en

# Eisen

## Ferrozin / TGA • manuell PL/PR, Endpunkt

## Characteristics

Ready-to-use reagent for ferrozine method without protein deproteinization.
Performed using PL/PR technique.
Evaluation using extinction coefficients or using standard if not measured at Hg 578 nm or 562 nm.

## Principle

Iron bound to transferrin is separated by acetate buffer/thioglycolic acid and reduced to $Fe^{2+}$.
Ferrozin <3-(2-Pyridyl)-5,6-bis(4-phenylsulfonsäure)-1,2,4-triazin-di-Natrium> reacts with $Fe^{2+}$ to a red-blue color complex (chelate) with maximum extinction at 562 nm.

$$nFe^{3+} \cdot TF(\text{Transferrin}) \xrightarrow[\text{TCA}]{\text{Buffer}} nFe^{2+} + n(2H^{+}) + TF$$

$$2Fe2+ + 6\ Ferrozin2- \Rightarrow 2(Fe \cdot Ferrozin3)4-$$

## Reagents

The reagents are originally closed and stored at room temperature (max. +25 °C) stable until the expiration date.

### *Risks and Safety*

Please observe the necessary precautions for use of laboratory reagents and body fluids. Applications should be performed by expert personnel only. Follow the national and laboratory internal guidelines for work safety and infection control. Wear suitable protective clothing and disposable gloves while handling.
It is important to ensure effective protection against infection according to laboratory guidelines.

SDS ID International
www.sds-id.com

For additional safety information please refer to the information on the label and the corresponding Safety Data Sheet (SDS).
Download by QR-Code or link:
www.sds-id.com/100-7 (Eisen Leerwert + Eisen Ferrozin)

### *Main Components*

| | | | | |
|---|---|---|---|---|
| 006571-... | Cont. | | | 1.45 mol/L Acetic acid/Acetate/TGA Buffer pH = 4.25 |
| 006572-... | Cont. | | | 1.45 mol/L Acetic acid/Acetate/TGA Buffer pH = 4.25 + 0.2 g/l Ferrozin |
| 006516-... | Cont. | | | 25.0 µmol/L = 140 µg/dl $Fe^{3+}$ (buffered) |
| **006570-6001** | **KIT** | **4×** | **100 ml** | Iron **Ferrozin (ready to use)** |
| 006571-0100 | R1 | 2× | 100 ml | Iron Blank |
| 006572-0100 | R2 | 2× | 100 ml | Iron Ferrozin (Chromogen) |
| **006570-6002** | **KIT** | **2×** | **500 ml** | Iron **Ferrozin (ready to use)** |
| 006571-0500 | R1 | 1× | 500 ml | Iron Blank |
| 006572-0500 | R2 | 1× | 500 ml | Iron Ferrozin (Chromogen) |

Additionally required

| | | | | |
|---|---|---|---|---|
| 006516-0010 | CAL | 1× | 10 ml | Calibrator (Standard) |
| 006516-0050 | CAL | 1× | 50 ml | Calibrator (Standard). |

## Specimen

Serum, heparin plasma: stable at + 4 °C for 7 days, at room temperature for 4 days.
Do not use hemolytic samples.

### *Preanalytics*

Centrifuge samples immediately. When collecting blood, do not use the first 2 ml for Fe determination, as Fe residues may be aspirated from the disposable cannula. This can lead to increased Fe values!
Only use iron-free disposable material.

## Reference Ranges

| | [µmol/l] | [µg/dl] |
|---|---|---|
| Males: | 9.5 ... 29.9 | 53 ... 167 |
| Females: | 8.8 ... 27.0 | 49 ... 151 |

Increased iron levels may be caused by hormonal contraceptives. The iron level in serum fluctuates day to day up to 30 %, during the day up to 32 %.
In the morning the iron level is higher then in the evening. The iron level decreases with aging.

## Diagnostics

Diagnoses should only be made by authorized and trained persons. Valid nomenclatures are to be used.
Further tests are to be selected and carried out according to recognised methods. Suitable controls should be carried with each application in order to exclude a faulty result.

### *Diagnostic relevance*

Due to the high fluctuations of the iron level in sera from day to day, diagnostic conclusions should be drawn only after repeated testing with similar results. A single analysis has only low diagnostic relevance. A useful diagnostic method to complete the analysis of iron in serum is to test the total and latent (unsaturated) iron-binding capacity (TIBC, UIBC).

