Industrial Wastewater to Crop Irrigation

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Industrial Wastewater Background

- **Source of Water**
  - Discharge from Metal Finishing Plant

- **Analysis/Contaminants**
  - pH, suspended solids, toxic metals

- **Treatment**
  - Main focus, remove copper

- **Use**
  - Direct Crop Irrigation
Industrial Wastewater Analysis

- **Analysis Physical Parameters**
  - pH Test - 3.5
  - Turbidity Test - 4.80 NTU
  - TSS- Total Suspended Solids - 120 mg/L
  - TDS- Total Dissolved Solids - 514.5 mg/L
  - Conductivity - 1029µs/cm

- **Analysis Chemical Parameters**
  - Spectrophotometer - .086A
  - BOD/COD - No BOD, COD - 35 mg/L
  - Ion Chromatograph - 15.4 mg/L Phosphate
  - Colorimetric - 1.94 mg/L NH4⁺
Copper Used in Metal Plating

- Toxic Metal Measurement
  - Copper
    - Mixed 4.5mL of Copper solution with 0.5mL ammonia
    - Measured absorptivity of sample

- High levels of copper
  - Toxic to plants
Treatment Method

- **Determine Optimum pH Level For Copper Precipitation**
  - 6 - 0.5L of wastewater
  - NaOH added 0, 0.5, 1, 1.5, 2, 3mL
  - Solubility of Metals is Dependent on pH
  - Results determined 3mL was necessary

- **Determine Optimum PAIC Addition for Copper Concentration Coagulation**
  - 6 - 0.5L of wastewater
  - PAIC coagulant: 0, 50, 200, 400, 600, 1000 µL
  - Measure TSS to determine effectiveness
  - Results determined 1000µL was necessary
Recycling Industrial Wastewater in Israel

- Applications in Israel
  - Direct Crop Irrigation
    - Unrestricted/Restricted

- Applications in California
  - Direct Crop Irrigation: Currently 80% of CA water usage.
Metal Finishing in California

- Copper is used extensively in the chroming and electroplating process of metals.
- Southern California has several chroming and electroplating facilities and washing off the parts carries the contamination to the waste water system.
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