

Magnesium

Magnesium Calmagite - EGTA. Colorimetric

Product information

24MG01-UN	Meditest Magnesium	6x40 mL
24MG01-AU	Meditest Magnesium	6x40 mL
24MG01-AB	Meditest Magnesium	6x40 mL
24MG01-ER	Meditest Magnesium	6x40 mL
24MG01-AR	Meditest Magnesium	6x40 mL

Purpose

This reagent is designed for the quantitative determination of magnesium concentration in human serum, plasma and urine.

Summary

Magnesium is the most abundant intracellular cation in the human body after potassium and is essential for numerous enzymatic and metabolic processes. It is a cofactor of all enzymatic reactions involving ATP and forms the membrane that provides the electrical excitability of muscle and nerve cells.

Low magnesium levels are seen in malabsorption syndrome, diuretic or aminoglycoside therapy, hyperparathyroidism or diabetic acidosis; high magnesium concentration is seen in uremia, chronic renal failure, glomerulonephritis, Addison's disease, or intensive antacid therapy^{1,4,5}. Clinical diagnosis should not be based on a single test result, but clinical and other laboratory data should be integrated.

Test principle

When magnesium reacts with sacagite in alkaline solution, it forms a purple-colored complex. The intensity of the resulting color is proportional to the concentration of magnesium in the sample¹

Reagents - working solutions

R 1 Buffer	Amino-methyl-propanol EGTA	1 mmol/L 0.21 mmol/L
R 2 Substrate	Calmagite	0.30 mmol/L

Precautions warnings

It is intended for in vitro diagnostic use by healthcare professionals. Follow the normal precautions necessary in handling all laboratory reagents.

Infectious or microbial waste:

Warning: handle waste as potentially biohazardous. Dispose of waste according to accepted laboratory instructions and procedures.

Environmental hazards: Follow all relevant local disposal regulations to determine that it has been disposed of safely. If requested, a safety data sheet can be provided to professional users.

Inhibit foam formation in all reagents and sample types (sample, calibrator and control).

If there is any damage on the package, do not use. Read the user manual carefully before use, do not use the expired assay kit. Do not mix different lot reagents.

All samples should be considered epidemic material, please dispose of them in accordance with the laboratory working standard of infectious diseases.

Take the necessary protective measures to prevent users from becoming infected during operation.

Use of reagents

Ready to use.

Storage and stability

All components of the kit are stable until the expiration date on the label when stored tightly closed at 2-8°C, protected from light and contamination is avoided during their use.

Do not use reagents after the expiration date. Signs of reactive deterioration: Presence of particles and turbidity.

Sample collection and preparation

Serum, heparinized plasma¹: Free from hemolysis and separated from cells as quickly as possible. Do not use oxalate or EDTA as an anticoagulant.

Stability: 7 days at 2-8°C.

Urine¹: It should be acidified with HCl to pH 1. If the urine is cloudy; Heat the sample to 60°C for 10 minutes to dissolve the precipitates. Dilute the sample with distilled water in a ratio of 1/10 and multiply the result by 10.

Stability: 3 days at 2-8°C

Required Materials (not included in the kit)

1. Cat# 24BIO01-DC Meditest Diachem Calibrator
2. Cat# 24BIO01-DQ Meditest Diachem Control L1
3. Cat# 24BIO02-DQ Meditest Diachem Control L2
4. General laboratory equipment
5. Distilled or deionized water

Working Procedure

If you are using a spectrophotometer to perform this test, work with the following procedure. Ask your representative for the application data for fully automatic devices.

1. Test Conditions:

Wavelength: . 520 nm

Cuvette: 1 cm light path

Temperature: .

2. Adjust the instrument to zero with distilled water.

3. Pipette into a cuvette:

	Blank	Standard	Sample
WR (mL)	1.0	1.0	1.0
Standard ^(Note 1,4,5) (μL)	--	10	--
Sample (μL)	--	--	10

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4. Stir and incubate at room temperature for 5 minutes or at 37°C for 3 minutes.
5. Read the absorbance of the samples and the calibrator (A) against the gap. The color is stable for at least 30 minutes.

Calculation:

$$\frac{(A)_{\text{Sample}}}{(A)_{\text{Standard}}} \times 2 (\text{Standard conc.}) = \text{mg/dL}$$

(A) Standard

Flip factor:

$$\text{mg/dL} \times 0.412 = \text{mmol/L or}$$

$$0.5 \text{ mmol/L} = 1.0 \text{ mEq/L} = 1.22 \text{ mg/dL} = 12.2 \text{ mg/L}^1$$

Expected values

Serum/plasma

Newborn:	0,620.91 mmol/L (1,241.82 mEq/L)
5 months	0,700.95 mmol/L (1,401.90 mEq/L)
6-12 years	0,700.86 mmol/L (1,401.72 mEq/L)
12-20 years	0.700.91 mmol/L (1.401.82 mEq/L)
Adults:	0.661.07 mmol/L (1,322.14 mEq/L)
60-90 years	0,660.99 mmol/L (1,321.98 mEq/L)
> 90 years old	0,700.95 mmol/L (1,401.90 mEq/L)
Urine (24 h)	3.05.0 mmol/day (6.010.0 mEq/day)

These values are for orientation purposes; Each laboratory should establish its own reference range

Limitations

Anticoagulants other than hemolysis and heparin¹. A list of drugs and other substances that interact with magnesium determination was reported by Young et al.².

Performance characteristics

Measuring range: 0.2 - 5 mg/dL

If the results obtained are greater than the linearity limit, dilute the sample by 1/10 with 9 g/L NaCl and multiply the result by 10.

Precision

	Intra-assay (n=20)		Inter-assay (n=20)	
Mean (mg/dL)	2.39	4.01	2.27	4.14
SD	0.02	0.07	0.07	0.13
CV (%)	1.18	1.73	2.99	3.22

Sensitivity: 1 mg/dL = 0.055 Abs.

Accuracy: Results obtained using Meditest reagents (y) did not show systematic differences when compared with other commercial reagents (x). The results obtained using 50 samples are as follows:

Correlation coefficient (r)²: 0.998

Regression equation: $y = 0.971x + 0.145$

The results of the performance characteristics depend on the analyzer used.

References

1. Farrell E C. Magnesium. Kaplan A et al. Clin Chem The C.V. Mosby Co. St Louis. Toronto. Princeton 1984; 1065-1069.
2. Young DS. Effects of drugs on Clinical Lab. Tests, 4th ed AACC Press, 1995.
3. Young DS. Effects of disease on Clinical Lab. Tests, 4th ed AACC 2001.
4. Burtis A et al. Tietz Textbook of Clinical Chemistry, 3rd ed AACC 1999.
5. Tietz N W et al. Clinical Guide to Laboratory Tests, 3rd ed AACC 1995.



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