Electrodialytic Remediation of CCA-Treated Waste Wood in Larger Scale

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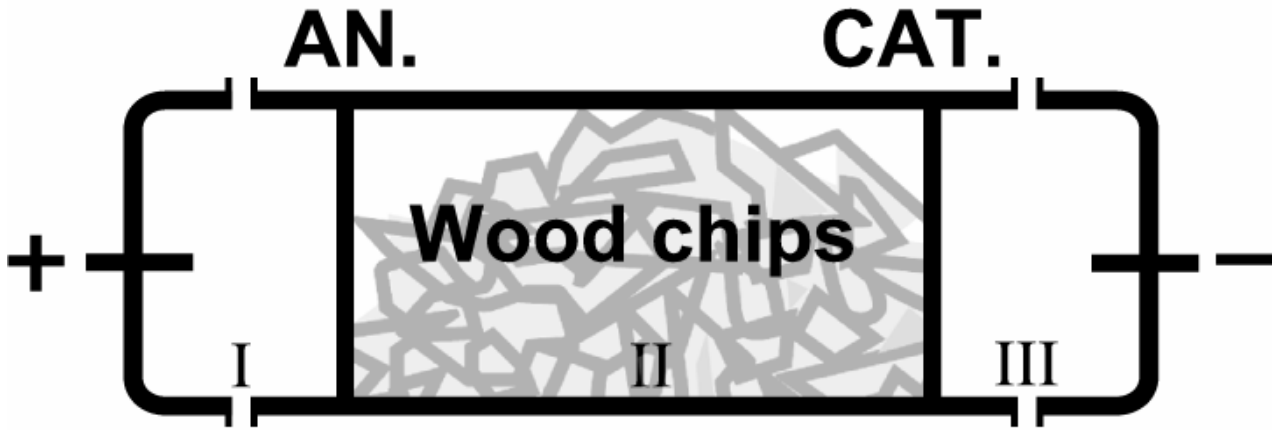
DTU

