

Manual Procedure

Automated procedure on request

MEDICHEM[®]
MIDDLE EAST
Clinical Chemistry Reagents
Liquid Stable Reagents

Cat. No. 12530 R1 1 x 20 ml
For 40 tests R2 1 x 20 ml

Cat. No. 12531 R1 1 x 50 ml
For 100 tests R2 1 x 50 ml

Magnesium Calmagite

Colorimetric method

Liquid Reagents

Test Principle

Magnesium ions react with Calmagite in alkaline medium to produce a red complex that is measured photometrically at 532 nm. The intensity of color produced is directly proportional to magnesium concentration.

Calcium interference is virtually eliminated by use of EGTA.

Concentrations in the test

Reagent R1			
2-Methyl-2-Amino-1-Propanol (AMP)	1.0	mol/L	
EGTA	20	μmol/L	
Surfactant			
Reagent R2			
Calmagite	0.30	mmol/L	
Standard : The concentration as indicated on vial.			

Stability and preparation of working reagent

Reagent R1: liquid, ready to use.

Reagent R2: liquid, ready to use.

All reagents are stable up to expiry date given on the label when stored at +2 → +25 °C.

Working Reagent: You could mix R1 and R2 in a ratio of (1+1) and use 1 ml of the mixture as a working reagent. (Stable for 1 day at 2 - 25 °C).

Note: Don't use if the working reagent is visibly turbid.

Specimen collection and handling

1. Use fresh non-hemolyzed serum or heparinized plasma.
2. Dilute urine (1+10) with distilled water, adjust to pH 3 - 4 with diluted HCl, multiply results by 11.
3. Cerebrospinal fluid (CSF), free from hemolysis.
4. Stability in serum : 7 days at 2 - 8°C.
in urine : 3 days at 2 - 8°C.

Calibrator / Standard

MediCal U Cat. No. 15011
Magnesium STD. Cat. No. 16151

Quality control

Meditrol N Cat. No. 15171
Meditrol P Cat. No. 15181

Procedure

Wavelength	Hg 546 nm (500 - 550 nm)
Spectrophotometer	532 nm
Cuvette	1 cm light path.
Temperature	37°C / 20 - 25 °C
Measurement	against reagent blank
Reaction	End point

Assay

	Blank	Calibrator / Standard	Sample
Double dist. water	10 μl	--	--
Calibrator/ Standard	--	10 μl	--
Sample	--	--	10 μl
Reagent R1	500 μl	500 μl	500 μl
Reagent R2	500 μl	500 μl	500 μl

Mix and incubate for 1 min. at 37°C or 5 min. at 20 - 25°C. Read the absorbance (A). The final color is stable for 1 hour.

Calculation

$$\text{Conc. Magnesium (mg/dl)} = \frac{A_{\text{Sample}}}{A_{\text{Cal./STD.}}} \times \text{Conc. Cal./STD. (mg/dl)}$$
$$\text{mmol/L} \xleftarrow{\text{X 2.43}} \text{mg/dl} \xrightarrow{\text{(41.1 X 10}^{-2}\text{) X}}$$

Linearity

Up to 5 mg/dl (2.03 mmol/L).

If the result exceeds 5 mg/dl, repeat the test using diluted sample (1+1) with sodium chloride solution (0.9 %) and multiply the result by 2.

Interferences

1. Hemolyzed, grossly icteric or lipemic specimens are unsuitable for this method. Red cells contain twice the magnesium concentration as serum. Hemolyzed sample would falsely elevate results.
2. A number of drugs and substances affect the concentration of magnesium. See Young, et al.²

Precautions

1. Blood collected on citrate, oxalate, or EDTA is unacceptable because these compounds chelate the magnesium ions.
2. Use disposable plastic containers or glass equipment cleaned with 1N HCl and rinsed with distilled water to avoid contamination.

Reference range

Serum

1 – 30 d.	women	1.7 – 2.5	mg/dl
	men	1.7 – 2.4	mg/dl
1 – 12 mth.	women	1.9 – 2.4	mg/dl
	men	1.6 – 2.5	mg/dl
1 – 3 yr.		1.7 – 2.4	mg/dl
4 – 6 yr.	women	1.7 – 2.2	mg/dl
	men	1.7 – 2.4	mg/dl
7 – 9 yr.	women	1.6 – 2.3	mg/dl
	men	1.7 – 2.3	mg/dl
10 – 12 yr.		1.6 – 2.2	mg/dl
13 – 15 yr.		1.6 – 2.3	mg/dl
16 – 18 yr.		1.5 – 2.2	mg/dl
Adults		1.70 – 2.55	mg/dl

CSF

Cerebrospinal fluid (CSF)	2.80 – 3.50	mg/dl
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Urine

Urine /24 hr.	60 – 210	mg/24 hr.
Spontaneously – voided Urine	4.1 – 13.8	mg/L

References

1. Ginder E. and al., Clin. Chem., 17, (1971), 662.
2. Young, DS., Effects of Drugs on Clinical Laboratory Tests, fifth edition 2000, AACC Press, Washington, D.C.
3. Gonzalez - Revalderia J, Garcia - Bermejo S, Menchén Herreros A, Fernandez - Rodriguez E. Biological variation of Zn, Cu and Mg in serum of healthy subjects. Clin Chem 1990, 36: 2140 -1.
4. Al Ghandi SMG, Cameron EC, Sutton RAL. Magnesium deficiency: pathophysiology and clinical overview. Am J Kidney Dis 1994, 24:737- 5.