Total iron-binding capacity indicates the maximum amount of iron necessary to saturate all available transferrin iron-binding sites. Therefore, TIBC correlates well with transferrin concentration. Measurements of TIBC, serum iron, and the ratio of serum iron to TIBC (transferrin saturation) are widely used for the clinical diagnosis and monitoring of treatment for iron-deficiency anemia and chronic inflammatory diseases as well as for screening tests for other clinical goals. Methods of TIBC determination: calculated TIBC, indirect, direct.
**Calculated TIBC**

TIBC may be calculated from the sum of measured unsaturated iron-binding capacity (UIBC) and measured iron (Fe):

\[
\text{TIBC} = \text{UIBC} + \text{Fe}
\]

- This approach requires two separate analyses: serum iron and serum UIBC.
- Moreover, when either serum iron or UIBC values are below the detection limit, the TIBC value cannot be calculated.

**Indirect determination of TIBC**

The indirect procedure involves centrifugation or pretreatment of serum samples to remove unbound iron after transferrin saturation:

- An excess of iron is added to fully saturate all serum iron-binding sites.
- Any remaining free iron is then removed by a solid-phase adsorbent (magnesium carbonate).
- The TIBC is determined by a serum iron test. This method requires a separation step and manual manipulation of the samples.

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**Direct determination of TIBC (d-TIBC)**

**Principle of the test:**

Step A: \( \text{Fe}^3+ + \text{CAB} \Rightarrow \text{Fe} - \text{CAB} + \text{TRF} / \text{pH} \geq 4.5 / \)

Step B: \( \text{Fe} - \text{CAB} + \text{TRF} \Rightarrow \text{Fe} - \text{TRF} + \text{Fe} - \text{CAB} / \text{pH} \geq 7.2 / \)

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**Direct TIBC reagent set**

**Reagent 1 contains:**

- CAB (chromazurol B)
- CTAB (cetrimide)
- \( \text{FeCl}_3 \) (ferric chloride)
- in acetate buffer - pH \( \geq 4.5 \)

**Reagent 2 contains:**

- \( \text{NaHCO}_3 \) (sodium bicarbonate)
- in MOPS buffer - pH \( \geq 7.2 \)

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**Specification**

**Reagent preparation:**

- R1 and R2 are ready to use

**Reagent storage:**

- 2 - 8°C ≤ 12 months

**Specimen storage and collection:**

- Serum is the specimen of choice
- Serum may be stored at 2 - 8°C up to 1 month
- Serum can be stored at 20 - 25°C for 2 weeks

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**Comparison**

**Commercial reagent set of the same methodology d-TIBC:**

- Linearity between 70 and 700 μg / dL TIBC
- Correlation R = 0.991 (Hitachi / Cobas)
- Stability of the calibration 7 days
- On board stability 7 days

**Cormay d-TIBC reagent set:**

- Linearity between 50 and 850 μg / dL TIBC
- Correlation R = 0.987
- Stability of the calibration ≥ 7 days
- On board stability 14 days

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**Excelent linearity**

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**Conclusions**

Cormay d-TIBC determination reduces the time associated with the assay, can reduce sample manipulation steps, can be conducted in a single vessel and in a relatively short period of time.

Cormay d-TIBC Reagent Set can be applied to any automated chemical analysers.

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