Electrodialytic Remediation

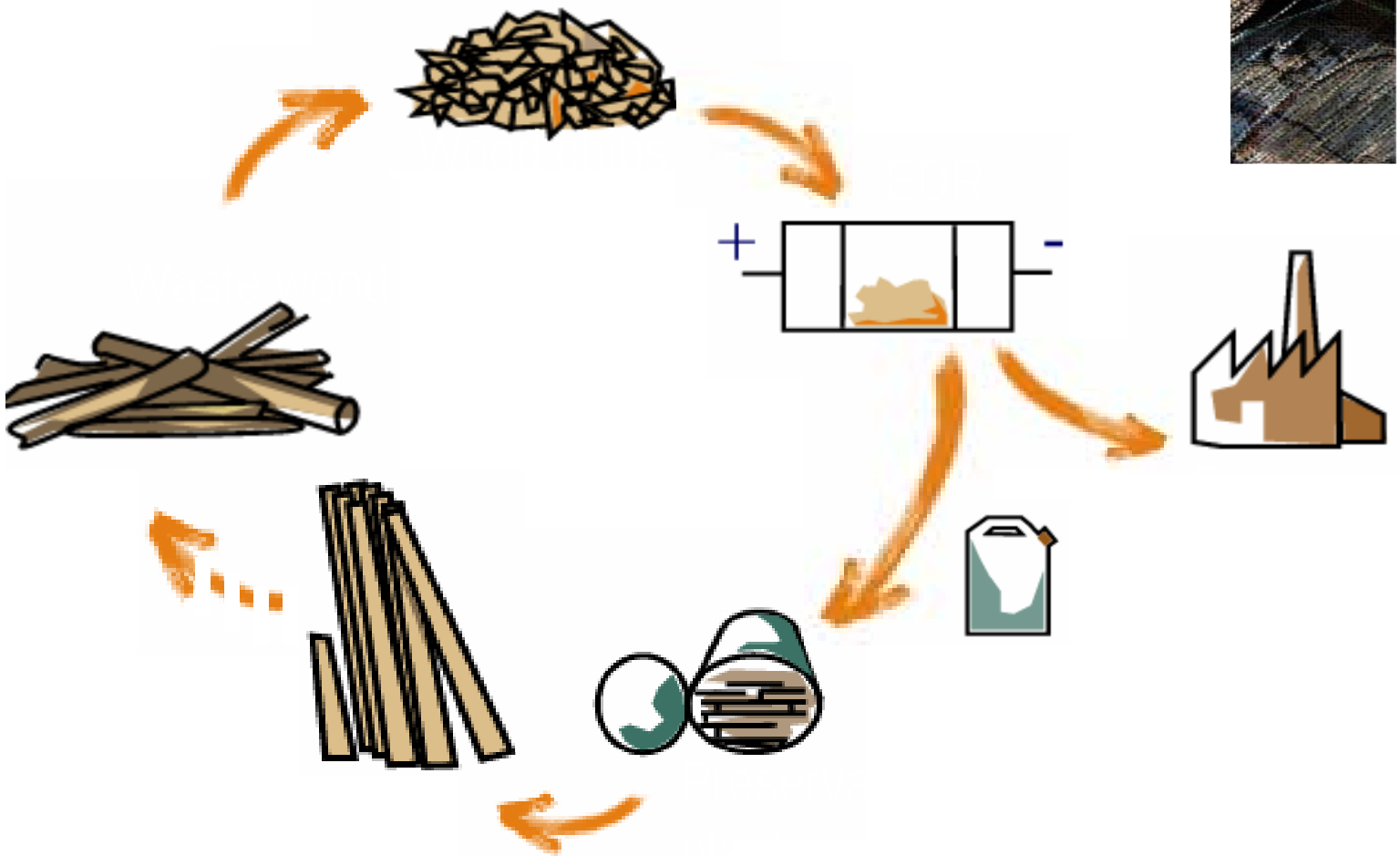
- in principle



AN: Anion exchange membrane

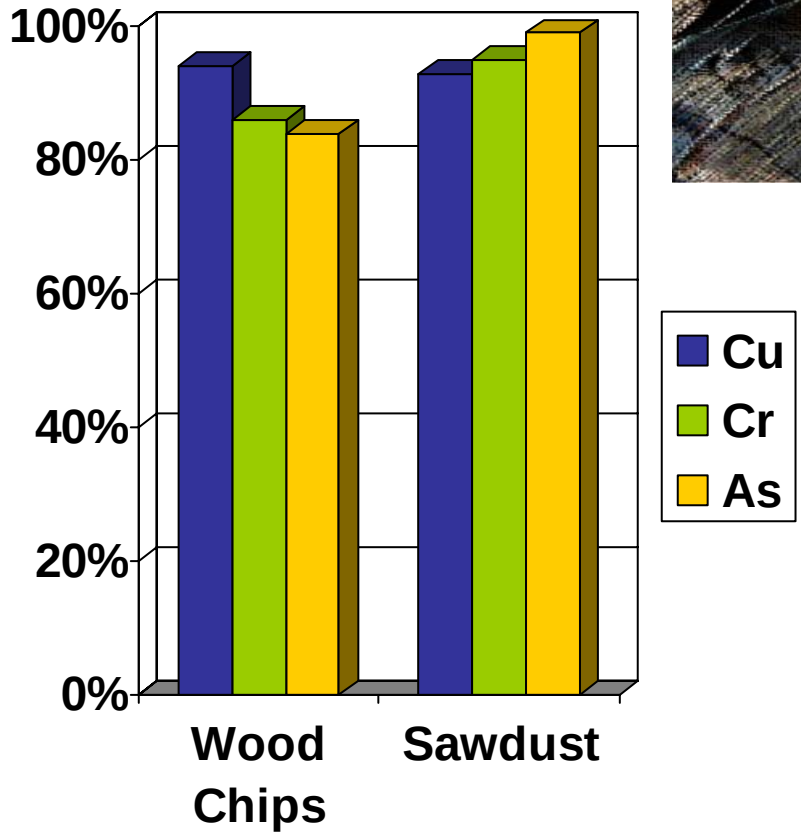
CAT: Cation exchange membrane

Life cycle



Laboratory scale experiments

- CCA treated wood
- Oxalic acid
  - Electrolytes
  - Additive (middle compartment)
- 40 mA DC
  - 2,5 V – 3,2 V
- 7 days (2 days)



