Atlas Medical CE

Iron FerroZine Colorimetric

IVD *For In-Vitro diagnostic and professional use only*

Store at 2-8°C

INTENDED USE

For the quantitative determination of iron in human serum or heparinized plasma.

CLINICAL SIGNIFICANCE

The iron is the component of a great number of enzymes. The myoglobin, muscular protein, contains iron, as well as the liver.

Iron is necessary for the hemoglobin production, molecule that transports oxygen inside red globules. Their deficit in the last causes the ferropenic anemia. High levels of iron are found in hemochromatosis, cirrhosis, hepatitis and in increased transferrin levels.

The variation day to day is quite marked in healthy people.

Clinical diagnosis should not be made on a single test result; it should integrate dinical and other laboratory data.

PRINCIPLE

The iron is dissociated from transferring-iron complex in weakly acid medium. Liberated iron is reduced into the bivalent form by means of ascorbic acid. Ferrous ions give with FerroZine a coloured complex:

$$\text{Transferrin}(Fe^{3+})_2 + e^- \xrightarrow{\text{Ascorbic acid}} 2\,Fe^{2+} + \text{Transferrin}$$

$$Fe^{2+} \xrightarrow{\text{FerroZine}} \text{Coloured complex}$$

The intensity of the color formed is proportional to the iron concentration in the sample.

MATERIALS

REAGENTS

R 1 Buffer	Acetate pH 4.9	100 mmol/L
R 2 Reductant	Ascorbic acid	99.7%
R 3 Color	FerroZine	40 mmol/L
IRON CAL	Iron aqueous primary standard	100 µg/dL

EQUIPMENTS NEEDED BUT NOT PROVIDED

- Spectrophotometer or colorimeter measuring at 562 nm.
- Matched cuvettes 1.0 cm light path.
- General laboratory equipment

PREPARATION

- Working reagent (WR):
  Dissolve the content of one vial R2 Reductant in one bottle of R1 Buffer. Cap and mix gently to dissolve contents.
- Stability: 3 months at 2-8°C or 1 month at 15-25°C.

STORAGE AND STABILITY

- All the components of the kit are stable until the expiration date on the label when stored tightly closed at 2-8°C, protected from light and contaminations prevented during their use.
- Do not use reagents over the expiration date.

SIGNS OF REAGENT DETERIORATION

- Presence of particles and turbidity.
- Blank absorbance (A) at 562 nm $\geq$ 0 .020.

SAMPLES

- Serum or heparinized plasma.
- Free of hemolysis and separated from cells as rapidly as possible.
- Stability of the sample: 2-8°C for 7 days.

PROCEDURE

1. Assay conditions:
   Wavelength:.....562 nm (530-590).
   Cuvette: ..... 1 cm light path.
   Temperature..... 37°C / 15- 25°C.
2. Adjust the instrument to zero with distilled water.
3. Pipette into a cuvette:

	Reagent Blank	Standard	Sample Blank	Sample
WR (mL)	1.0	1.0	1.0	1.0
R 3 (drops)	1 (50µl)	1 (50µl)	--	1 (50µl)
Distilled water (µL)	200	--	--	--
Standard (µL)	--	200	--	--
Sample (µL)	--	--	200	200

4. Mix and incubate 5 min at 37°C or 10 min at room temperature.
5. Measure the absorbance (A) of Standard and sample against reagent Blank. The colour is stable for at least 30 minutes.

CALCULATIONS

$$\frac{\text{(A) Sample} - \text{(A) Sample Blank} - \text{(A) Reagent Blank}}{\text{(A) Standard} - \text{(A) Reagent Blank}} \times 100 (\text{Standard Conc.}) = \mu g/dL \text{ iron}$$

Conversion factor: µg/dL x 0.179= µmol/L.

QUALITY CONTROL

- Control sera are recommended to monitor the performance of assay procedures.
- If control values are found outside the defined range, check the instrument, reagents and calibrator for problems.
- Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

REFERENCE VALUES

Male	65 - 175 µg/dL =	11.6 – 31.3 µmol/L
Female	40 - 150 µg/dL =	7.16 - 26.85 µmol/L

NOTE

These values are for orientation purpose; each laboratory should establish its own reference range.

PERFORMANCE CHARACTERISTICS

Measuring range:

From *detection limit* of 0.850 µg/dL to *linearity limit* of 1000 µg/dL.

If the results obtained were greater than linearity limit, dilute the sample 1/2 with NaCl 9 g/L and multiply the result by 2.

Precision:

	Intra-assay (n=20)		Inter-assay (n=20)	
Mean(µg/dL)	113	250	111	249
SD	0.89	0.72	3.51	6.29
CV (%)	0.79	0.29	3.17	2.52

Sensitivity:

1 µg/dL = 0.00104.

Accuracy:

Results obtained using ATLAS reagents did not show systematic differences when compared with other commercial reagents.

The results obtained using 50 samples were the following :

Correlation coefficient (r)2:0.9934.

Regression equation : y= 1.0243x – 3.877.

The results of the performance characteristics depend on the analyzer used.

INTERFERENCES

- Hemolyzed samples are rejected, since erythrocytes contain iron and therefore falsely elevate the serum results.
- A list of drugs and other interfering substances with iron determination has been reported.

NOTES

1. Iron STD: proceed carefully with this product because due its nature it can get contamined easily.
2. It is recommended to use disposable material. If glassware is used the material should be soaking for 6 h in diluted HCl (20% v/v) and then thoroughly rinsed with distilled water and dried before use.
3. Calibration with the aqueous standard may cause a systematic error in automatic procedures. In these cases, it is recommended to use a serum Calibrator.
4. Use dean disposable pipette tips for its dispensation.
5. The reference values are strongly method dependent.

REFERENCES

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PPI1517A01

Revision A (02.09.2019)

REF	Catalogue Number		Temperature limit
IVD	*In Vitro* diagnostic medical device		Caution
Σ	Contains sufficient for <n> tests and Relative size		Consult instructions for use (IFU)
LOT	Batch code		Manufacturer
	Fragile, handle with care		Use-by date
	Manufacturer fax number		Do not use if package is damaged
	Manufacturer telephone number		Date of Manufacture
	Keep away from sunlight		Keep dry