

Order references

Reagents

REF		CONT
CETUR-B00	Universal kit	1 x 50 ml R1 + 1 x 5 ml R2
CETUR-H00	Universal kit	2 x 50 ml R1 + 1 x 15 ml R2
CETUR-C00	Universal kit	1 x 14 ml R1 + 1 x 2,8 ml R2

Other necessary products

REF		CONT
MPREK-000	Multiparametric Calibrators Kit (5 Levels)	5 x 1 ml
MPREH-001	Multiparametric High Calibrator	1 x 1 ml
MPREH-005	Multiparametric High Calibrator	1 x 5 ml
MPCOS-002	Multiparametric Low Control	1 x 2 ml
MPCON-002	Multiparametric Medium Control	1 x 2 ml
MPCOX-002	Multiparametric High control	1 x 2 ml

Field of application - Purpose

In vitro diagnostic reagent for the quantitative determination of ceruloplasmin in samples of human origin by immunoturbidimetry on photometric systems.

Medical benefit - Scientific validity

Ceruloplasmin is predominantly synthesized by the cells of the liver parenchyma. This protein is an α_2 -globulin containing approximately 95% of the copper present in the serum. Each ceruloplasmin molecule contains between six and eight copper atoms. That is why it has long been thought that ceruloplasmin only served to transport this ion. However, it has been demonstrated that ceruloplasmin plays a major role in the regulation of the ionic state of iron: oxidizing ferrous iron to ferric iron at the cell surface, ceruloplasmin enables the incorporation of iron in transferrin without forming a toxic compound.

Ceruloplasmin is often assayed in evaluating for Wilson's disease, where the ceruloplasmin level is drastically low. Low levels of ceruloplasmin can also be detected in case of malnutrition or poor copper absorption.

Ceruloplasmin levels may increase during pregnancy or when taking oral contraceptives. Moreover, ceruloplasmin is a late protein of the inflammatory phase; its rate increases between four and twenty days after an inflammatory phase.

Method principle

The ceruloplasmin contained in the sample to assay reacts specifically with anti-human ceruloplasmin antiserum and the turbidity induced by the formation of the antigen-antibody immune complex is measured at 340 nm and 700 nm. The measured turbidity is proportional to the ceruloplasmin concentration contained in the sample.

Warning and precautions

- For in vitro diagnostic use only.
- Must be handled by qualified personnel under the responsibility of a biologist.
- The human-origin products have been screened and found negative for HIV 1 and 2 antibodies, HCV antibodies and HBAg, but they must nevertheless be handled as potentially infectious products.
- These products contain sodium azide. Products containing sodium azide must be handled with care: avoid ingestion and contact with the skin or mucous membranes.

- Sodium azide becomes explosive on contact with heavy metals such as copper or lead.

Samples

Collection conditions

Collect specimens using standard laboratory techniques; use only suitable procedures, tubes or collection containers.

Sample type

Fresh serum and plasma (Heparin or EDTA).

Storage and stability of specimens

Temperature	Stability
- 20 °C	≤ 1 year
4 - 8 °C	≤ 2 weeks
20 - 25 °C	≤ 8 days

This information comes from data originating from "Tietz Clinical Guide to Laboratory Tests" and from "WHO".

Reagents

Composition and concentrations/Storage

Active ingredients :

Reagent R1: none.

Reagent R2: anti-human ceruloplasmin goat antiserum (titer \pm 0,5 mg/ml).

Other ingredients :

Reagent R1: buffer, polymer, inorganic salt and preservative.

Reagent R2: buffer, inorganic salt and preservative.

Storage temperature :

Reagent R1: 2 - 25°C.

Reagent R2: 2 - 8°C.

Preparation

Ready to use.

Storage and stability

Reagents are stable until the expiration date printed on the packaging (months passed), under the following recommended storage and handling conditions:

- Unopened vial stored at temperature indicated on packaging.
- Opened vial: closed immediately after use or placed on closed analyser intended for this purpose, not contaminated by handling and stored at the temperature indicated on the packaging.

Note:

- Do not freeze the reagents.
- Nanoparticle-based reagents can settle over time. It may be necessary to delicately mix by repeated turning.

Other materials required

Usual laboratory equipment including an analytical system equipped with a photometric detector.

Calibration

Calibration

The calibration curve is performed by using the calibration kit indicated in the "Order references" section. The zero point of the calibration curve is performed with physiological saline solution.

Traceability

The method has been standardised with a benchmark method traceable to the international standard as described in the associated calibrators data sheet (see the "Order references" section).

Calibrate the method when the reagent batch number changes or in case of change in performance (contact the manufacturer if the changes persist) or if quality control requires it.

Quality control

The frequency of controls and the confidence limits must be adapted to the laboratory requirements. The results must be within the defined confidence limits. Each laboratory shall establish corrective measures to be taken if results fall outside the defined limits. Comply with current legislation in the country and local guidelines relating to quality control.

The calibration curve and its stability can be validated using the control materials indicated in the "Order references" section.

Reference values

	Reference values
< 4 months	150 - 560 mg/L
5 - 6 months	260 - 830 mg/L
7 - 36 months	310 - 900 mg/L
4 - 12 years	250 - 450 mg/L
13 - 19 years (men)	150 - 370 mg/L
13 - 9 years (women)	220 - 500 mg/L
Adult (men)	220 - 400 mg/L
Adult (women)	250 - 600 mg/L (non oral contraceptive) 270 - 660 mg/L (oral contraceptive) 300 - 1200 mg/L (pregnant)

International units: mg/L

Conventional units: g/L

This information comes from data originating from "Tietz Clinical Guide to Laboratory Tests" and from "WHO".