Pilot scale

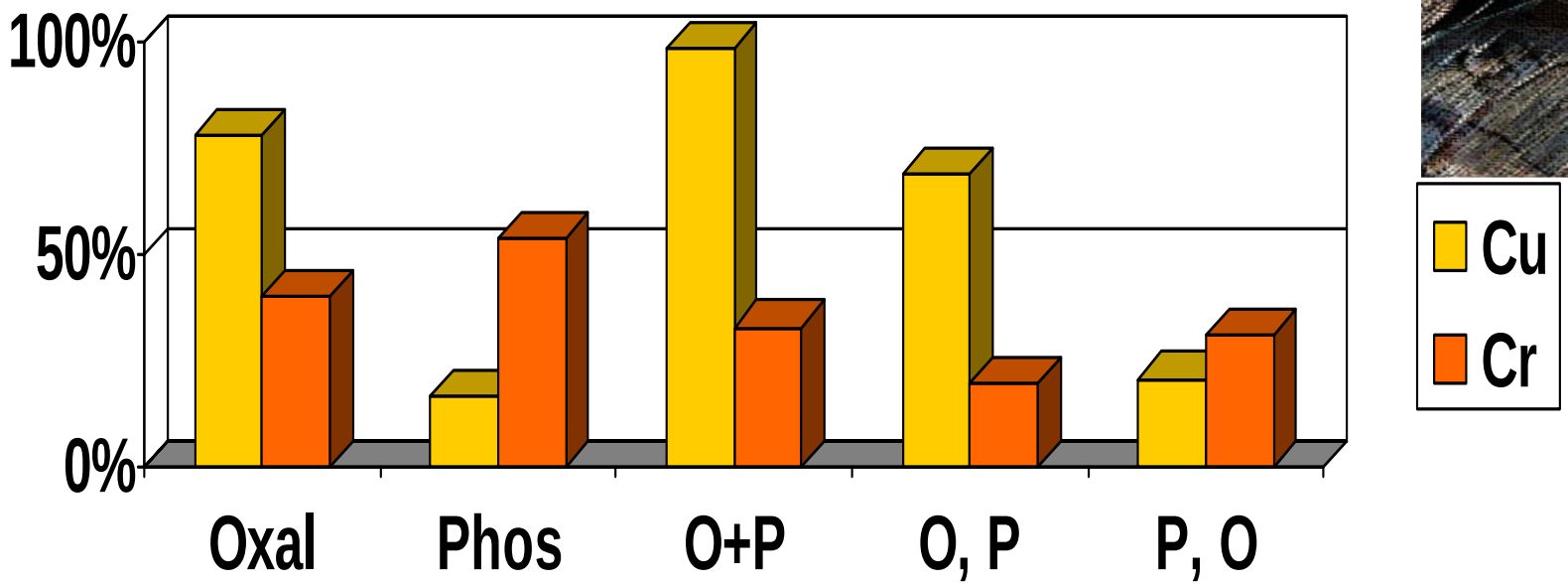
- Remediation of 2 m^3 wood
- Min. distance between electrodes/collecting units:30 cm.
- Max distance app. 3 m
- Unit volume: 20 l
- Membrane surface: 1 m^2

