Magnesium XL FS*

Diagnostic reagent for quantitative in vitro determination of magnesium in serum, plasma, cerebrospinal fluid or urine on photometric systems

Order Information

Cat. No.	Kit size		
1 4610 99 10 021	R 5 x	25 mL	+ 1 x 3 mL Standard
1 4610 99 10 026	R 6 x	100 mL	
1 4610 99 10 704	R 8 x	50 mL	
1 4610 99 10 930	R 6 x	20 mL	
1 4610 99 90 314	R 12 x	25 mL	
1 4600 99 10 030	6 x	3 mL	Standard

Summary

Deficiency of magnesium is a quite common disorder which can be caused by malnutrition, malabsorption, renal loss and endocrinological disturbances. Complications associated with decreased magnesium concentrations are neuromuscular irritability (e.g. tremor, seizures) and cardiac symptoms (e.g. tachycardia, arrhythmia). Decreased magnesium concentrations are often related to decreased calcium and potassium levels, taking into account that hypomagnesemia may be the primary cause of hypocalcemia. Elevated magnesium values can be observed in dehydration, renal disorders and after intake of excessive amounts of antacids and can be associated with weakness of reflexes and low blood pressure [1,2].

Method

Photometric test using xylidyl blue

Principle

Magnesium ions form a purple colored complex with xylidyl blue in alkaline solution. In presence of GEDTA, which complexes calcium ions, the reaction is specific. The intensity of the purple color is proportional to the magnesium concentration.

Reagents

Components and Concentrations

Reagent:		
Ethanolamine	pH 11.0	750 mmol/L
GEDTA (Glycoletherdiamine-tetraacetic acid)		60 µmol/L
Xylidyl blue		110 µmol/L
Standard:		2 mg/dL (0.82 mmol/L)

Storage Instructions and Reagent Stability

The reagent is stable up to the end of the indicated month of expiry, if stored at 2 – 8 °C and contamination is avoided. Do not freeze the reagent!
The standard is stable up to the indicated month of expiry, if stored at 2 – 25 °C.

Warnings and Precautions

1. Reagent 1 Danger. H315 Causes skin irritation. H318 Causes serious eye damage. P280 Wear protective gloves/protective clothing/eye protection/face protection. P302+P352 If on skin: Wash with plenty of water/soap. P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308+P313 If exposed or concerned: Get medical advice/attention.
2. In very rare cases, samples of patients with gammopathy might give falsified results [8].
3. Please refer to the safety data sheets and take the necessary precautions for the use of laboratory reagents. For diagnostic purposes, the results should always be assessed with the patient's medical history, clinical examinations and other findings.
4. For professional use only!

Waste Management

Please refer to local legal requirements.

Reagent Preparation

The reagent and the standard are ready to use.

Materials required but not provided

NaCl solution 9 g/L
General laboratory equipment

Specimen

Serum, plasma, cerebrospinal fluid (CSF) or urine
Do not use EDTA plasma.

Stability [3]:

in serum/plasma:	7 days	at	20 – 25 °C
	7 days	at	4 – 8 °C
	1 year	at	–20 °C
in urine:	3 days	at	20 – 25 °C
	3 days	at	4 – 8 °C
	1 year	at	–20 °C

Acidify urine with some drops of conc. HCl to pH 3-4, then dilute 1+4 with dist. water; multiply the result by 5.
Freeze only once!
Discard contaminated specimens!

Assay Procedure

Application sheets for automated systems are available on request.

Wavelength	520 nm, Hg 546 nm, 500 - 550 nm (Increase of absorbance) 628 nm, Hg 623 nm, 570 - 650 nm (Decrease of absorbance)
Optical path	1 cm
Temperature	20 – 25 °C/37 °C
Measurement	Against reagent blank

	Blank	Sample or standard
Sample or standard	-	10 µL
Dist. water	10 µL	-
Reagent	1000 µL	1000 µL

Mix and read absorbance against blank after 5-60 min. at 20 – 25 °C/37 °C.

* fluid stable

Calculation

With standard or calibrator

$$\text{Magnesium [mg/dL]} = \frac{A\ \text{Sample}}{A\ \text{Std./Cal.}} \times \text{Conc. Std./Cal. [mg/dL]}$$

Conversion factor
Magnesium [mg/dL] x 0.4114 = Magnesium [mmol/L]

Calibrators and Controls

For the calibration of automated photometric systems the DiaSys TruCal U calibrator is recommended. The assigned values of the calibrator have been made traceable to the reference method Atomic Absorption Spectrometry (AAS). DiaSys TruLab N and P or TruLab Urine controls should be assayed for internal quality control. Each laboratory should establish corrective actions in case of deviations in control recovery.

	Cat. No.	Kit size
TruCal U	5 9100 99 10 063	20 x 3 mL
	5 9100 99 10 064	6 x 3 mL
TruLab N	5 9000 99 10 062	20 x 5 mL
	5 9000 99 10 061	6 x 5 mL
TruLab P	5 9050 99 10 062	20 x 5 mL
	5 9050 99 10 061	6 x 5 mL
TruLab Urine Level 1	5 9170 99 10 062	20 x 5 mL
	5 9170 99 10 061	6 x 5 mL
TruLab Urine Level 2	5 9180 99 10 062	20 x 5 mL
	5 9180 99 10 061	6 x 5 mL

Performance Characteristics

Measuring range

The test has been developed to determine magnesium concentrations within a measuring range from 0.05 - 5 mg/dL (0.02 – 2.05 mmol/L). When values exceed this range samples should be diluted 1+4 with NaCl solution (9 g/L) and the result multiplied by 5.

Specificity/Interferences

No interference was observed by ascorbic acid up to 30 mg/dL, bilirubin up to 40 mg/dL, lipemia up to 2,000 mg/dL triglycerides and calcium up to 25 mg/dL. Hemoglobin interferes because magnesium is released by erythrocytes. For further information on interfering substances refer to Young DS [7].

Sensitivity/Limit of Detection

The lower limit of detection is 0.05 mg/dL (0.02 mmol/L).

Precision (at 37 °C)

Intra-assay n = 20	Mean [mg/dL]	SD [mg/dL]	CV [%]
Sample 1	1.88	0.02	0.92
Sample 2	2.34	0.02	0.87
Sample 3	4.02	0.03	0.83

Inter-assay n = 20	Mean [mg/dL]	SD [mg/dL]	CV [%]
Sample 1	1.84	0.02	1.09
Sample 2	2.38	0.03	1.12
Sample 3	4.11	0.06	1.43

Method Comparison

A comparison of DiaSys Magnesium XL FS (y) with a commercially available test (x) using 81 samples gave following results:
y = 1.01 x – 0.03 mg/dL; r= 0.999.

Reference Range [1,6]

Serum/Plasma:

Neonates	1.2 – 2.6 mg/dL	(0.48 – 1.05 mmol/L)
Children	1.5 – 2.3 mg/dL	(0.60 – 0.95 mmol/L)
Women	1.9 – 2.5 mg/dL	(0.77 – 1.03 mmol/L)
Men	1.8 – 2.6 mg/dL	(0.73 – 1.06 mmol/L)
Urine:	73 – 122 mg/24 h	(3 – 5 mmol/24 h)
CSF:	2.1 – 3.3 mg/dL	(0.85 – 1.35 mmol/L)

Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary.

Literature

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Manufacturer

IVD CE

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