



Digestion

Definition-to breakdown into simpler forms



Aerobic Digestion

- Breakdown of food or organics using enzymes until Oxygen is the final electron acceptor



Anaerobic Digestion

- Breakdown of food or organics using enzymes until Oxygen is not the final electron acceptor
- CO₂, Nitrates, Sulfates, or organic compounds are the final electron acceptor



Aerobic Digesters

- Need to pump in air - cost



Anaerobic Digesters

- Most common
- Just feed sludge to the digesters
- No air is supplied
- Batch processes
- Continuous feed processes



Anaerobic Digesters

- Two phases
 - Acid forming process- done by the “Acid Formers” bacteria
 - Methane formers process- done by the “Methane formers ” bacteria



Acid Formers

- Bugs take complex organics and CO₂ and convert to Organic acids known as **Acid Fermentation**
- pH in digester will go down to about 6.0 because of the acids formed
- Almost no change in the amount of organic material in the system
- Acid Fermentation occurs more quickly than Methane Fermentation.



Methane Formers

- Bugs take Organic acids and produce Methane gas and CO₂ gas
- Significant breakdown of organic material (sludge) occurs
- Methane is caught in a dome at the top of the digester and Harvested for use in running a electric generators



Temperatures

- Methane bacteria are active at 85 to 95 degrees F
- Then are inhibited from 104 to 122 degrees F
- Methane bacteria are again active at 122 to 140 degrees F
- Which would be easier for a Municipality to achieve?
 - 85 to 95 requires less energy to achieve, therefore most common temperature.



Detention Times

- Methane bacteria have residence times between 2 and 20 days

Most Common Anaerobic Digester problems



Overfeeding- creates "sour digesters" or low ph in digester < 6.0

Must raise pH in order to get the Methane bacteria growing

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Soda Ash is added to raise pH and alkalinity to jump start the Methane bacteria