Pilot scale

Experimental parameters

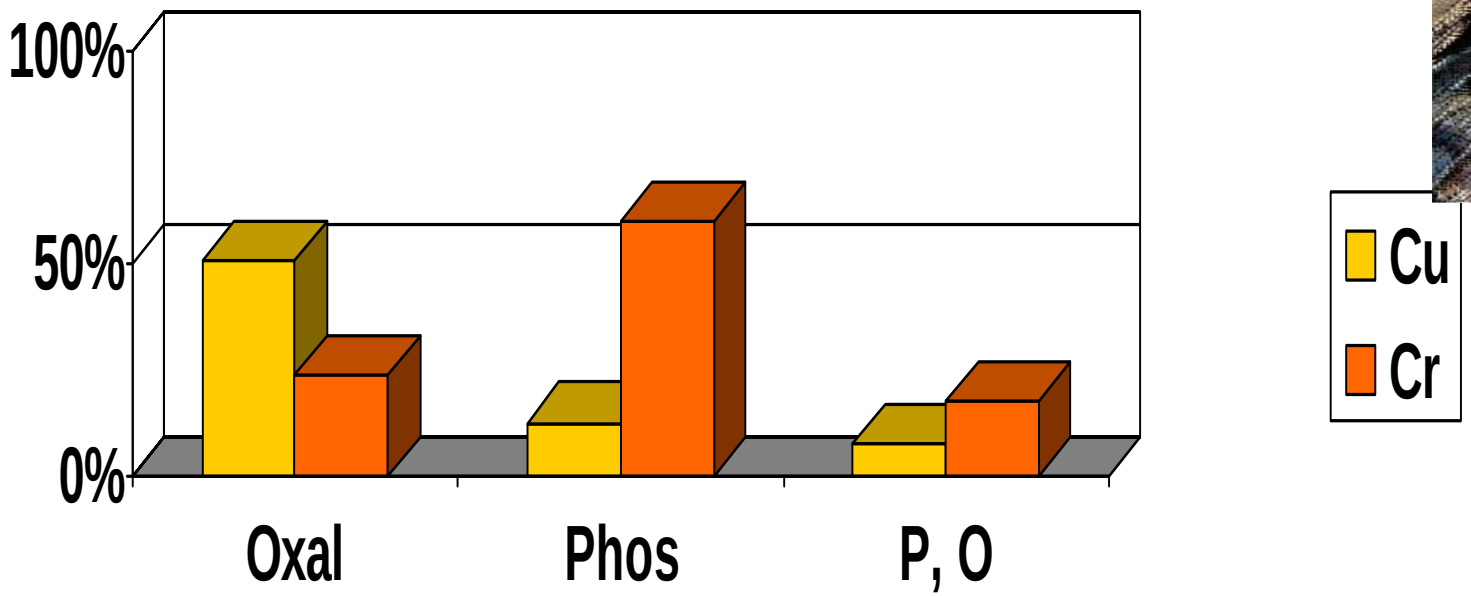
- Collecting Units
- Soaking
- Size of Wood Chips
- Electrode Distance

