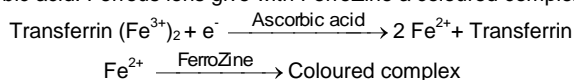


**Quantitative determination of iron IVD**

Store at 2-8°C

**PRINCIPLE OF THE METHOD**

The iron is dissociated from transferrin-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:



The intensity of the color formed is proportional to the iron concentration in the sample<sup>1,2</sup>.

**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<sup>1,5,6</sup>.

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

**REAGENTS**

<b>R 1</b>	Buffer	Acetate pH 4,9	100 mmol/L
<b>R 2</b>	Reductant	Ascorbic acid	99,7%
<b>R 3</b>	Color	FerroZine	40 mmol/L

**PREPARATION**

Working reagent (WR):

- Ref: 1001247. Dissolve (→) the contents of one tube R 2 Reductant in one bottle of R 1 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 ≥ 0,020.

**ADDITIONAL EQUIPMENT**

- Spectrophotometer or colorimeter measuring at 562 nm.

- Matched cuvettes 1,0 cm light path.

- General laboratory equipment<sup>(Note 2)</sup>.

**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<sup>1</sup>.

**PROCEDURE**

1. Assay conditions:

Wavelength: ..... 562 nm (530-590)

Cuvette: ..... cm light path

Temperature: ..... 37°C / 15- 25°C

2. Adjust the instrument to zero with distilled water.

3. Pipette into a cuvette:

	WR Blank	Standard	Sample Blank	Sample
WR (mL)	1,0	1,0	1,0	1,0
R 3 (μL)	250	250	--	250
Distilled water (μL)	200	--	--	--
Standard <sup>(Note 1,3,4)</sup> (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 WR Blank. The colour is stable for at least 30 minutes.

**CALCULATIONS**

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

**Conversion factor:** μg/dL x 0,179= μmol/L.

**QUALITY CONTROL**

Control sera are recommended to monitor the performance of assay procedures: CONTROL Normal and Pathologic.

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** <sup>(Note 5)</sup>

Male 65 - 175 μg/dL ≅ 11,6 - 31,3 μmol/L<sup>(Note 4)</sup>

Female 40 - 150 μg/dL ≅ 7,16 - 26,85 μmol/L<sup>(Note 4)</sup>

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

**PERFORMANCE CHARACTERISTICS**

*Measuring range:* From *detection limit* of 1.85 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)	102	190	107	193
SD	0,88	1,31	1,26	1,57
CV (%)	0,86	0,69	1,18	0,81

*Sensitivity:* 1 μg/dL = 0,0009 A.

*Accuracy:* Results obtained using Audit Diagnostics reagents did not show systematic differences when compared with other commercial reagents.

The results obtained using 50 samples were the following:

Correlation coefficient (r): 0,987.

Regression equation: y= 1,0052x - 2,3159.

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<sup>1,2</sup>.

A list of drugs and other interfering substances with iron determination has been reported by Young et. al<sup>3,4</sup>.

**NOTES**

1. 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.
2. Calibration with the aqueous standard may cause a systematic error in automatic procedures. In these cases, it is recommended to use a serum Calibrator.
3. Use clean disposable pipette tips for its dispensation.
4. The reference values are strongly method dependent.
5. **Audit Diagnostics has instruction sheets for several automatic analyzers. Instructions for many of them are available on request.**

**BIBLIOGRAPHY**

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