Analytical performances

The analytical performance data below are given as an indication. The results obtained in the laboratory may differ from these. The analytical performances were determined following the indications of the "Guide technique d'accréditation de vérification (Portée A)/validation (Portée B) des méthodes en biologie médicale"; document SH GTA 04 Révision 01.

Measurement range

9,48 - 1051,2 mg/L

The measurement range is bounded by the quantification and linearity limits. Samples having a concentration greater than the upper limit must be diluted.

Limit of detection

3,45 mg/L

It is the smallest signal expressed as a quantity or concentration that can be distinguished with a given probability from a reagent blank performed in the same conditions.

The evaluation of the limit of detection is based on the statistical analysis of the observed signal differences between the blanks and samples.

Interferences (Analytical specificity)

There is no known cross-reactivity of the antiserum cited or the antibodies used.

The abnormally coloured and particle-containing samples can cause, depending on the analytical system, assay errors. These samples must be clarified chemically or physically before their assay.

Precision

The precision is evaluated using the repeatability (CV within-run) and reproducibility (CV within-calibration).

	Repeatability (n=30)		Reproducibility (n=30)	
	Average (mg/L)	CV (%)	Average (mg/L)	CV (%)
Level 1	246,3	0,61	188,8	3,02
Level 2	396,4	0,63	361,1	1,55
Level 3	520,1	0,72	487,1	1,28

Trueness - Accuracy

Trueness, quantified by the bias, is estimated by comparing the mean obtained in the intermediate precision study, based on internal quality control samples, with the expected target value equated to the "true" value of the tested sample.

Accuracy is defined as the closeness of agreement between a measured value and a true value of a measurand (quantity to be measured).

DiAgam allows a bias of 5% compared to the international standard or compared to a reference method traceable to the international standard when it exists.

Limitations of the method

The results of this test should always be interpreted in relation to the patient's medical history, clinical signs and other findings.

Prozone

By limiting the linearity to the value of the upper limit of the measurement range, no excess antigen effect was observed for samples with a concentration up to 2160 mg/L.

Matrix effect

The inter-laboratory control samples and controls can yield different results from those obtained with other assay methods because of a matrix effect. In this case, an analysis of the results according to specific target values of the method utilised may be necessary. If in doubt, contact the manufacturer.

Utilisation procedure

Validated automatic applications for different analyzers are available from DiAgam. The utilisation procedure indicated below enables deriving a manual or automatic application of the reagent (NB - comply with the sample/R1/R2 ratios correctly). Please contact the manufacturer for more information.

Mix 5 µl of sample with 250 µl of reagent R1 and incubate the mixture for 5 minutes at 37°C. Then read the optical density at a wavelength of 340 nm (primary wavelength) (OD1 340 nm) and at a wavelength of 700 nm (secondary wavelength) (OD1 700 nm). Then add 50µl of reagent R2 to the reaction mix and incubate at 37°C for 5 min. Perform a second OD measurement at 340 nm (OD2 340 nm) and 700 nm (OD2 700 nm).

This operation must be made with a "reagent blank" sample (physiological saline solution, considered as point zero of the calibration curve), with the calibrators indicated in the "Order references" section and to finish with the samples of unknown concentrations.

In order to obtain the final OD of the sample, it is first necessary to calculate the intermediate ODs as indicated in the following equations:

$OD1\ intermediate = OD1(340\ nm) - OD1(700\ nm)$

$OD2\ intermediate = OD2(340\ nm) - OD2(700\ nm)$

The final OD is finally calculated as shown in the following equation:

$OD\ final = OD2\ intermediate - f \times OD1\ intermediate$

Where f is a factor taking account of the difference in volume between the 2 measurements of OD.






















The final OD of the "reagent blank" sample as well as the known calibrator concentrations allows a calibration curve to be drawn. The transfer of the OD measured for an unknown sample on this calibration curve enables its concentration to be determined.


Literature

1. Tietz Textbook of Clinical chemistry and molecular Diagnostics, fourth edition, edited by Carl A. Burtis, Edward R. Ashwood, David E. Bruns, 2006
2. Use of Anticoagulants in Diagnostic Laboratory Investigations & Stability of blood, plasma and serum samples. Publication WHO/DIL/LAB/99.1 Rev. 2. Jan. 2002.
3. Clinical guide to laboratory tests, second edition, edited by Norbert W. Tietz, 1990
4. CLSI. Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard-Sixth Edition. CLSI document H3-A6 (ISBN 1-56238-650-6). CLSI, 940 West Valley Road, Suite 1400, Wayne, PA 19087-1898 USA; 2007.
5. NCCLS. Procedures and Devices for the Collection of Diagnostic Capillary Blood Specimens; Approved Standard-Fifth Edition. NCCLS document H4-A5 [ISBN 1-56238-538-0]. CLSI, 940 West Valley Road, Suite 1400, Wayne, PA 19087-1898 USA, 2004.

Symbols legend

The following symbols may appear on the packaging and the label:

	<i>Batch code</i>		<i>Buffer</i>
	<i>Use until</i>		<i>Calibrator</i>
	<i>Manufacturer</i>		<i>High</i>
	<i>In vitro diagnostic medical device</i>		<i>Moderate</i>
	<i>Temperature (Storage at)</i>		<i>Low</i>
	<i>Catalogue reference</i>		<i>4 levels</i>
	<i>Read the usage instructions</i>		<i>5 levels</i>
	<i>Reagent</i>		<i>6 levels</i>
	<i>Kit</i>		<i>Control</i>
	<i>Content</i>		<i>This product meets the requirements of European Directive 98/79 EC concerning in vitro diagnostic medical devices</i>
	<i>Antibody or Antisera</i>		

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