Soaking -laboratory scale



% in wood after soaking

Remediation -laboratory scale

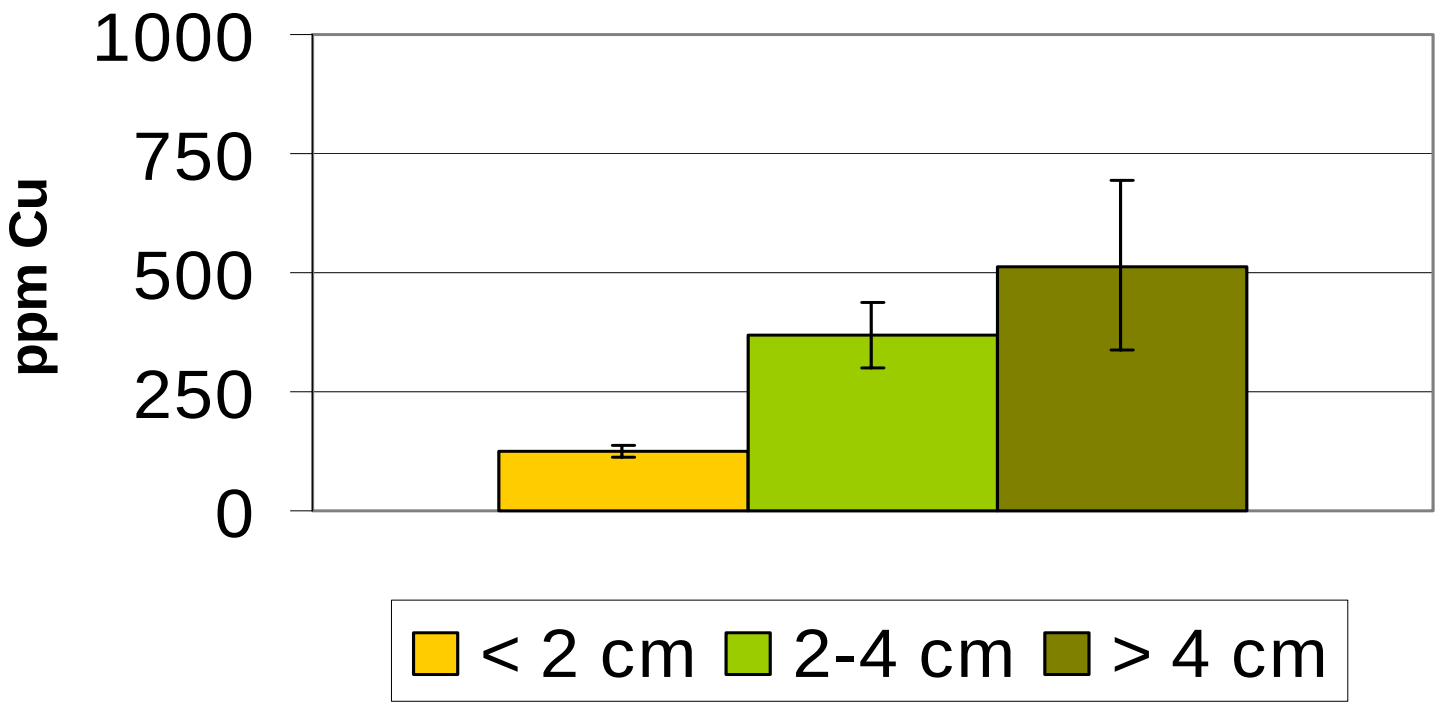


% in wood after remediation

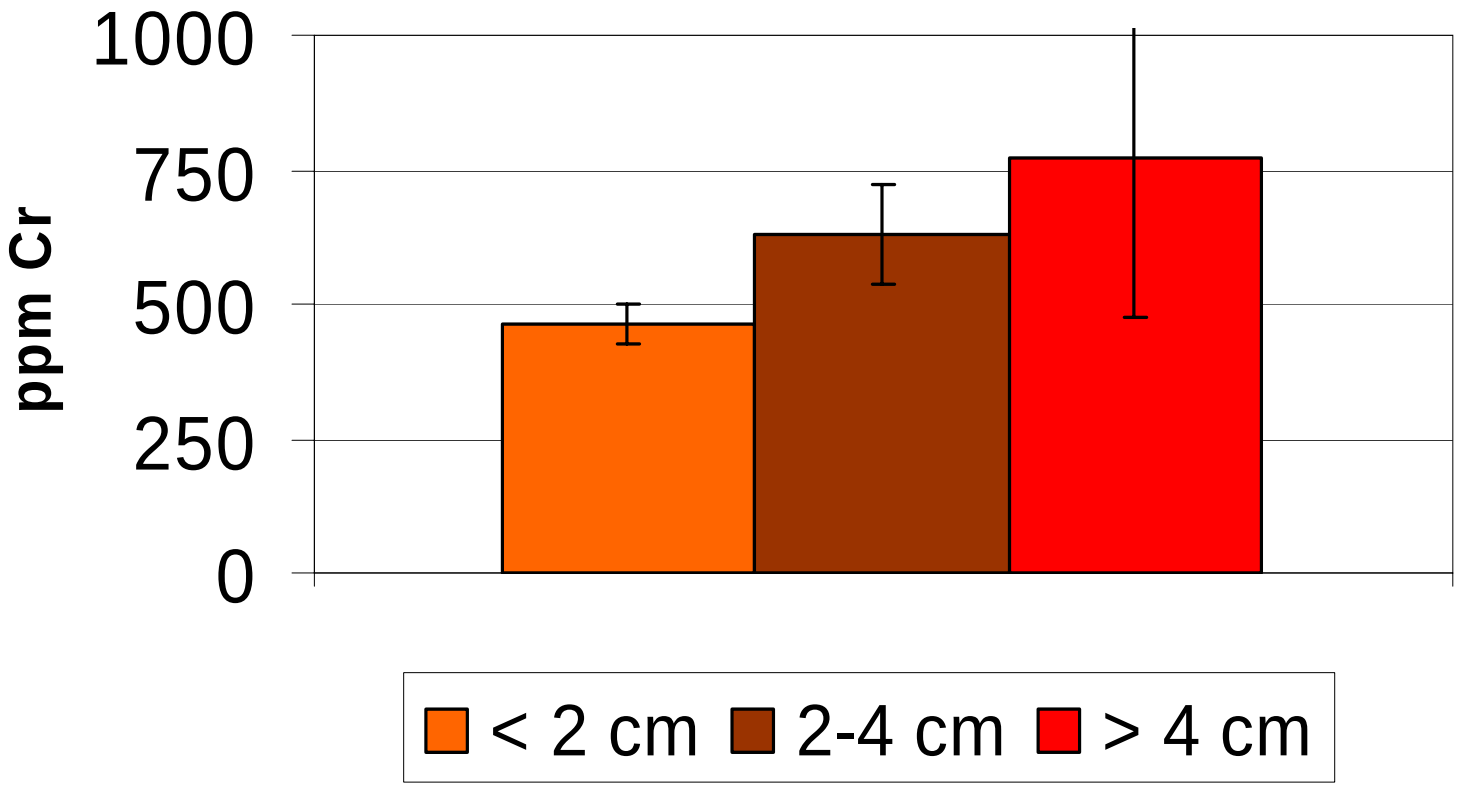
Wood Chips

- 10 m^3
- Chromazurol S used for identification (Cu)
- Chipped and sorted
  - 0 – 2 cm (F)
  - 2 – 4 cm (M)
  - > 4 cm (L)
- Wood placed in nets.

