

## Colorimetric determination of zinc in serum, plasma and urine

### CLINICAL SIGNIFICANCE

Zinc intervenes in the function and structure of more than 70 enzymes involved in various metabolic processes such as synthesis or degradation of carbohydrates, lipids, proteins and nucleic acids.

Zinc deficiencies cause anemia, hepatosplenomegaly, delay in development, delayed healing of wounds and ulcerations, taste and smell alterations.

Decreases in Zinc concentration can be observed in physiological conditions such as the last months of pregnancy, the use of oral contraceptives and in pathological conditions such as myocardial infarction, alcoholic cirrhosis, malabsorption syndrome, lung infections, carcinomas and lymphomas.

### TEST SUMMARY

Zinc reacts with the chromogen present in the reagent forming a coloured compound which colour intensity is proportional to the zinc concentration present in the sample.

### SAMPLES

Serum or plasma unhemolyzed. Use heparin salt as anticoagulant.

Urine 24 hours. Stability 8 days at 2-8°C.

### REAGENTS

Reagent A: Borate buffer 0.37 M pH 8.2; Salicyladoxime 12.5 mM; Dimetilgioxime 1.25 mM; surfactants and preservatives.

Reagent B: NITRO-PAPS; 0.4 mM, preservatives.

Standard: Zinc ion 200 µg/dl (30.6 µmol/l); stabilizers and preservatives.

### MATERIAL REQUIRED BUT NOT SUPPLIED

Normal laboratory equipment. Spectrophotometer UV/VIS with thermostatisation. Automatic Micropipette. Cuvette in optical glass or monouse in optical polystyrene. Distilled water.

### PRECAUTIONS

Reagent may contain not reactive and conservative components. It is opportune to avoid contacts with the skin and do not swallow.

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

### REAGENTS PREPARATION

Add 2 ml of Reagent B to a vial of Reagent A.

Reagents are stable until expiration date on label, stored at 2-8°C.

Work Reagent is stable 15 days at 2-8°C.

Warning: do not contaminate reagents after the vials opening.

### PROCEDURE

Kind of analysis: End point  
 Reading time: 5 minutes  
 Colour stability: 30 minutes  
 Wavelength: 578 nm (570-582)  
 Temperature: 20-25°C  
 Lightpath: 1 cm  
 Zero: Blank Reagent

### URINE

Zn µg/24h =  $[A_{(sample)} / A_{(standard)}] \times 200 \times dl \text{ urine}$

Zn µmol/24h =  $[A_{(sample)} / A_{(standard)}] \times 30.6 \times Lt \text{ urine}$

### EXPECTED VALUES

#### SERUM / PLASMA

70 - 115 µg/dl (10.7 - 17.6 µM)

#### URINE

100 - 1000 µg/24h (15.3 - 153 µmol/24h)

Every laboratory should establish own reference intervals in accordance with own population.

### NOTES

- Strong lipemic sera can sometimes interfere in the analysis: is suggested to centrifuge or filtrate the sample with membrane 0.2 µm.
- Use glassware surely without Zinc traces.
- The volumes could be proportionally changed.
- If the results are incompatible with clinical presentation, they have to be evaluated within a total clinical study.
- Only for IVD use.

### CALIBRATION/ QUALITY CONTROL

It is suggested to perform an internal quality control using control serum with known zinc values.

### TEST PERFORMANCE

#### Precision

Intra-assay (n = 21)	Mean (µg/dl)	SD (µg/dl)	CV%
Sample 1	94.14	2.220	2.36

Inter-assay (n = 21)	Mean (µg/dl)	SD (µg/dl)	CV%
Sample 1	94.48	2.502	2.65

#### Sensitivity/limit of detection

The method is able to discriminate until 3 µg/dl.

#### Linearity

The method is linear up to 1000 µg/dl.

#### Methods comparison

A comparison with a commercial available product gave the following results in a comparison on 21 samples of serum:

Zinc LTA = x  
 Zinc Acid competitor = y  
 n = 21

$y = 0,96262x + 4,49686$   $r = 0,99331$ .

A comparison with a commercial available product gave the following results in a comparison on 21 samples of urine:

Zinc LTA = x  
 Zinc Acid competitor = y  
 n = 21

$y = 0,99539x + 2,9706$   $r = 0,99984$

#### Interferences

No interference was observed in presence of:  
 bilirubin  $\leq 20 \text{ mg/dl}$

Haemoglobin can interfere with the analysis.

### WASTE DISPOSAL

Product is intended for professional laboratories. Waste products must be handled as per relevant security cards and local regulations.

### PACKAGING

**CODE CC02750 (50 TESTS)**  
 Reagent A 5 x 8 ml (liquid)  
 Reagent B 1 x 10 ml (liquid)  
 Standard 1 x 5 ml (liquid)

### REFERENCES









Pasquinelli F., Diagnostica e Tecniche di Laboratorio, (pag.: 1103 - 1104) Rossini Editrice. (1984).  
 Tetsuo Makino, Chimica Clinica Acta 197, 209-220 (1991).

Maringoni A., Illuzzi R., ATB 1991 Abstract.

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### SYMBOLS

-  Only for IVD use
-  Lot of manufacturing
-  Code number
-  Storage temperature interval
-  Expiration date
-  Warning, read enclosed documents
-  Read the directions
-  Biological risk

Mod. 01.06 (ver. 4.8 - 29/09/2020)



REAGENTS	BLANK	STANDARD	SAMPLE
Work Reagent	1 ml	1 ml	1 ml
Distilled Water	50 µl	--	--
Standard	--	50 µl	--
Sample	--	--	50 µl

Mix and read the absorbance against blank at 578 nm.  
 Colour is stable for 30 minutes.

### CALCULATION

#### SERUM / PLASMA

Zn µg/dl =  $[A_{(sample)} / A_{(standard)}] \times 200$

Zn µmol/l =  $[A_{(sample)} / A_{(standard)}] \times 30.6$