

# CALCIUM ASX

CA 0500 CH

4 x 125 ml

## SUMMARY OF TEST

In human body, circulating calcium is used for several functions, in skeletal metabolism as well as in neuromuscular function and in hemostasis.

Serum calcium is affected by malabsorption, parathyroidal problems, bones disease, circulating albumin diseases.

Typical variations:

greater than normal levels in hyperparathyroidism, metastatic bone tumor, milk - alkali syndrome, multiple myeloma, Paget's disease, sarcoidosis, vitD intoxication;

lower than normal levels in hypoparathyroidism, malabsorption, osteomalacia, pancreatitis, renal failure, vitD deficiency.

The amount of calcium excreted into the urine reflects intestinal absorption, skeletal resorption, and renal tubula filtration and reabsorption. Under fasting conditions, the intestinal and renal components are relatively fixed and calcium excretion (mg/dl of glomerular filtrate) in the fasting state is used to assess the skeletal components.

In the present method, arsenazo(III) as a calcium binding reagent shows high specificity and sensitivity in formulation conditions and therefore a reliable, simple and fast methodology has been developed.

## PRINCIPLE OF THE METHOD

Arsenazo(III) combines with calcium at slight acidic pH to form a blue complex, the absorbance of which is measured at 660 nm. The reaction has high specificity and interference from magnesium is avoided, due to pH.

For bichromatic analyzers, the reference wavelength must be set at 700 nm.

## KIT COMPONENTS

**For in vitro diagnostic use only.**

The components of the kit are stable until expiration date on the label.

Keep away from direct light sources.

**Reagent A:** 4 x 125 ml (liquid) blue cap

Composition: arsenazo(III) 0.2 mM, Good's buffer 50 mM pH 6.8, stabilizers.

**Standard:** calcium solution 10 mg/dl - 5 ml

Store all components at 15-25°C.

## MATERIALS REQUIRED BUT NOT SUPPLIED

Current laboratory instrumentation. Spectrophotometer UV/VIS with thermostatic cuvette holder. Automatic micropipettes. Glass or high quality polystyrene cuvettes. Saline solution.

## REAGENT PREPARATION

Use reagent ready to use.

Stability: up to expiration date on labels at 15-25°C.

Stability since first opening of vials: ≥ 60 days at 15-25°C.

## PRECAUTIONS

Reagent may contain some non-reactive and preservative components. It is suggested to handle carefully it, avoiding contact with skin and swallow.

Perform the test according to the general "Good Laboratory Practice" (GLP) guidelines.

## SPECIMEN

Serum (preferred), plasma heparinate. Do not use citrate, oxalate and EDTA as anticoagulant.

Total calcium is stable 7 days at 2-8°C and for several months when frozen at -20°C.

Urine specimens should be collected in 20 to 30 ml of HCl 6M per 24/h specimen (1-2 ml for random urine) in order to prevent calcium salt precipitation.

Dilute sample urine 1:2 with redistilled water and multiply results by two.

## TEST PROCEDURE

Wavelength:	660 nm (allowed 650 ÷ 660 nm)		
Lightpath:	1 cm		
Temperature:	25, 30 or 37°C		
dispense:	blank	standard	sample
reagent	2 ml	2 ml	2 ml
water	20 µl	-	-
standard	-	20 µl	-
sample	-	-	20 µl

Mix, incubate at 25, 30 or 37°C for 2 minutes.  
Read absorbances of standard (As) and samples (Ax) against reagent blank.

## RESULTS CALCULATION

serum/plasma sample:

calcium mg/dl =  $Ax/As \times 10$  (standard value)

urine sample:

calcium mg/dl =  $Ax/As \times 10 \times 2$  (standard value and dilution factor)

24 hours urine sample:

calcium mg/24h =  $Ax/As \times 10 \times 2 \times$  urine volume (standard value, dilution factor and diuresis in decilitres)

## EXPECTED VALUES

serum/plasma: 8.6 - 10.3 mg/dl (2.15 - 2.57 mmol/l)  
urine (men): up to 300 mg/24h (7.49 mmol/24h)  
urine (women): up to 250 mg/24h (6.24 mmol/24h)

Each laboratory should establish appropriate reference intervals related to its population.

## QUALITY CONTROL AND CALIBRATION

It is suggested to perform an internal quality control. For this purpose the following human based control sera are available:

**QN 0050 CH QUANTINORM CHEMA 10 x 5 ml**  
with normal or close to normal control values

**QP 0050 CH QUANTIPATH CHEMA 10 x 5 ml**  
with pathological control values.

If required, a multiparametric, human based calibrator is available:

**AT 0030 CH AUTOCAL H 10 x 3 ml**

Please contact Customer Care for further information.

## TEST PERFORMANCE

### Linearity

the method is linear up to 20 mg/dl.

If the limit value is exceeded, it is suggested to dilute sample 1+9 with distilled water and to repeat the test, multiplying the result by 10.

### Sensitivity/limit of detection (LOD)

the limit of detection is 0.1 mg/dl.

### Interferences

no interference was observed by the presence of:

hemoglobin ≤ 300 mg/dl

bilirubin ≤ 40 mg/dl

Lipids interferences are possible performing readings at single wavelength of 660 nm. To avoid interferences, perform a bichromatic reading at 660 / 700 nm.

### Precision

intra-assay (n=10)	mean (mg/dl)	SD (mg/dl)	CV%
sample 1	8.89	0.10	1.10
sample 2	13.74	0.16	1.20

inter-assay (n=20)	mean (mg/dl)	SD (mg/dl)	CV%
sample 1	9.22	0.19	2.10
sample 2	14.04	0.23	1.70

### Methods comparison

a comparison between Chema and a commercially available product gave the following results:

Calcium ASX Chema = x  
Calcium competitor = y  
n = 97

$y = 0.98x + 0.17$  mg/dl      $r = 0.94$

## WASTE DISPOSAL

This product is made to be used in professional laboratories. Please consult local regulations for a correct waste disposal.

S56: dispose of this material and its container at hazardous or special waste collection point.

S57: use appropriate container to avoid environmental contamination.

S61: avoid release in environment. Refer to special instructions/safety data sheets.

## REFERENCES

Zak B., Epstein E., Babinski E.S., Review of Calcium Methodologies, Annals of Clinical and Laboratory Science 5, 195-212 (1975).

Tietz Textbook of Clinical Chemistry, Second Edition, Burtis-Ashwood (1994).

Clinical Chemistry vol. 38 N. 6 - 904-908 - (1992)

## MANUFACTURER

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## SYMBOLS

	for in vitro diagnostic use only
	lot of manufacturing
	code number
	storage at temperature interval
	expiration date (year/month)
	warning, read enclosed documents
	read the directions