

EDTA-Metal Complexes in Drinking Water

Public Health Implications

Is this harmful?

- **Is there exposure?**
- **What chemicals are involved?**
- **What do we know about these chemicals?**

Exposure

- **To what?**
- **By what route?**
- **How much?**
- **How long?**

The EDTA Part

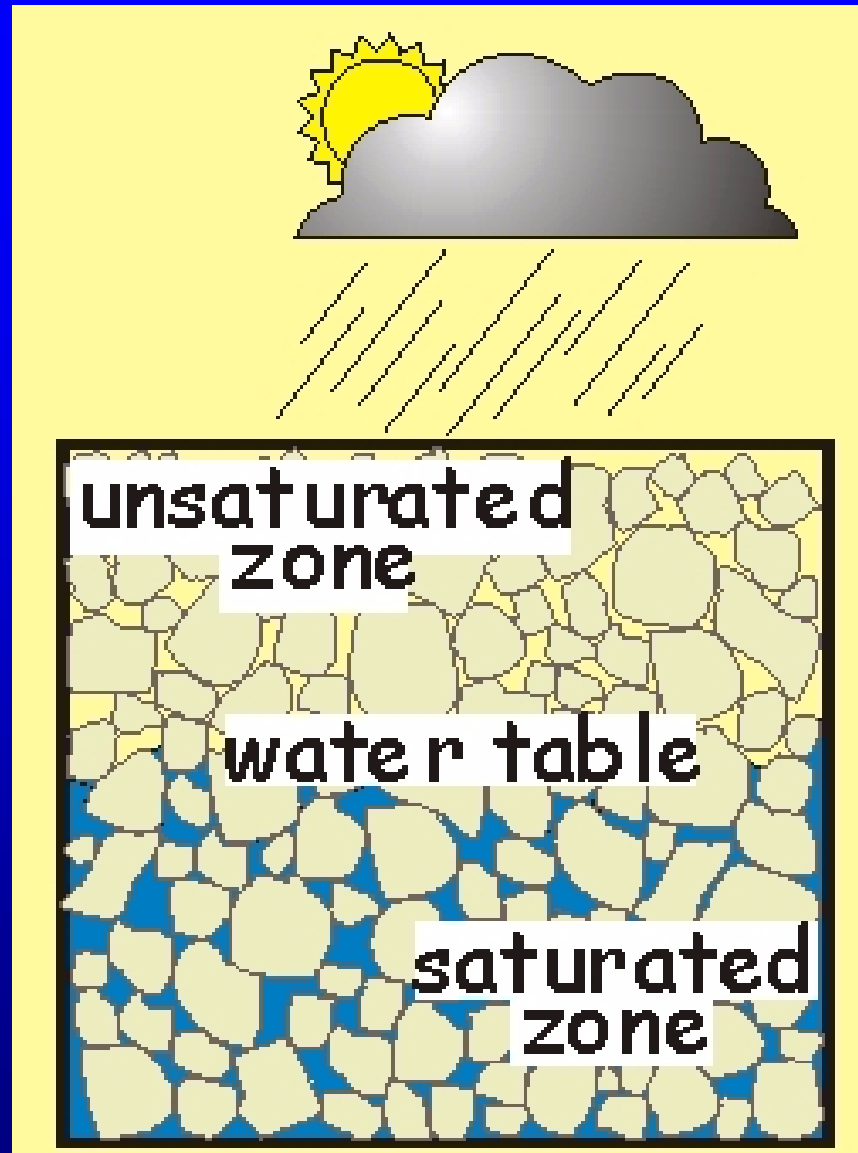
- **Chelator (“claw”)**
- **Used therapeutically for heavy metal poisoning**
- **Used in food processing, other industries**