### *Diseases, causing decreased iron level:*

- Acute blood loss due to severe external or internal bleeding
- Chronic blood loss (e. g. occult gastrointestinal bleeding)
- Menstrual blood loss
- Hookworm infection (Ankylostoma duodenale)
- Iron absorption disorder (e. g. celiac disease)
- Bacterial infections, inflammations, malign tumors
- Nephrotic syndrome, exudative enteropathy, atransferrinemia
- Malnutrition (Fe-uptake < 10 mg/day), increased need for iron (e. g. due to pregnancy, during growth)

### *Diseases, causing increased iron level:*

- Necrotic liver parenchyma
- Pancreatic insufficiency
- Thalassaemia major
- Vitamin B6 deficiency
- Plumbism
- Idiopathic hemochromatosis



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## Procedure

Wavelength:..... 562 nm, Hg 578 nm
Optical path length:..... 10 mm
Temperature:..... +20 ... +37 °C
Measuring mode:..... Sample/Sample blank (SA / SB)

Add in reaction tube or cuvette:

| | | RB | CAL | SB | SA |
|---|---|---|---|---|---|
| **Aqua p.a.** | | **100 µl** | **—** | **—** | **—** |
| **CAL** | **Standard** | **—** | **100 µl** | **—** | **—** |
| **SA** | **Sample** | **—** | **—** | **100 µl** | **100 µl** |
| **R1** | **Blank** | **—** | **—** | **500 µl** | **—** |
| **R2** | **Ferrozin** | **500 µl** | **500 µl** | **—** | **500 µl** |

Mix and after 5 ... 60 minutes measure samples ($E_{SA}$) against sample blank ($E_{SB}$).

The reagent blank value ($E_{RB}$) must be subtracted from the measured values (determined once per series). For this purpose, Aqua p.a. is used as a sample. For calculation via standard (CAL), this is also treated as a sample.

The determination is very sensitive to technical delays during the measurement! To avoid carry-over, proceed as follows when measuring via suction cuvette:

- Set the photometer with reagent R1 to zero. First measure all SB.
- Set photometer with R1 to zero, then measure ST and all SA if necessary.

The zero position with RB means that the RB has already been subtracted.

Pre-rinse the suction cuvettes with a part of the preparation. If the volume is not sufficient for pre-rinsing, the preparation can be doubled if necessary.

## Evaluation/Calculation

$$E_{SA} - E_{SB} - E_{RB} = \Delta E_{SA}$$

1a. by extinction coefficient (Hg 578 nm)

µmol/L Fe = $\Delta E_{SA} \times 238$
µg/dL Fe = $\Delta E_{SA} \times 1330$

1b. by extinction coefficient (562 nm)

µmol/L Fe = $\Delta E_{SA} \times 218$
µg/dL Fe = $\Delta E_{SA} \times 1220$

2. by standard

µmol/L Fe = $\Delta E_{SA} \times (25 / E_{CAL})$
µg/dL Fe = $\Delta E_{SA} \times (140 / E_{CAL})$

3. Conversion

µg/dL Fe = µmol/L × 5.59

mg/L [ppm] Fe = µmol/L × 0.0559

Nomenclature

CAL = Calibrator (Standard)
$E_{SA}$ = Extinktion/Absorbance Sample
$E_{SB}$ = Extinktion/Absorbance Sample Blank
$E_{RB}$ = Extinktion/Absorbance Reagent Blank
$E_{ST}$ = Extinktion/Absorbance Standard

## Quality Controls and Proficiency Test

The national guidelines for quality assurance must be followed.

Suitable controls should be conducted with each application in order to avoid an incorrect result. For control of precision and accuracy using a suitable control material is recommended. Results

## Performance Characteristics

### *Measuring range/detection limits*

The method is specific for iron in serum/plasma and linear up to at least 200 µmol/l = 1100 µg/dl.

If the range is exceeded, samples 1 + 2 should be diluted with NaCl 0.9 %. The result should then be multiplied by factor 3.

### *Interferences*

Hemolysis.

Increased values are also obtained by hormonal contraceptives.

Use of non-iron-free materials (e.g. sample needle) leads to incorrectly elevated results.

## Notes

This product information exclusively relates to the product described in this leaflet. In particular, this product information cannot be applied to similar reagents from other manufacturers.

Periodically check for updates of this product information on our website.

### *Classifications*

Not for human diagnostics.

### *Instructions for use*

For professional use only.

To avoid errors, the use of qualified personnel is carried out. National guidelines for work safety and quality assurance must be followed.

The used equipment must comply with the state of technology and the laboratory requirements.

All samples and used tubes/vials must be marked clearly identifiable to exclude any confusion.

### *Protection against Infection*

It is important to ensure effective protection against infection according to laboratory guidelines.

Laboratory personnel working with human samples should at a minimum be immunized against Hepatitis B (HBV).

### *Technical information*

Cleaning: Rinse the flow-through cell with 2 % "Flush-solution" (REF 002650).

### *Support / Information service*

For methodological and technical support, please contact us by E-Mail at support@bioanalytic.de.

Periodically check for updates of this product information on our website.

### *Feedback*

Information from users can be reported to support@bioanalytic.de.

Suggestions for further developments will be considered.

### *Waste Management*

Please observe your national laws and regulations.

Used and expired solutions must be disposed of in accordance with your local regulations.

Inside the EU, national regulations apply that are based on the current, amended version of Council Directive 67/548/EEG on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances.

Decontaminated packaging can disposed of as household waste or recycled, unless otherwise specified.

Unused Remains

These are usually hazardous wastes that must be recycled or disposed of. After consultation we take back such residual materials in the original container.

## Literature & Footnotes

Legends for the graphic symbols and tags used follow relevant norms or are available on our internet pages.