Quantitative determination of chloride ion

1. **IVD**

Store at 2-8°C

2. **PRINCIPLE OF THE METHOD**

The quantitative displacement of thiocyanate by chloride from mercuric thiocyanate and subsequent formation of a red ferric thiocyanate complex is measured colorimetrically:

\[
2 \text{Cl}^- + \text{Hg(SCN)}^- \rightarrow \text{HgCl}_2 + 2 \text{SCN}^- \\
\text{SCN}^- + \text{Fe}^{3+} \rightarrow \text{Fe(SCN)}^2^+ 
\]

The intensity of the color formed is proportional to the chloride ion concentration in the sample.\(^1,2,3,4\)

3. **CLINICAL SIGNIFICANCE**

It is important clinically the determination of chloride due regulation of osmotic pressure of extra cellular fluid and to its significant role in acid-base balance. Increases in chloride ion concentration may be found in severe dehydratation, excessive intake of chloride, severe renal tubular damage and in patients with cystic fibrosis.

Decrease in chloride ion concentration may be found in metabolic acidosis, loss from prolonged vomiting and chronic pylonephritis.\(^1,2,3,4\)

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

4. **PROCEDURE**

- In refrigerator (2-8°C), in refrigerator (2-8°C), or frozen (-20°C) until the expiration date on the label
- Prevented during their use

5. **STORAGE AND STABILITY**

- Refrigerator (2-8°C), in refrigerator (2-8°C), or frozen (-20°C) until the expiration date on the label
- Prevented during their use

6. **ADDITIONAL EQUIPMENT**

- Spectrophotometer or colorimeter measuring at 480 nm.
- Matched cuvettes 1.0 cm light path.
- General laboratory equipment

7. **SAMPLES**

- Serum, plasma, CSF, sweat and other body fluids.\(^1,2\)
- Free of hemolysis and separated from cells as rapidly as possible.
- Anticoagulants such as oxalate or EDTA are not acceptable they will interfere with results.
- Urine.\(^5\)
- Collect 24-hour urine specimen in chloride free containers. Dilute a sample 1/2 in distilled water. Mix. Multiply results by 2 (dilution factor).
- Stability of the sample: Ion chloride is stable 1 week at room temperature (15-25°C), in refrigerator (2-8°C) or frozen (-20°C) temperatures.

8. **CALCULATIONS**

(A) Sample

\[
\text{mmol/L} = \frac{\text{Absorbance} \times \text{Volume} \times \text{Conversion factor}}{\text{Sample volume}}
\]

(A) Standard

\[
\text{mmol/L} = \frac{\text{Absorbance} \times \text{Volume} \times \text{Conversion factor}}{\text{Sample volume}}
\]

9. **QUALITY CONTROL**

- Control sera are recommended to monitor the performance of assay procedures: SPINTRON H Normal and Pathologic (Ref. 1002120 and 1002210).
- Interference levels 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.

10. **REFERENCE VALUES**

- Serum or plasma: 95 - 115 mmol/L
- CSF: 95 - 110 mmol/L
- Urine: 110 - 250 mmol/24h
- Sweat: Up to 60 mmol/L

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

11. **PERFORMANCE CHARACTERISTICS**

- Measuring range: From detection limit of 0.033 mmol/L to linearity limit of 190 mmol/L.
- If the results obtained were greater than linearity limit, dilute the sample 1/2 with distilled water and multiply the result by 2.

12. **INTERFERENCES**

- Hemolysis. Anticoagulants other than heparin.\(^1\)
- Bilirubin up to 120 mg/L, bovine serum albumin up to 150 g/L and triglycerides up to 6 mmol/L did not significantly alter the assay.\(^6\)

A list of drugs and other interfering substances with chloride determination has been reported.\(^1,2,3\)

13. **NOTES**

- CHLORIDE CAL: Proceed carefully with this product because due its nature it can get contaminated easily.
- It is recommended to use disposable material. If glassware is used the material should be scrupulously cleaned with H₂SO₄ - K₂Cr₂O₇ Solution and then thoroughly rinsed with distilled water.
- Most of the detergents and water softening products used in the laboratories contains chelating agents. A defective rinsing will invalidate the procedure.
- Avoid the contact with metal materials.
- Calibration with the aqueous standard may cause a systematic error in automatic procedures. In these cases, it is recommended to use a serum Calibrator.
- Use clean disposable pipette tips for its dispensation.

14. **PACKAGING**

- Ref: 1001360
- Cont: R: 2 x 150 mL, CAL: 1 x 5 mL

BSIS10-I 13/06/13

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**BIBLIOGRAPHY**