Indicator Organisms

Concept: Certain non-pathogenic bacteria and viruses occur naturally in the feces of warm-blooded animals.

- Use as indicators of fecal contamination.

- **Total coliforms:** Escherichia, Citrobacter, Enterobacter, Klebsiella
  - Definition: aerobic, facultative anaerobic, G- bacteria that produce gas and acid upon lactose fermentation within 48 hours at 35°C.
  - 3 common methods for testing:
    1. MPN test (Most Probable Number test)
      - 3 Steps:
        a. presumptive test (identifies P/A)
        b. confirmatory test
        c. complete test (double-check)
    2. MF test (Membrane Filtration)
    3. P/A test (Presence/Absence)
      - not quantitative
      - typically utilizes color indicators

- **Fecal Coliforms:** Escherichia, Klebsiella
  - Can carry out lactose fermentation at temperatures up to 44.5°C in 24 hours
    - E. coli: β- glucuronidase

- **Fecal Streptococci:** Enterococcus, Streptococcus
  - Definition: G+ bacteria; can tolerate 6.5% NaCl, a pH of upto 9.6 at 45°C.

- **Clostridium Perfringens**
  - Definition: Sulfite-reducing anaerobe; forms spores-spores are tolerant to heat

- **Bacteriophages**
  - Bacterial + viral indicators
    - Example: Somatic colifages
    - F-specific RNA coliphages