Audit Diagnostics

CE

MAGNESIUM

Magnesium Xylidyl

Xylidyl Blue. Colorimetric

Quantitative determination of magnesium
IVD

Store at 2-8ºC

PRINCIPLE OF THE METHOD
Magnesium forms a coloured complex when reacts with Magon sulfonate in alkaline solution.
The intensity of the color formed is proportional to the magnesium concentration in the sample[1].

CLINICAL SIGNIFICANCE
Magnesium is the second more abundant intracellular cation of the human body after potassium, being essential in great number of enzymatic and metabolic processes.
Is a cofactor of all the enzymatic reactions that involve the ATP and comprises of the membrane that maintains the electrical excitability of the muscular and nervous cells.
A low magnesium level is found in malabsortion syndrome, diuretic or aminoglucoside therapy; hyperparathyroidism or diabetic acidosis.
Elevated concentration of magnesium is found in uremia, chronic renal failure, glomerulonephritis, Addisons's disease or intensive anti acid therapy[1,4,5].
Clinical diagnosis should not be made on a single test result; it should integrate clinical and other laboratory data.

REAGENTS

R	Xylidyl Blue	0,1 mmol/L
	Thioglycolic acid	0,7 mmol/L
	DMSO	3000 mmol/L
MAGNESIUM CAL	Magnesium aqueous primary standard 2 mg/dL	

PRECAUTIONS
R: H314-Causes severe skin burns and eye damage.
Follow the precautionary statements given in MSDS and label of the product.

PREPARATION
The reagent and standard are ready to use.

STORAGE AND STABILITY
All the components of the kit are stable until the expiration date on the label when stored tightly closed at 2-8ºC protected from light and contaminations prevented during their use.
Do not use reagents over the expiration date.
Signs of reagent deterioration:
- Presence of particles, color change and turbidity.
- Blank absorbance (A) at 546 ≥ 1,8.

ADDITIONAL EQUIPMENT
- Spectrophotometer or colorimeter measuring at 546 nm.
- Matched cuvettes 1,0 cm light path.
- General laboratory equipment (Note 2).

SAMPLES
- Serum, heparinised plasma[1]:
  Free of hemolysis and separated from cells as rapidly as possible.
  Do not use oxalates or EDTA as anticoagulant.
  Stability: 7 days at 2-8ºC.
- Urine[1]:
  Should be acidified to pH 1 with HCl.
  If urine is cloudy; warm the specimen to 60ºC for 10 min. to dissolve precipitates.
  Dilute the sample 1/10 with distilled water and multiply the result by 10.
  Stability: 3 days at 2-8ºC

PROCEDURE
1. Assay conditions:
   Wavelength: . . . . . 546 nm
   Cuvette: . . . . . .1 cm light path
   Temperature: . . . . . 37ºC / 15-25ºC
2. Adjust the instrument to zero with distilled water.
3. Pipette into a cuvette(Note 4):

	Blank	Standard	Sample
R (mL)	1,0	1,0	1,0
Standard(Note 1,3) (µL)	--	10	--
Sample (µL)	--	--	10

4. Mix and incubate for 5 min at room temperature or 3 min a 37ºC.
5. Read the absorbance (A) of the samples and calibrator, against the Blank. The colour is stable for at least 30 minutes.

CALCULATIONS

$$\frac{(A)Sample - (A)Blank}{(A)Standard - (A)Blank} \times 2\ (\text{Standard conc.}) = \text{mg/dL magnesium de in the sample}$$

Conversion factors:
mg/dL x 0,412 = mmol/L
0,5 mmol/L = 1,0 mEq/L = 1,22 mg/dL = 12,2 mg/L[1].

QUALITY CONTROL
Control sera are recommended to monitor the performance of assay procedures: CONTROL Normal and Pathologic .
If control values are found outside the defined range, check the instrument, reagents and calibrator for problems.
Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

REFERENCE VALUES[1]
Serum or plasma:
1,6 – 2,5 mg/dL ≅ 0,66 – 1,03 mmol/L
Urine:
24 – 244 mg/24 h ≅ 2 – 21 mEq/L/24 h
These values are for orientation purpose; each laboratory should establish its own reference range.

PERFORMANCE CHARACTERISTICS
Measuring range: From *detection limit* of 0,0052 mg/dL to *linearity limit* of 6 mg/dL. If the results obtained were greater than linearity limit, dilute the sample 1/2 with NaCl 9 g/L and multiply the result by 2.
Precision:

	Intra-assay (n=20)		Inter-assay (n=20)	
Mean (mg/dL)	1,99	3,55	1,98	3,41
SD	0,03	0,04	0,09	0,15
CV (%)	1,68	1,14	4,55	4,42

Sensitivity: 1 mg/dL = 0,5536 (A).
Accuracy: Results obtained using Audit Diagnostics reagents (y) did not show systematic differences when compared with other commercial reagents (x).
The results obtained were the following:
Correlation coefficient (r)[2]: 0,92276
Regression equation: y=1,027x + 0,102
The results of the performance characteristics depend on the analyzer used.

INTERFERENCES
Haemolysis and anticoagulants other than heparin[1].
A list of drugs and other interfering substances with magnesium determination has been reported by Young et. al[2].

NOTES
1. MAGNESIUM CAL: Proceed carefully with this product because due its nature it can get contaminated easily.
2. It is recommended use disposable material to avoid magnesium contamination. If glassware is used the material should be scrupulously clean with H_2SO_4 - $K_2Cr_2O_7$ and then thoroughly rinsed with distilled water and dried before use.
3. Calibration with the aqueous standard may cause a systematic error in automatic procedures. It is recommended to use a serum Calibrator.
4. Use clean disposable pipette tips for its dispensation.
5. **Audit Diagnostics has instruction sheets for several automatic analyzers.**

BIBLIOGRAPHY

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