# MAGNESIUM KIT

(Calmagite method)

For the determination of Magnesium in serum, urine & CSF.

(For Invitro Diagnostic Use Only)

## Summary

Magnesium, along with potassium, is a major intracellular cation. It is an activator of various enzymes. It is also involved in amino acid activation and protein synthesis. Increased levels are found in dehydration, addison's disease and uremia. Decreased levels are found in malabsorption, during treatment of diabetic coma, chronic renal disease, chronic alcoholism, pancreatitis and hyperthyroidism.

## Principle

Magnesium combines with Calmagite in an alkaline medium to form a red coloured complex. Interference of calcium and proteins is eliminated by the addition of specific chelating agents and detergents. Intensity of the colour formed is directly proportional to the amount of magnesium present in the sample.

$$\text{Magnesium + Calmagite} \xrightarrow[\text{Medium}]{\text{Alkaline}} \text{Red coloured complex}$$

## Normal reference values

| | | |
|---|---|---|
| Serum (Children) | : | 1.5 - 2.0 mEq/L |
| (Adults) | : | 1.3 - 2.5 mEq/L |
| CSF | : | 2.0 - 3.0 mEq/L |
| Urine | : | 6.0 - 8.5 mEq/24 hrs |

It is recommended that each laboratory establish its own normal range representing its patient population.
Note : 2 mEq/L = 1 mmol/L = 2.44 mg/dl

| Contents | 25 ml | 75 ml |
|---|---|---|
| **L1 :** Buffer Reagent | 12.5 ml | 37.5 ml |
| **L2 :** Colour Reagent | 12.5 ml | 37.5 ml |
| **S :** Magnesium Standard (2.0 mEq/L) | 2 ml | 2 ml |

## Storage / stability

Contents are stable at 2 - 8 $^0$C till the expiry mentioned on the labels.

## Reagent Preparation

Reagents are ready to use. Protect from bright light.
**Working reagent :** For larger assay series a working reagent may be prepared by mixing equal volumes of L1 (Buffer Reagent) and L2 (Colour Reagent). The Working reagent is stable at 2 - 8 $^0$C for at least one month. Keep tightly closed.

## Sample material

Serum (Free from hemolysis ), Urine and CSF.
24 hr. collected urine should be acidified to a pH of 2 - 3 by the addition of approx. 10 to 15 ml of HCl and diluted 1+ 3 with D.Water before use. Multiply results by 4.
Magnesium is reported to be stable in serum / plasma for 7 days at 2-8$^0$C.

## Procedure

| | | |
|---|---|---|
| Wavelength / filter | : | 510 nm(Hg 546 nm) / Green |
| Temperature | : | R.T. |
| Light path | : | 1 cm |

Pipette into clean dry test tubes labelled as Blank (B), Standard (S), and Test (T) :

| Additiion Sequence | B (ml) | S (ml) | T (ml) |
|---|---|---|---|
| Buffer Reagent (L1) | 0.5 | 0.5 | 0.5 |
| Colour Reagent (L 2) | 0.5 | 0.5 | 0.5 |
| Distilled water | 0.01 | - | - |
| Magnesium Standard (S) | - | 0.01 | - |
| Sample | | - | |

Mix well and incubate at R.T. (25$^0$C) for 5 min. Measure the absorbance of the Standard (Abs.S), and Test Sample (Abs.T) against the Blank, within 30 Min.

## Calculations

$$\text{Magnesium in mEq/L} = \frac{\text{Abs.T}}{\text{Abs.S}} \times 2$$

## Linearity

This procedure is linear upto 10 mEq/L. If values exceed this limit, dilute the sample with distilled water and repeat the assay. Calculate the value using an appropriate dilution factor.

## Notes

All glassware being used for the test should first be rinsed with 1% or 0.1 N HCl and then with good quality deionised water before use.

Chelating agents such as EDTA, Oxalate and Citrate, present even in traces, prevent the formation of the colour complex, hence necessary care should be taken during the assay.

RBC's have double the magnesium content compared to serum, and hence hemolysed samples should not be used.

## Reference

Gindler, E., et. al. (1971), Clin. Chem. 17 : 662

**System Parameters**

| | | |
|---|---|---|
| **Reaction** | : | End Point |
| **Wavelength** | : | 510 nm |
| **Zero Setting** | : | Reagent Blank |
| **Incub. Temp.** | : | R.T. |
| **Incub. Time** | : | 5 min. |
| **Delay Time** | : | --- |
| **Read Time** | : | --- |
| **No. of read.** | : | --- |
| **Interval** | : | --- |
| **Sample Vol.** | : | 0.01 ml |
| **Reagent Vol.** | : | 1.00 ml |
| **Standard** | : | 2.0 mEq/L |
| **Factor** | : | --- |
| **React. Slope** | : | Increasing |
| **Linearity** | : | 10 mEq/L |
| **Units** | : | mEq/L |

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