



**CALCIUM**-COLORIMETRIC METHOD  
FOR BECKMAN CX-3/ CX-4 SYSTEMS

**CA**

**INTENDED USE**

This calcium reagent kit is prepared for the quantitative determination of calcium in serum or urine.

**CLINICAL SIGNIFICANCE**

The metabolism of calcium and that of phosphorus are very closely related. More than 99% of the calcium in the body are present in bone as calcium phosphate, the remainder of the calcium, although very small amount, have varied and significant functions in the body. For example, calcium ions decrease neuromuscular excitability, participate in blood coagulation, and activate some enzymes, such as succinate dehydrogenase and adenosine triphosphatase.

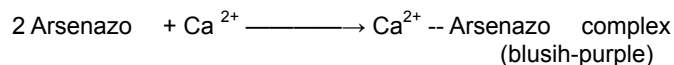
Furthermore, calcium ions and cyclic AMP may play a role in the transfer of inorganic ions across cell membranes and in the release of neurotransmitters. The calcium in serum occurs in two forms: approximately 50% as non-diffusible protein-bound calcium, and another 50% as unbound diffusible calcium. The calcium reagent described here is intended for use in the quantitative determination of total serum calcium.

The concentration of calcium in blood is maintained within close limits by means of two hormones, PTH and calcitonin. Hypercalcemia is encountered in hyperparathyroidism, hypervitaminosis, sarcoidosis, multiple myeloma and certain cancers of bone. Hypocalcemia is observed in hypothyroidism, rickets, nephrosis, nephritis, steatorrhea and pancreatitis.

Serum calcium levels, are somewhat dependent upon protein concentration, especially albumin. Hypoalbuminemia is usually accompanied by decreased serum calcium levels.

**PRINCIPLE**

Calcium, reacts with Arsenazo to form an bluish-purple colored chromophore which is measured spectrophotometrically at 650 nm. Magnesium and iron are excluded from the reaction by complexing with 8-hydroxyquinoline. The reaction formula is shown as follows:



**SPECIMEN COLLECTION AND PREPARATION**

Freshly drawn serum is the specimen of choice, plasma derived from specimen collection tubes containing EDTA, citrate, or oxalate must not be used in this procedure. Serum should be removed from the clot without delay to avoid loss of serum calcium due to increased erythrocyte permeability to calcium. Serum calcium separated from clot is stable at least 24 hours at room temperature, 1 week under refrigeration and up to 1 year in the freezer.

**REAGENT**

- Package: 2×300 tests Beckman CX-4  
1×1000 tests Beckman CX-3
- Components: contains Arsenazo , 0.15 mmol/L; 8-Hydroxyquinidine, surfactant and buffer.
- Ready to use

**STORAGE:** Store the reagent at room temperature.

**PRECAUTIONS:**

- For in vitro diagnostic use only.
- Since all specimens are potentially infectious, they should be handled with appropriate precautions and practices in accordance with Biosafety level 2 as recommended by USA NIH manual Biosafety in "Biosafety in Microbiological and Biomedical Laboratories, and in accordance with National or local regulations related to the safety precautions of such materials.
- Each laboratory has to perform the quality control test to assure the results being reliable before running the specimen tests.

**PROCEDURES:**

The reagent are used directly in accordance with Beckman analyzers parameters and procedures .

**PROCEDURAL LIMITATIONS**

Hemoglobin up to levels of 200 mg/dl, bilirubin up to 20 mg/dl or moderate lipemia produce no detectable interference in this procedure. Markedly lipemic serum will give elevated results due to added absorbance of the specimen caused by its turbidity.



Contamination of glassware with calcium, usually from detergents, is a problem of determination. Wash all glassware with 4N hydrochloric acid and rinse with distilled water. Use of disposable plastic tubes is recommended.

#### EXPECTED VALUES

Serum or plasma 2.18-2.74 mmol/L (8.7~11 mg/dl)

Children under 12 usually have higher normal value of calcium which decrease with aging.

It is highly recommended that each laboratory establish its own normal range.

#### PERFORMANCE

Linearity: 3.75 mmol/L

Sensitivity: 0.0047 mmol/L of calcium can be accurately determined.

Precision:

Samples	Within run		Between run	
	Level	Level	Level	Level
Number n	20	20	20	20
Mean mmol/L	2.12	3.13	2.21	3.21
SD mmol/L	0.059	0.053	0.0796	0.0803
CV %	2.78	1.69	3.60	2.50

**Note:** It is generally recommended that each laboratory establish its own range of normal values for commonly performed tests.

#### REFERENCES:

1. Gitelman H.J., Anal Biochem. 18:521,1967.
2. Tietz, N.W., Fundamentals of Clin. Chem. p. 638 W. B. Saunders, Philadelphia 1970.
3. Baginski, E.S.et.al. Clin. Chem. Acta 46:46,1973.