 12

The reproducibility was assessed with 2 samples on 12 dried blood spot carriers each, under varying parameters (different operators, measurement systems, days and kit lots) in duplicate determinations.

sample	L-tryptophan [µmol/l]	CV [%]
1	53.0	6.2
2	82.1	10.6

Spiking recovery

Kynurenine

Three serum samples were spiked with different L-kynurenine concentrations and measured in this assay (n = 2). The mean recovery rate was 102.5 %.

sample [µmol/l]	spike [µmol/l]	expected [µmol/l]	measured [µmol/l]	recovery [%]
2.48	1.5	3.98	4.49	112.8
	3.0	5.48	5.92	108.0
1.98	1.5	3.48	3.56	102.3
	3.0	4.98	4.81	96.6
2.03	1.5	3.53	3.45	97.7
	3.0	5.03	4.99	97.4

Tryptophan

2 plasma samples and 1 serum were spiked with different L-tryptophan concentrations and measured in this assay (n = 2). The mean recovery rate for all concentrations was 97.2 %.

sample [µmol/l]	spike [µmol/l]	expected [µmol/l]	measured [µmol/l]	recovery [%]
66.8	50	116.8	108.0	92.5
	100	166.8	151.1	90.6
64.1	50	114.1	122.1	107.0
	100	164.1	184.9	112.7
69.9	50	119.9	112.8	94.2
	100	169.9	146.9	86.5

Dilution recovery

Kynurenine

Two serum samples were diluted and analysed. The mean recovery rate was 100.3 % (n = 2).

sample [µmol/l]	dilution	expected [µmol/l]	measured [µmol/l]	recovery [%]
2.319	1:2	1.160	1.099	94.8
	1:3	0.773	0.748	96.8
	1:4	0.580	0.498	85.9
2.581	1:2	1.291	1.297	100.5
	1:3	0.860	0.877	101.9
	1:4	0.645	0.594	92.1
2.097	1:2	1.049	1.196	114.1
	1:3	0.699	0.822	117.6
	1:4	0.524	0.520	99.2

Tryptophan

2 serum samples were diluted and measured in this assay. The mean recovery was 96.8 % (n = 2).

sample [µmol/l]	dilution	expected [µmol/l]	measured [µmol/l]	recovery [%]
91.5	1:2	45.8	46.7	102.0
	1:3	30.5	27.5	90.1
	1:4	22.9	22.7	99.4
	1:5	18.3	17.7	96.6
89.6	1:2	44.8	41.2	91.9
	1:3	29.9	25.2	84.5
	1:4	22.4	21.9	97.6
	1:5	17.9	21.1	117.5

Analytical sensitivity

Kynurenine

Limit of blank, LoB 0.076 µmol/l

Limit of detection, LoD 0.12 µmol/l

Limit of quantitation, LoQ 0.18 µmol/l

The evaluation was performed according to the CLSI guideline EP-17-A2. The specified accuracy goal for the LoQ was 15 % CV.

Tryptophan

Limit of blank, LoB	4.9 µmol/l
Limit of detection, LoD	8.0 µmol/l
Limit of quantitation, LoQ	10.0 µmol/l

The evaluation was performed according to the CLSI guideline EP-17-A2. The specified accuracy goal for the LoQ was 15 % CV.

Specificity

Kynurenine

The specificity of the antibody was tested by measuring the cross-reactivity against a range of compounds with structural similarity to L-kynurenine. The specificity is calculated in percent in relation to the L-kynurenine binding activity:

3-HK (3-hydroxy-DL-kynurenine)	< 0.5 %
L-tryptophan	< 0.08 %
5-HTP (5-hydroxytryptophan)	< 0.01 %
Serotonin (5-HT, 5-hydroxytryptamine)	< 0.01 %
5-HIAA (5-hydroxyindoleacetic acid)	< 0.01 %
Quinolinic acid	< 0.01 %
Kynurenic acid	< 0.01 %
Picolinic acid	< 0.01 %

Tryptophan

The specificity of the antibody was tested by measuring the cross-reactivity against a range of compounds with structural similarity to L-tryptophan. The specificity is calculated in percent in relation to the L-tryptophan binding activity:

5-HTP (5-hydroxytryptophan)	< 0.5 %
L-phenylalanine	< 0.1 %
L-tyrosine	< 0.1 %

12. PRECAUTIONS

- All reagents in the kit package are for *in vitro* diagnostic use only.
- Human materials used in kit components were tested and found to be negative for HIV, Hepatitis B and Hepatitis C. However, for safety reasons, all kit components should be treated as potentially infectious.

- Kit reagents contain sodium azide or ProClin as bactericides. Sodium azide and ProClin are toxic. Substrates for the enzymatic color reactions are toxic and carcinogenic. Avoid contact with skin or mucous membranes
- The stop solution consists of sulfuric acid, which is a strong acid. Although diluted, it still must be handled with care. It can cause burns and should be handled with gloves, eye protection, and appropriate protective clothing. Any spills should be wiped up immediately with copious quantities of water. Do not breathe vapour and avoid inhalation.

13. TECHNICAL HINTS

- Do not interchange different lot numbers of any kit component within the same assay. Furthermore, we recommend not assembling wells of different microtiter plates for analysis, even if they are of the same batch.
- Control Samples should be analysed with each run.
- Reagents should not be used beyond the expiration date stated on the kit label.
- Substrate solution should remain colourless until use.
- To ensure accurate results proper adhesion of plate sealers during incubation steps is necessary.
- Avoid foaming when mixing reagents.
- Do not mix plugs and caps from different reagents.
- The assay should always be performed according to the enclosed manual.

14. GENERAL NOTES ON THE TEST AND TEST PROCEDURE

- This assay was produced and distributed according to the IVD guidelines of 98/79/EC.
- The guidelines for medical laboratories should be followed.
- *IDK*® is a trademark of Immundiagnostik AG.
- Incubation time, incubation temperature, and pipetting volumes of the different components are defined by the producer. Any variation of the test procedure, which is not coordinated with the producer, may influence the results of the test. Immundiagnostik AG can therefore not be held responsible for any damage resulting from incorrect use.

- Warranty claims and complaints regarding deficiencies must be logged within 14 days after receipt of the product. The product should be sent to Immundiagnostik AG along with a written complaint.

15. REFERENCES

General Literature

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Used symbols:


Temperature limitation

Catalogue Number

In Vitro Diagnostic Medical Device

To be used with


Manufacturer

Contains sufficient for <n> tests

Lot number


Use by


Attention


Consult instructions for use

Consult specification data sheet