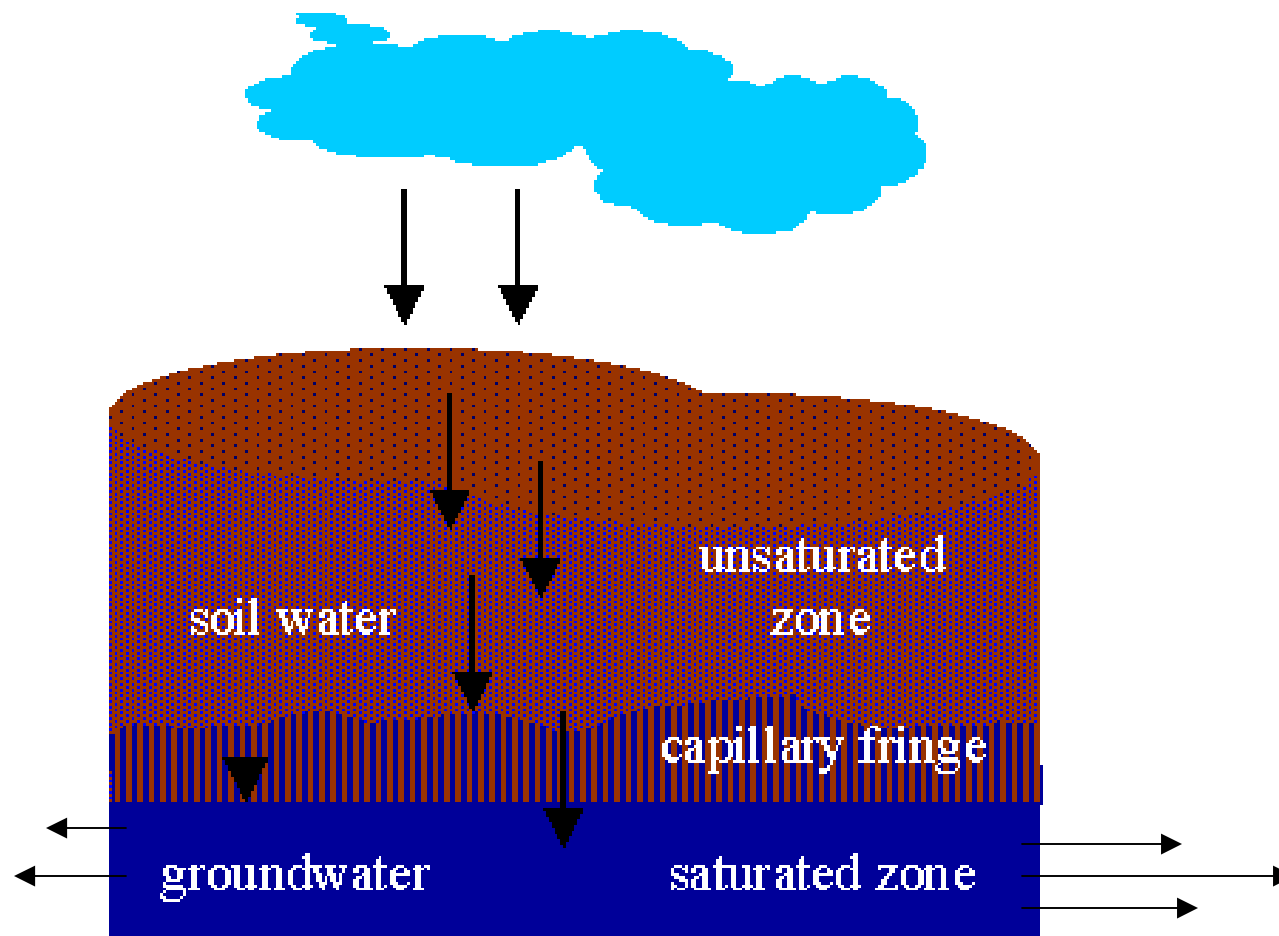
EDTA in Drinking Water

- **Max. found = 12 mg/L**
- **Adult dose at max. = 0.34 mg/kg BW**
- **WHO tolerance dose = 1.9 mg/kg BW**
- **EDTA should not cause a deficiency**

Metals in Drinking Water

- **Anoxic/saturated zone (core of plume):**
 - **Iron**
 - **Manganese**
 - **Arsenic**
- **Oxic/unsaturated zone (edge of plume):**
 - **Cobalt**
 - **Lead**
 - **Nickel**
 - **Cadmium**
 - **Sodium**





Iron

- **Common in Michigan groundwater**
- **Essential nutrient**
- **Max. found = 29.2 mg/L (29,200 ppb)**
- **Criterion**
 - **300 ppb (aesthetic)**
 - **2,000 ppb (health-based)**

Manganese

- **Common in Michigan groundwater**
- **Essential nutrient**
- **Max. found = 2.4 mg/L (2,400 ppb)**
- **Criterion**
 - **50 ppb (aesthetic)**
 - **860 ppb (health-based)**

Arsenic

- **Carcinogen; nutrient??**
- **Max. found = 0.079 mg/L (79 ppb)**
- **Criterion = 10 ppb**

Cobalt

- **Essential nutrient (Vitamin B12); too much affects testes, heart**
- **Max. found = 0.978 mg/L (978 ppb)**
- **Criterion = 40 ppb**

Lead

- **Neurotoxic**
- **Max. found = 0.040 mg/L (40 ppb)**
- **Criterion = 4 ppb**

Nickel

- **Common metal**
- **Allergic reactions (skin)**
- **Max. found = 0.390 mg/L (390 ppb)**
- **Criterion = 100 ppb**

Cadmium

- “Heavy” metal
- Max. found = 0.0034 mg/L (3.4 ppb)
- Criterion = 5 ppb

Sodium

- **Essential nutrient (electrolyte balance, blood pressure)**
- **Max. found = 245 mg/L (245,000 ppb)**
- **Criterion = 120,000 ppb**

Health Implications??

Questions

- **Does the EDTA-metal complex come apart in the stomach or intestine?**
- **If so, to what extent?**
- **Does freed metal then get absorbed?**

Other Considerations

- **Interactions between the metals?**
- **Cadmium – kidney status**
- **Nutritional status (low iron?)**
- **Irrigated locally grown produce/crops**
- **Could locally caught fish be contaminated?**

Conclusions

- **Does *not* appear to be an immediate health threat**
- **Health implications of long-term exposure are unclear**
 - **Did exposure occur?**
 - **How long was exposure?**
 - **Concentration changes over time**

Next Steps

- **MDEQ and Abbott – Determine extent of plume**
- **MDCH**
 - **Continue researching issue**
 - **Request scientific support**
 - **Address community health concerns**
 - **Write health consultation report**

What the public can do:

- If requested, give MDEQ access for water sample
- Contact MDCH with any health concerns regarding this situation:
 - 1-800-648-6942
 - Bushcr@michigan.gov (Christina Bush)