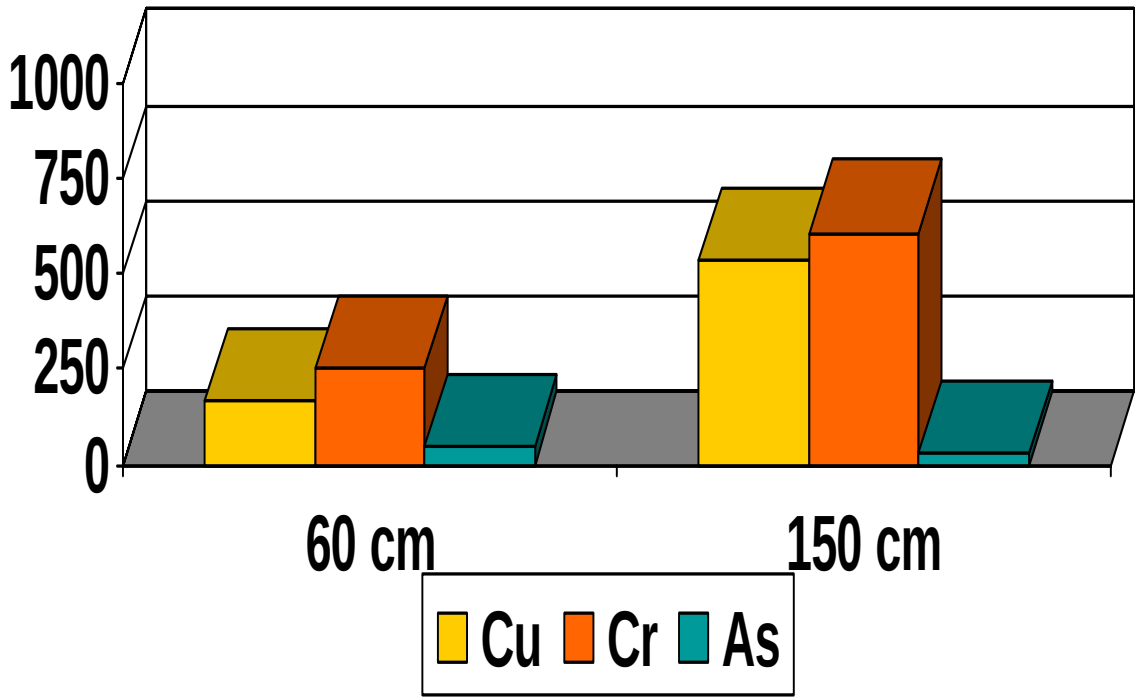
Wood Chips
[Cu] ± 95% CL



Wood Chips
[Cr] ± 95% CL



Electrode Distance



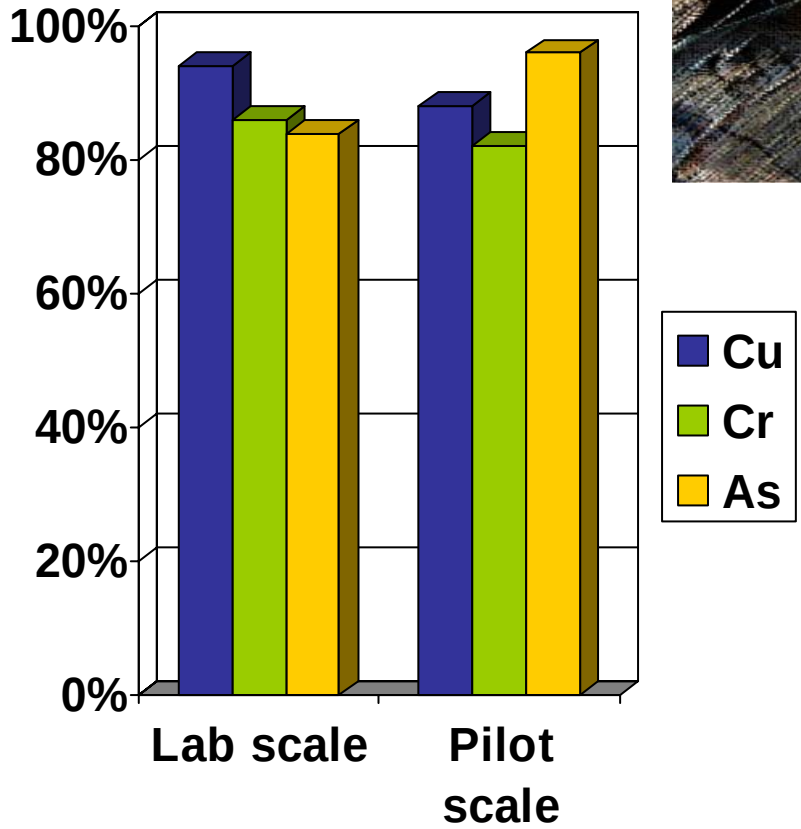
% in wood after remediation

Experimental parameters

- Collecting units
  - ✓Enhances the remediation
- Size fraction
  - ✓Smaller fractions easier remediated
- Soaking
  - ✓Dual soaking most efficient
- Electrode distance
  - ✓Remediation decreases with electrode distance ?
    - Further research necessary

Best Pilot Scale Results

- Electrode distance
  - 60 cm
- Soaking
  - H_3PO_4, Oxalic acid
- Remediation
  - $NaNO_3$ as electrolytes
  - Water in middle compartment
- 2-5 A, 30-58 V
- 21 days



Acknowledgement

LIFE project
- Supported by the EU LIFE programm

Project partners

- Osmose, Denmark
- RGS90, Denmark
- Faculdade De Ciencias E Tecnologia/UNL, Portugal