

# Dosage of calcium (Ca) and magnesium (Mg) by microwave plasma atomic emission spectrometry (MP-AES) in the control of individualized parenteral nutrition (IPN): routine implementation.

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## Introduction

Individualized parenteral nutrition (IPN) are routinely monitored with sodium (Na) and potassium (K) dosages, carried out by MP-AES. This analytical technique also allows the determination of other ions such as Ca and Mg present in our IPN.

During method validation, the 4 ions were validated at 3 concentrations and 2 different wavelengths per element (repeatability, linearity, intermediate precision, accuracy, inter-sample contamination, accuracy).

After several tests, we encountered difficulties, particularly in the calibration of Ca and Mg with the current 3 point range.

### Objective :

Add Ca and Mg dosages to our routine checks to:

- increase the security level of controls
- further guarantee the quality of IPN

## Methods

- New calibration range with 5 points based on theoretical data from recent months
- Adjustment of several analysis parameters:
  - Sampling time,
  - Stabilization time
  - Rinse time
  - Nebulization flow rates
- Measurements of analysis times before and after modifications.
- Analyzes of 30 samples under routine conditions.  
The concentrations obtained were compared to the theoretical value using the same compliance standards as for Na and K: 10% (or 3 mmol/L if higher). Results are presented as medians and quartiles.

## Results

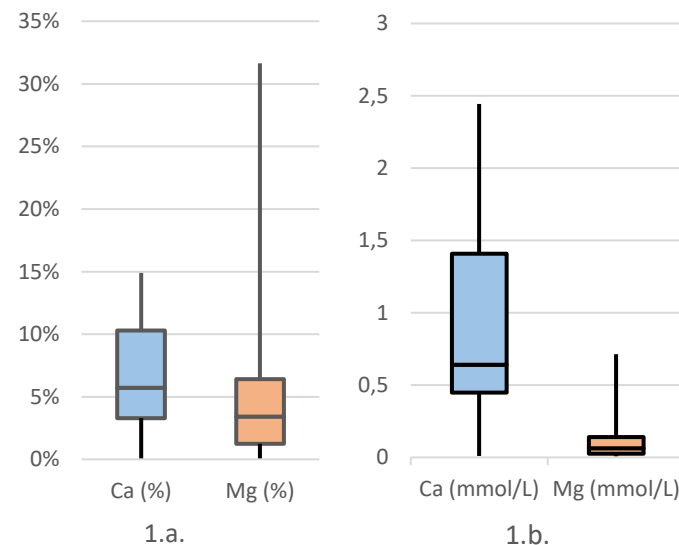


Figure 1. Statistical distributions of deviations from the theoretical value, in percentage (1.a.) and in mmol/L (1.b.), representing the following values: minimum, 1st quartile, median, 3rd quartile and maximum

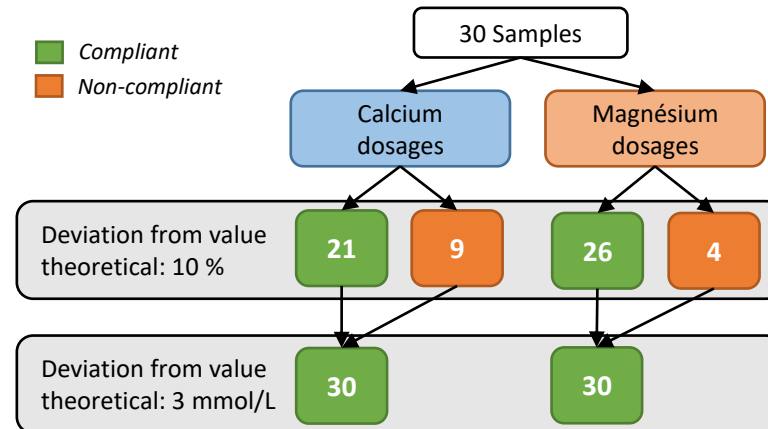


Figure 2. Number of samples compliant with set standards

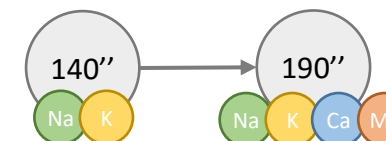


Figure 3. Evolution of analysis time per sample (in seconds)

## Discussion and conclusion

The results are conclusive with the error margins currently set.

New time constraints and routine organization.  
→ Need to prepare the calibration range a few hours in advance.  
→ We will need to evaluate the stability of our calibration range.

Define acceptable deviations and set the NPI release conditions for Ca and Mg.  
→ Discussion with pediatricians from the neonatology department..

Implementation and communication to subcontracting establishments.