Nitrate

Sources

- **Fertilizers and manure**
- **Decayed vegetable**
- **Animal feedlots**
- **Municipal wastewater and sludge disposal to land**
- **Industrial discharges**
- **Leachates from refuse dumps**
- **Septic systems and**
- **N-fixation from atmosphere by bacteria and lightning**

Chloride

Presence in Natural Waters

- Dissolution of salt deposits
- Discharges of effluents
- Oil well operations
- Sewage discharges
- Irrigation drainage
- Sea water intrusion in coastal areas

Chloride

Methodology : An Argentometric Method

- Principle

Chloride is determined in a natural or slightly alkaline solution by titration with standard silver nitrate, using potassium chromate as an indicator. Silver chloride is quantitatively precipitated before red silver chromate is formed.

$$\text{Chloride mg/L} = \frac{(A-B) \times N \times 35.45 \times 1000}{ml \ sample}$$

Where A = ml $AgNO_3$ required for sample

B = ml $AgNO_3$ required for blank

N = Normality of $AgNO_3$ used

Methods for Nitrate Estimation

A) Ultraviolet Spectrophotometric Method

- Useful for uncontaminated natural waters and potable water supplies that have low organic content

- Follows Beer's law upto 11 mg/L as N

- Interferences

  - Dissolved Organic Matter

  - Surfactants

  - Nitrite and Hexavalent Chromium

- Procedure

  - Filter the sample

  - Add 1 ml of 1N HCl per 50 ml of sample

  - Read absorbance or tranmittance at 220 nm and 275 nm

  - Set 0 absorbance or 100% tranmittance with distilled water

B) Nitrate Electrode Method

- Useful for Nitrate concentration range of 0.14 to 1400 mg/L NO_3-N

- Interferences

  - Chloride and bicabonate with weight ratios to NO_3-N >10 or >5 respectively
  - NO_2, CN, Sulphide, Br, I, Chlorite and Chlorate

C) Phenoldisulphonic Acid (PDA) Method

- Nitrate reacts with Phenoldisulphonic acid to produce nitro derivatives that in alkaline solution rearranges its structure to form yellow colored compound with characteristics that follows Beer's law

- Chloride interferes seriously which can be overcome by precipitation of chloride with Ag^+ as AgCl